

FOREIGN POLICY AND NATIONAL SECURITY IMPLICATIONS OF OIL DEPENDENCE

HEARING BEFORE THE COMMITTEE ON FOREIGN AFFAIRS HOUSE OF REPRESENTATIVES

ONE HUNDRED TENTH CONGRESS

FIRST SESSION

MARCH 22, 2007

Serial No. 110-33

Printed for the use of the Committee on Foreign Affairs



Available via the World Wide Web: <http://www.foreignaffairs.house.gov/>

U.S. GOVERNMENT PRINTING OFFICE

34-241PDF

WASHINGTON : 2007

For sale by the Superintendent of Documents, U.S. Government Printing Office
Internet: bookstore.gpo.gov Phone: toll free (866) 512-1800; DC area (202) 512-1800
Fax: (202) 512-2250 Mail: Stop SSOP, Washington, DC 20402-0001

COMMITTEE ON FOREIGN AFFAIRS

TOM LANTOS, California, *Chairman*

HOWARD L. BERMAN, California	ILEANA ROS-LEHTINEN, Florida
GARY L. ACKERMAN, New York	CHRISTOPHER H. SMITH, New Jersey
ENI F.H. FALEOMAVAEGA, American Samoa	DAN BURTON, Indiana
DONALD M. PAYNE, New Jersey	ELTON GALLEGLY, California
BRAD SHERMAN, California	DANA ROHRABACHER, California
ROBERT WEXLER, Florida	DONALD A. MANZULLO, Illinois
ELIOT L. ENGEL, New York	EDWARD R. ROYCE, California
BILL DELAHUNT, Massachusetts	STEVE CHABOT, Ohio
GREGORY W. MEEKS, New York	THOMAS G. TANCREDI, Colorado
DIANE E. WATSON, California	RON PAUL, Texas
ADAM SMITH, Washington	JEFF FLAKE, Arizona
RUSS CARNAHAN, Missouri	JO ANN DAVIS, Virginia
JOHN S. TANNER, Tennessee	MIKE PENCE, Indiana
LYNN C. WOOLSEY, California	THADDEUS G. MCCOTTER, Michigan
SHEILA JACKSON LEE, Texas	JOE WILSON, South Carolina
RUBÉN HINOJOSA, Texas	JOHN BOOZMAN, Arkansas
DAVID WU, Oregon	J. GRESHAM BARRETT, South Carolina
BRAD MILLER, North Carolina	CONNIE MACK, Florida
LINDA T. SANCHEZ, California	JEFF FORTENBERRY, Nebraska
DAVID SCOTT, Georgia	MICHAEL T. McCAUL, Texas
JIM COSTA, California	TED POE, Texas
ALBIO SIRE, New Jersey	BOB INGLIS, South Carolina
GABRIELLE GIFFORDS, Arizona	LUIS G. FORTUÑO, Puerto Rico
RON KLEIN, Florida	
VACANT	
VACANT	

ROBERT R. KING, *Staff Director*
YLEEM POBLETE, *Republican Staff Director*
MANPREET ANAND, *Professional Staff Member*
GENELL BROWN, *Staff Associate*

CONTENTS

	Page
WITNESSES	
The Honorable John M. Deutch, Professor, Massachusetts Institute of Technology (Former Director, Central Intelligence Agency)	13
Daniel Yergin, Ph.D., Chairman, Cambridge Energy Research Associates, Inc.	20
Ariel Cohen, Ph.D., Senior Research Fellow, The Heritage Foundation	29
LETTERS, STATEMENTS, ETC., SUBMITTED FOR THE HEARING	
The Honorable Ileana Ros-Lehtinen, a Representative in Congress from the State of Florida: Statement by the Embassy of Canada	6
The Honorable John M. Deutch: Prepared statement	17
Daniel Yergin, Ph.D.: Prepared statement	22
Ariel Cohen, Ph.D.: Prepared statement	32

FOREIGN POLICY AND NATIONAL SECURITY IMPLICATIONS OF OIL DEPENDENCE

THURSDAY, MARCH 22, 2007

HOUSE OF REPRESENTATIVES,
COMMITTEE ON FOREIGN AFFAIRS,
Washington, DC.

The committee met, pursuant to notice, at 10:04 a.m. in room 2172, Rayburn House Office Building, Hon. Tom Lantos (chairman of the committee) presiding.

Chairman LANTOS. The committee will come to order. The United States is gorging itself on oil from overseas, a diet that is both unsustainable and unhealthy, and it seriously weakens our Nation.

With 5 percent of the world's population, we are using fully one-quarter of the oil consumed on this planet. Worse yet, the bulk of the stuff is under the soil of hostile or despotic states, and to get hold of it we are making compromises that undermine our foreign policy.

Anyway you slice global oil production along political lines, the picture is bleak. The nonprofit, nonpartisan NGO Freedom House reports that over half of the world's oil rich countries are not democratic.

Six of the top 10 oil exporting countries to the United States rank at the bottom third of the world's list of most corrupt countries according to Transparency International, and more than 70 percent of the global oil reserves are controlled by countries with which the United States has tenuous and troubled relations such as Venezuela, Russia, and Saudi Arabia.

These are the people we cut deals with to satisfy our thirst for oil. Our insatiable quest for more and more of it has got to come to an end. It is a matter of not only financial stability and environmental imperative, but it also goes to the core of our national security policy.

Take, for instance, our ties with Saudi Arabia. If it were not for United States intervention in 1991, the House of Saud would be nothing more than a villa on the Riviera by now, and because of its petroleum wealth it continues to enjoy unwarranted indulgence where U.S. interests are concerned.

Blessed with the world's largest proven oil reserves and riding on a close relationship between Washington and Riyadh going back some 60 years, Saudi Arabia received a free pass when it was identified as the home of 15 out of the 19 hijackers on 9/11, and it has bristled at subsequent suggestions by the United States that it has taken inadequate action against the private financing of terrorist activity within its borders. But, since a steady supply of oil and a

stable regime of whatever nature in Riyadh are key to our country's actions in the Middle East, our Government does next to nothing to pursue these matters.

Consider too the latitude we grant to Russia, the second largest oil producer after Saudi Arabia, with increasing amounts of that output coming to the United States. The administration talks a great game about spreading democracy and promoting human rights abroad, yet refuses to pressure Moscow to reverse its brutal crackdown on political dissent.

Is it because we have a financial stake in the reliability of the Russian oil supply and its guarantee by the state? As long as Russia uses its energy sector as a foreign policy instrument, it will continue to enjoy the upper hand.

It is important to note that even if the United States completely switched to some other energy source tomorrow and no longer imported a drop of oil we would remain vulnerable to oil-related disruptions in the rest of the world. This is because other countries, large and small, are also hooked on petroleum.

China is the second largest consumer of oil after the United States, and its oil consumption is expected to increase from 8 percent of world demand today to 13 percent by the year 2030. To feed its growing energy needs, China scours the globe for sources of oil and has come to rely increasingly on supplies from Africa, including Sudan. Is it any wonder that China has been a stubborn impediment to international efforts to pressure Khartoum into bringing its genocide in Darfur to an end?

Similarly, as we seek to galvanize international public opinion and to mobilize diplomacy to put an end to Iran's quest for nuclear arms, we are once again handicapped by the world's dependence on oil. Iran continues to cut lucrative deals with other countries involving its energy sector, which directly benefits Tehran's quest for nuclear weapons.

It is able to do so because the European Union and others are reluctant to compromise their steady oil supply in favor of international nonproliferation goals. They are willing to flirt with the threat of nuclear disaster to keep the oil flowing.

Creating viable and renewable energy alternatives to oil is clearly a matter not only of U.S. foreign policy interest, but also a matter of global security.

Unfortunately, it took 5 years for the current administration suddenly to wake up to the fact that the United States is addicted to oil, as President Bush announced last year. A new office to coordinate international energy priorities was only just created. I am glad that the administration finally has acknowledged our energy insecurity, but the rhetoric must be followed by decisive action.

We need to continue to press for higher CAFE standards so that the vast majority of vehicles in the United States will be more fuel efficient. We have to put real resources into research and development of alternative fuel sources with the aim to replace petroleum altogether. We must immediately step up national efforts at energy conservation, which is an immediate and effective way to wean ourselves away from oil and gas.

It is clear that the United States cannot be completely energy independent, but the goal of reducing our energy dependence is

within our reach, and stabilizing the supply of energy is and should remain a key component of United States national security. Our energy and foreign policies are inextricably bound.

I am now delighted to turn to my friend and colleague from Florida, the ranking member of the Foreign Affairs Committee, Ms. Ileana Ros-Lehtinen.

Ms. ROS-LEHTINEN. Thank you so much, Mr. Chairman. Thank you for yielding me the time.

As the title of this hearing highlights, energy independence and reducing demand for oil and gasoline is not just an environmental problem, but a national security issue. A critical development regarding this most important of resources is that it is being leveraged by enemies of the United States and the west in general as a weapon to undermine our foreign policy efforts overseas.

Another critical problem regarding our dependence on foreign oil sources is not economic or technological, but political. This natural resource is concentrated in regions such as the Persian Gulf that are characterized by enduring instability and in countries such as Iran and Venezuela that are actively anti-United States.

The lure of riches from oil has focused the attention of countries around the world on exporting as much of it as they can find and develop. Russia and Kazakhstan, to only name a few, are rapidly expanding production. With vast resources and untapped reserves, these countries are planning for massive increases in output and sales on the world market.

Russia is already the world's second largest producer after Saudi Arabia and has only begun to tap its enormous potential. Already it is using its rapidly increasing output of oil and gas to exert political pressure on its neighbors; not merely on countries such as Ukraine and Georgia, but instead on all of Europe, which is becoming increasingly dependent on Russian energy.

Other potential sources of oil pose challenging problems. Finding and extracting the oil are only the first hurdles. Getting the oil to market is a major challenge in itself not only technologically, but strategically. Here again foreign leaders seek to destroy free access to the market by securing monopoly control over other countries' exports, be that by pipeline, by ship or other means.

Our interests call for creating as many options as possible in order to reduce the ability of any enemy to choke off our supply. To address this problem, the United States and other countries have invested considerable resources in constructing oil and gas pipelines through Turkey, for example, as part of a larger effort to reduce the world's dependence on Russia's unreliable cooperation even as we encourage that country to increase its own production.

A far greater strategic problem is the Middle East where two-thirds of the world's oil reserves are concentrated. The most vulnerable location of all is the Strait of Hormuz through which a significant percentage of the world's oil supply moves. The strait itself is a narrow choke point where a danger of collision from the high ship traffic alone is a major source of concern.

But the greatest threat is from Iran, which has made clear its intention to assert a commanding role over the entire Persian Gulf. The threat is not hypothetical. Iran's so-called Supreme Leader has

warned that his country would disrupt the world's oil supply if it is attacked.

As a result of Iran's growing power, just today it is being reported that other Gulf States are considering a series of options for oil pipelines to bypass the Iran dominated strait. A report by the Dubai-based Gulf Research Center has proposed six options for a trans Gulf pipeline. This project will give a new boost to the stability of oil says the security analyst at the Gulf Research Center.

One option called for a 2,500 kilometer pipeline that would move through Kuwait, Saudi Arabia and the United Arab Emirates to the Omani capital of Muscat on the Arabian Sea. Another proposal would end in Yemen. The study noted that any overland pipeline must be protected from insurgency attack.

Given that the U.S. oil supply is inseparable from that of the world as a whole, we need a global strategy. However, securing global cooperation is not an easy feat. After all, for years we have been trying to convince our allies to do the right thing and to stop investing in Iran's energy sector and deny the regime the financial resources to engage in its threatening activities.

Instead, what we have seen is a rush to provide Iran an economic lifeline by increasing investments in Iran's energy sector and doing whatever is necessary to generate a profit. Just today we see reports that the head of France's oil group, Total, is being held in custody over suspected corruption and bribery to gain a gas contract in Iran in 1997.

The pursuit of Iranian oil and gas by western European, Asian and Russian entities does not stop there. Foreign governments' export credit agencies are subsidizing many of these investments in Iran. To address this loophole, I introduced H.R. 957, the Iran Sanctions Amendments. This bill was overwhelmingly adopted by our committee on February 15. However, we understand that due to objections from the Democrat Majority of other committees the report has not yet been filed.

This is of grave concern to me, Mr. Chairman. I would like to highlight that the language in H.R. 957 was adopted by the full House last year as part of my Iran Freedom Support Act co-sponsored by our chairman, Chairman Lantos, and over 360 other Members of the House.

All of the other committees of jurisdiction discharged the legislation so that it could move quickly to the Floor. In the end, the language was not included in the version that became law due to other provisions taking precedence. It is my hope that this noncontroversial Iran bill, H.R. 957, and my Iran divestiture bill, H.R. 1357, will be moved expeditiously to the Floor.

Our focus today is on oil, but I want to take this opportunity to highlight an emerging threat to the global supply of natural gas that the U.S. must take action to stop, namely the creation of an OPEC for natural gas.

Through its artificial scarcities and efforts to destroy any semblance of a free market in oil, OPEC has done nothing but harm to the world. Now there are troubling efforts by Russia and other major producers such as Iran to set up a similar cartel for natural gas. It must be a priority for the United States to stop this in its

track if we are to prevent yet another permanent threat to arise to the world's energy supplies.

Let me end my remarks, Mr. Chairman, by saying that we can talk about solutions to our problems that may be decades away, but we must focus our efforts on practical objectives that can be accomplished in the here and now.

I would ask the chairman if I could enter a statement by Canada, the Embassy of Canada, on the issue of foreign policy and natural security implications of oil dependence for the record.

Chairman LANTOS. Without objection.

Ms. ROS-LEHTINEN. Thank you, Mr. Chairman.

[Some of the information referred to follows. The presentation pages that accompanied the statement, however, are not reprinted here but are available in committee records.]



Government of Alberta Office
Washington, DC

March 21, 2007

The Honorable Ileana Ros-Lehtinen
U.S. House of Representatives
2160 Rayburn House Office Building
Washington, DC 20515-0918

Dear Representative Ros-Lehtinen,

Tomorrow's hearing on **Foreign Policy and National Security Implications of Oil Dependence** is a topic of great importance to Alberta. We view continental energy security as key area of discussion for both of our jurisdictions and hope to continue an open dialogue on this topic.

Canada is home to the world's second largest oil reserves and has been the #1 supplier of crude oil to the USA for six consecutive years, chiefly due to growing production from Alberta's oil sands. Canada is also the largest provider of natural gas to the USA, with the lion's share provided by the province of Alberta. In fact, Alberta alone supplies the US with 12% of its total natural gas consumption, lighting-up 1 out of every 7 American homes.

As the United States' most stable and secure supplier of energy, Alberta is poised at the hub of what will be the largest energy corridor in history – running from the Alaska and Canadian Arctic, down the spine of the Rocky Mountains and to the US Gulf Coast. The Alberta hub will supply North America's integrated energy market with enough energy to fuel the North America's economy for the next 100 years. Alberta's oil sands will play a major role as they triple in output over the next decade to over 3 million barrels of production per day, with much of this new supply destined for the US market.



Embassy of Canada
501 Pennsylvania Avenue, NW
Washington, DC 20001
Telephone: (202) 448-6475 Fax: (202) 448-6477
albertainwashington@canadianembassy.org



Government of Alberta Office
Washington, DC

In addition to our massive hydrocarbon resources, Alberta continues to be a leader in establishing and enforcing environmental standards. We were the first, and only, Canadian province to legislate greenhouse gas reductions. We are also Canada's largest producer of wind power and are investing in technology and infrastructure and capture, transport and permanently store carbon dioxide emissions from oil sands development. These initiatives are in addition to already strict guidelines for energy development, including a requirement for complete site remediation for oil sands leases.

As former Minister of Energy for Alberta and the province's Official Representative to the United States, I would be pleased to meet with House Foreign Affairs Committee members or staffers, or to testify before the Committee, regarding the vital role Alberta plays in North American energy security.

Attached is a recent presentation that provides an overview of the role Alberta plays in the North American market. I look forward to future discussions on this topic.

Sincerely,

A handwritten signature in cursive script, reading "Murray Smith".

Murray Smith
Minister-Counsellor



Embassy of Canada
501 Pennsylvania Avenue, NW
Washington, DC 20001
Telephone: (202) 448-6475 Fax: (202) 448-6477
albertainwashington@canadianembassy.org

Ms. ROS-LEHTINEN. I have to go to another previously scheduled meeting, but I will be back for the questioning period.

Chairman LANTOS. We look forward to having you.

Ms. ROS-LEHTINEN. Thank you.

Chairman LANTOS. I would be delighted to give all of my colleagues 1 minute for opening statements. We will begin with Ambassador Watson.

Ms. WATSON. Thank you, Mr. Chairman.

As the President has acknowledged and you have repeated today, America is addicted to oil. Like any addict, when we are under the influence we tend to do some pretty crazy things.

While under the influence, we invaded a country halfway around the world that posed no direct threat to U.S. territories and citizens. While under the influence, we have propped up intolerant and despotic regimes that abuse their own people and thus foster the hateful ideology of groups like al-Qaeda.

While under the influence, we have given those same despots a virtual veto over United States policies in the Middle East and have put our ally, Israel, at risk. While under the influence, we continue down a path of development that is ultimately unsustainable as it depends on the finite resource of fossil fuel deposits and that through global warming threatens to make our planet less hospitable to human life.

Mr. Chairman, America needs to drop this habit. I want to work with you and the rest of our colleagues to lead the intervention. We have the technology today to ensure that we consume a lower volume of fossil fuels. We need to invest more in supporting renewables, but we also need to ask every American to join us in this effort to reduce energy consumption.

America has faced challenges like this before, and we have always succeeded, but only after we acknowledge both the true scale of the problem and what sacrifices we need to make to find victory. I think the President has led us down a path that takes us dubiously somewhere, but it is up to us to really mark the rest of the way.

I am looking forward to the testimony, Mr. Chairman, and thank you very much.

Chairman LANTOS. Thank you.

Congressman Burton.

Mr. BURTON. Thank you, Mr. Chairman.

We have been fighting this energy battle since the Carter administration when we had gasoline lines that went for blocks and blocks and block. There are a lot of Presidents that could have done more and should have done more, but this President has suggested that we drill in the ANWR in an environmentally safe way where we could get at least 1 million barrels of oil a day and probably more.

Your Majority, Mr. Chairman, has stopped us dead in our tracks. This administration has also talked about drilling offshore in an environmentally safe way, but we have been stopped dead in our tracks by the Democrat Majority.

Mr. Chairman, right off the coast of Cuba China is going to be drilling for oil, and yet we can't drill off the coast of Florida in approximately the same area, so China is getting the benefit of it

while Americans continue to say we need more oil and we can't get it. We really need to think about environmental problems, but also energy that we can get in an environmentally safe way right here in the United States.

Finally, we have hundreds of years, I have been told, of supply of natural gas in the ground if we could just go after it. Once again the environmental extremists have stopped us through the Democrat Majority in this Congress from being able to do that. We should be energy independent. We can move rapidly in that direction if we could just get the Majority in this Congress to start being realistic.

I still love you, Mr. Chairman. Thank you very much.

Chairman LANTOS. I appreciate that, Mr. Burton.

The gentleman from Georgia, Mr. Scott.

Mr. SCOTT. Thank you very much, Mr. Chairman. This is indeed a very important and essential hearing.

Let me start off by saying we did not leave the Stone Age because we ran out of stone, nor will we leave the Oil Age because we have run out of oil. What will happen first is we will run out of civilization.

If we continue to premise our energy policy on not only a dwindling nonrepetitive resource like oil, but a very destructive element such as oil, civilization will not last. Oil will be here and mankind will be gone simply because if we continue with our predominance of our energy needs on oil the heeding impact, the carbon dioxides that are put into the air, scientist after scientist have told us the earth will not survive as long as we have this overdependence on oil as our energy. Civilization will not be around. That is how profound this is.

It is beyond the Middle East now. It is beyond all of that. It is with our collective will to look beyond oil and to understand that our future does not rest in drilling into the earth, but being able to use the bountiful crops, the alternative means of energy that do not damage this earth, do not damage the atmosphere, but provide for a way such as cellulosic and granular ethanol, such as using hydrogen, such as using those kinds of clean, renewable energies that will not only fulfill our energy needs, but will allow us to maintain the flow of human life on this planet for which all dependency will destroy.

Chairman LANTOS. Thank you.

Mr. Royce of California.

Mr. ROYCE. Thank you, Mr. Chairman.

Maybe some of our witnesses might want to comment on this theme or this idea, but over the years I have been very interested in diversifying our sources of energy, and what I have tried to do is promote the concept of Africa's emergence as a major supplier for the United States. In 10 years, one-quarter of our oil imports are expected to come from Africa into our markets here. You know, at that point in time we might be seeing from North Africa and West Africa as much oil as we do from the Persian Gulf.

If African countries are going to reach their energy potential and if Africans are going to benefit from their resources, it is important that we be doing what we need to do right now to promote transparency in Africa in that regard. This will be increasingly difficult

because I believe that the business practices that China is bringing to Africa right now is corroding or undermining the goal of transparency in this regard in oil. Those business practices need to be improved.

Terrorism is the other big concern that I have in terms of the impact it is going to have. The terror premium is already factored into the price of a barrel of oil. We have taken steps to improve security at home, but a successful attack on energy oil infrastructure abroad either in Africa or the Middle East would really hurt us.

Given the integrated energy markets and the tightness of supply, I think we can readily see what that impact would be, so we should be doing more to lessen that risk abroad, and I would like to see some comments on that point as well.

Thank you again, Mr. Chairman.

Chairman LANTOS. Thank you very much.

Before recognizing my next colleague, I want to recognize the most distinguished former Member of Congress who is in the audience from the state of Texas, Mr. Martin Frost.

Martin, we are delighted to have you. You have done so much to make this institution a substantive and viable body, and we are delighted to have you back.

I am pleased to call on my friend from Arizona, Congresswoman Giffords.

Ms. GIFFORDS. Thank you, Mr. Chairman. I appreciate you holding a hearing on such an important topic. Reducing our dependency on foreign oil is not only sound energy policy, but will help strengthen the long-term national security and economic vitality of our Nation as well.

The statistics are truly staggering if you take the time to look at them. The United States is only 5 percent of the global population, yet currently we use 25 percent of the world's oil. We rely on foreign sources for about 65 percent of that amount.

When you look at China, you look at India, you look at these other populations and how they are transforming their demand for oil coupled with our demand for oil, it is truly a crisis waiting to happen.

Another statistic which is important is that we currently sit on only 3 percent of the entire oil reserves. The Persian Gulf has approximately two-thirds of the world's reserves. We simply cannot drill our way out of this problem.

For the 5 years leading up to the war in Iraq, the United States spent over \$5 billion per year that went to Saddam Hussein to pay for Iraqi oil. The international oil market continues to funnel money to countries that are hostile to the United States such as Iran and Venezuela.

Ending our addiction on foreign oil, investing in renewable energy and achieving true energy independence, I believe, is the Apollo mission of the future. When you look through the past history of time, those civilizations that have been innovative, those that have developed new technologies, have been the civilizations that have led. We need to lead today, Mr. Chairman.

I could speak at length about something that comes from my home state of Arizona. If we use less than one quarter of 1 percent

of the land in my state that could be converted over to solar generation, that could supply all of the state's electricity needs. It is pretty important to look at that, at the possibilities that we have just in my home state of Arizona.

Yesterday, former Vice President Al Gore spoke about changing the CAFE standards and embracing hybrid technology. President Bush recently stated a goal of producing 35 billion gallons of renewable and alternative fuels by 2017. These are goals that are achievable, and this new Congress has the opportunity to do that.

Again, Mr. Chairman, I just appreciate you bringing the attention today to this important topic. This truly is our future, and I just appreciate the opportunity. Thank you.

Chairman LANTOS. Thank you very much.

Mr. Tancredo I understand passes. Mr. Fortenberry.

Mr. FORTENBERRY. Thank you, Mr. Chairman. Just very briefly, I am very grateful to you for your willingness to hold a hearing on this topic.

This is one of the most important questions of our day as to how do we untangle foreign policy considerations from our overdependence on foreign oil. Since a few members have touted some of their home state's initiatives in this regard particularly in terms of rural renewable energy, I should mention a couple of projects as well.

I think that as a nation we need to begin to write a new book on energy policy that began several years ago with the new energy act. Back in Nebraska we have several just magnificent projects that are leading the way in helping to answer these fundamental questions.

One is a cattle feedlot. The manure is captured, turned through a patented process methane, which is then used to fire an ethanol plant that distills a grain byproduct from the ethanol plant. The corn that went into the plant is then fed back to the cattle. This closed-loop energy system moves the energy output to input equation to five to one versus a traditional ethanol plant using grain-based sources, which is less than two to one.

This is again a small chapter in the overall energy portfolio for our Nation, but it is one of the answers that we have to aggressively develop because there are such severe foreign policy implications in our overutilization of foreign oil.

Thank you, Mr. Chairman.

Chairman LANTOS. Thank you very much.

Mr. Klein.

Mr. KLEIN. Thank you, Mr. Chairman. I again appreciate your bringing this forth.

This is something those of us as new members who just ran campaigns back in our districts probably heard more on this issue than any other because it relates to our foreign policy, it relates to a new economy of jobs and it relates to the environment. You can go anywhere around the United States, and one of those elements will be at the top of people's minds and their list.

I also believe very much so in what many of the members have said today. The United States has always led in innovation, and this is truly an opportunity for this century to be our Manhattan Project or the Apollo Project, as Ms. Giffords said.

Whether it is solar, wave, wind, ethanol, any one of the combinations, the competitive market should have a lot to do with that, but the United States Government, along with the private sector, needs to work together on this.

Specifically, the gentlemen, as you are speaking today, can also comment on Venezuela. Venezuela obviously supplies currently about 11 to 13 percent of our petroleum on a daily basis, and because of the view that Mr. Chavez may be certainly an unreliable partner in the supply of oil to the United States, what impact may there be in the near term and the long term in terms of Mr. Chavez cutting off, reducing some of the oil exports that come to the United States, his newfound relationship with Ahmadinejad of Iran and the collaboration that may come to pass with their views and their relations or lack of relations with the United States? What implications does this have in the supply of oil to the United States?

Thank you, Mr. Chairman.

Chairman LANTOS. Thank you very much.

The gentleman from New Jersey, Mr. Sires.

Mr. SIRES. Thank you, Mr. Chairman. I will be very brief. I want to thank you for holding this hearing. It seems like every hearing, one is more important than the next, but this is certainly very important.

I just want to when you get a chance comment on China's involvement off Florida. How is that going to impact the world?

Thank you very much.

Chairman LANTOS. Thank you.

Finally, our colleague from New York, Mr. Engel.

Mr. ENGEL. Thank you, Mr. Chairman. I am delighted of course to serve on this committee. My other committee is Energy and Commerce, and I am one of the founders of the Oil and National Security Caucus because I believe that the problem we have with oil is very important to our national security.

We are funding both sides of the war on terror. We are fighting terrorism, and yet we are adding money to the coffers of people in countries like Saudi Arabia that are trying to use terrorism to further their ends. I agree with what the President has said in two consecutive States of the Union addresses about weaning us off of Middle Eastern oil and oil in general, but we need action, not just words.

Global demand is soaring, and much of the revenue is flowing into the coffers of governments like Iran, Saudi Arabia, Russia and Venezuela. Since I am chair of the Western Hemisphere Subcommittee I am concerned about Venezuela, and these countries' intentions are questionable, if not outright dangerous.

I want to also mention that I am the sponsor of the bipartisan DRIVE Act, along with Congressman Kingston. It is bipartisan legislation which if passed today would in the very near term create the incentive to reduce our oil dependence. Many of our colleagues on this committee have already added their names as co-sponsors, and I urge all to join this important effort.

I look forward to the testimony, and I thank you, Mr. Chairman, for holding this hearing.

Chairman LANTOS. Thank you very much.

Today we have an extraordinarily expert and distinguished panel. First we will hear from John Deutch, who is currently serving as a professor at the Massachusetts Institute of Technology. He served as director of our Central Intelligence Agency and in a number of critical positions in both the Department of Energy and the Department of Defense.

Recently he co-chaired an independent task force on energy and U.S. policy for the Council on Foreign Relations. His insights will be invaluable to this committee, having studied this topic both within and outside the administration.

Next we will hear from Dr. Daniel Yergin, chairman of Cambridge Energy Research Associates. A scholar and a Pulitzer Prize winner, Dr. Yergin is a highly respected authority on international energy policy serving as a global energy analyst for government bodies, public policy institutions and media. I look forward to your frank assessment, Dr. Yergin.

Finally, we are delighted to have Dr. Ariel Cohen, who serves as a senior fellow at The Heritage Foundation, who will offer his perspective, drawing upon his deep experience in the field of international energy security. He is a noted author, and I appreciate his participation in our program.

We will begin with you, Professor Deutch.

STATEMENT OF THE HONORABLE JOHN M. DEUTCH, PROFESSOR, MASSACHUSETTS INSTITUTE OF TECHNOLOGY (FORMER DIRECTOR, CENTRAL INTELLIGENCE AGENCY)

Mr. DEUTCH. Thank you very much, Mr. Chairman. I am very pleased to be here today to speak with you about the national security and foreign policy implications of oil import dependence.

I want to briefly speak to you about the realities of this dependence, myths about what can be done to get rid of it and the third, the promise of future benefits for Americans if we take needed action today.

The views I express are my own, but, as the chairman mentioned, I was co-chair with Jim Schlesinger of the Council on Foreign Relations Task Force on the National Security Consequence of U.S. Oil Dependence, and it has shaped my views.

Let me begin with the realities. The first and most important reality is that we should expect for at least the next two decades the United States to continue to consume greater amounts of petroleum and to remain dependent on imported oil, much of it from the politically fragile and unfriendly states of the Middle East.

The second reality is that we will not run out of oil, but that the real price of petroleum on average should be expected to increase for the consumers in this country. This is because we are running out of low-cost supplies of oil, and we need to turn to progressively more costly sources first from deep offshore regions and remote regions of the world, then from tar sands, from shale and from synthetic liquids from coal.

This dependence is not new. It has been growing at a steady pace since I joined the Department of Energy when it was formed in 1976. The United States has been unwilling to adopt and sustain policy measures that would reduce this dependence.

This oil dependence has extremely important national security costs, and almost every one of the members of the committee have mentioned one or another aspect of it. I want to just simply cite three examples.

The first is Iran. Clearly the fact that Iran is providing 2.5 million barrels of oil per day to world oil markets means that that oil dependence has to be taken into account as we consider the other important foreign policy objectives we have with respect to Iran, principally and foremost to keep them from acquiring a nuclear weapon and, secondly to stop them from fiddling around in Iraq.

So the fact that we and our allies and our closest partners are dependent on oil imports means that we must compromise our foreign policy objectives, and that is a very bad thing for our country.

Russia. Russia has made it clear that its intent is to use its oil and gas reserves to promote its global interests. It does so in its exports of natural gas to Western Europe and Eastern Europe. It does so in the placing of its new pipelines in the Central Asian region and pipelines which will be going east to China and to Japan.

Venezuela. Congressman Klein mentioned Venezuela. Quite properly the case, Chavez's oil revenues permits Chavez to pursue domestic policies and foreign policies in South America which are not in the democratic tradition of that country and not in interest of the United States.

There are four new elements that I want to draw your attention to that I believe make this oil dependence a more serious security issue. The first is the increasing demand from the rapidly emerging economies such as China and India. They are now projected to become the central new consumers of oil in world oil markets. They are making extensive efforts in Africa, elsewhere in the world, Cuba, to lock up oil supplies in that area.

The second trend is a move from the role of international oil companies such as Exxon Mobil or Chevron to national oil companies that represent the interests of the major resource holding states. When I joined the Department of Energy in 1977, about 15 or 20 percent of the reserves and production of oil in the world were in the hands of national oil companies. The remainder were in the hands of international private corporations.

Today that percentage is about reversed and national oil companies pursue their interests in production and production arrangements, which of course fulfill and advance the political ambitions of their countries.

The consequence of this rapid growth in demand for energy from emerging economies and from the increasing control of the national oil companies has been a growth in state-to-state arrangements where there are arrangements between producers and these new consumers which are not arrived at in commercial terms, but include political and other aspects which influence the relationship—military assistance, economic assistance, trade concessions.

The purpose of these concessions is to establish a new political relationship between the producing countries and the new importing countries that will secure advantageous access to resources on the one hand and political advantage on the other.

The role of India and China are especially aggressive in this new state-to-state trend, and China's activities both in the Sudan and

in Angola illustrate the nature of having great concern about the rise in a set of arrangements that move us away from transparent international oil markets where oil is allocated on the basis of prices openly arrived at.

Finally I note, as have others on the committee here this morning, that oil is being produced in progressively more remote parts of the world. The security of the energy infrastructure is becoming progressively in doubt. Oil facilities, pipelines, control systems for the energy distribution system are all very much more vulnerable to terrorist attack and to national disaster. These are the four elements that are different in our import dependence.

I also note, as has been mentioned earlier, that with the situation with respect to natural gas, while nowhere near as precarious as oil because it is much lower and we are almost self-sufficient in North America, natural gas promises to grow in this direction as well.

Next let me mention briefly some myths. These are myths which I do not think help us on balance to move forward on dealing with this very urgent problem. Here are some of the myths that I hear:

That the United States can be energy independent; that reducing oil imports will reduce the price of gasoline and other oil products for the consumer; that international oil companies control the price of oil; that there is plenty of low-cost oil to be tapped;

That the world will run out of oil at some future date certain; that a Manhattan or Apollo space-like project is necessary and sufficient to acquire new technology that will replace fossil fuel; that there is a single technical pathway, whether it is solar or nuclear or hydrogen—you take your pick—that will solve this oil dependence problem.

We have to move forward on a number of fronts. Let me briefly just mention to the committee some measures that I think the nation should take which will help dampen the adverse effects of this oil dependence and will eventually help us make a transition to a post petroleum economy.

First, with respect to some specific foreign policy measures, the large emerging developing economies, notably China and India, should be today included in the International Energy Agency. That will permit these countries to see themselves as part of a community of large, oil consuming nations such as the United States, other OECD members, and it will draw them into understanding their common interests in open and transparent markets as consumers.

It will also help for them to become part of the planning process for what happens if there is a supply disruption and what should be the level and operation of our strategic petroleum reserves around the world.

Second, we should encourage countries to move their internal domestic prices toward world oil prices, so as not to subsidize petroleum use. This is important for the large emerging economies such as China and India, and as I will turn to momentarily for the United States as well.

Third, we must recognize that our foreign policy must seek to maintain political stability in the Persian Gulf region.

Fourth, U.S. trade, diplomacy, economic assistance and technology transfer should be aimed at encouraging production of oil and gas in countries outside the Persian Gulf.

Fifth, the United States should take the lead in the creation of new mechanisms for joint contingency planning, setting standards and conducting exercises that will increase the security of the energy infrastructure around the world, especially pipelines and sea lanes for tankers.

As has been mentioned, the world will become more dependent on production from Africa, especially from West Africa, and it is important that this country encourage good governance in these countries as they produce their oil. It is very important not only because it will improve the social and economic circumstances of the citizens of these countries, but also because by providing for good governance you will have stability that will permit oil production which will serve the world needs.

Let me also now turn finally, Mr. Chairman, momentarily to domestic energy policy because domestic energy policy, as you noted in your opening remarks, and foreign policy implications are linked, and we are not very good in this country of always recognizing that linkage.

I just want to mention two or three items where we should be taking steps in our domestic energy policy to improve these issues of import dependence. The first is we should be adopting measures that will reduce the demand for petroleum products.

I personally support and I believe it would be important to adopt a significant tax on motor gasoline and other petroleum products say at a level of \$1 per gallon. Adopting such a tax would provide not only a dampening of the demand for petroleum products; it would also provide a price signal to the private sector for the need to introduce new technologies that do not rely on petroleum, and it would also serve to raise revenue that could be used to pay for the needed energy research and development of this country.

My second point is that we need vastly more research and development and demonstration of new technologies that avoid petroleum use. There are plenty of possibilities both in the private sector and the government sector for action. Some have been mentioned here this morning. In the near term there is promise from hybrids, cellulosic biofuels, from advanced hydrocarbon exploration and production techniques.

Energy efficiency is the single most important thing the nation can do to reduce its oil dependence. Improved efficiency is best brought about by price signals to the consumer and to the economy, but it is also, as Congressman Burton mentioned, important that we take some responsible steps to increase our domestic supply of energy.

The United States should consider some increase in hydrocarbon production in the Gulf of Mexico, off the Atlantic and Pacific Coasts or in Alaska. Incremental domestic production is good for our citizens because it is the most secure source of supply, and it also strengthens the United States' position when it urges other nations to expand their production around the world.

Serious national security challenges are an unavoidable part of our energy future. We will not make progress if we believe in

mythical solutions to these difficult problems brought on by our dependence on oil and gas dependence. There are important steps that we can take today that will make our energy future more secure, more affordable and more environmentally friendly.

If we do not take these steps today, if we do not make the required investments in energy supply and end use efficiency, future generations of Americans will bear a greater burden than is necessary.

Thank you very much, Mr. Chairman.

[The prepared statement of Mr. Deutch follows:]

PREPARED STATEMENT OF THE HONORABLE JOHN M. DEUTCH, PROFESSOR, MASSACHUSETTS INSTITUTE OF TECHNOLOGY (FORMER DIRECTOR, CENTRAL INTELLIGENCE AGENCY)

Mr. Chairman, members of the committee, I am pleased to appear here today to address the subject of how oil import dependence impacts our ability to pursue our foreign policy objectives. I wish to address briefly: the *realities* of this dependence, *myths* about what can be done to overcome this dependence, and the *promise for future benefit* if the United States adopts necessary measures today.

The views I express have been significantly shaped by the independent, bi-partisan, Council of Foreign Relations task force report on *The National Security Consequences of U.S. Oil Dependence*, co-chaired by James R. Schlesinger and myself, that was completed in November 2006. I also have provided for the Committee a paper entitled *Priority Energy Security Issues* that I presented at the Trilateral Commission's annual meeting in Brussels, earlier this week. This paper addresses the energy security aspects of global warming and expanded use of commercial nuclear power, which I favor, as well as oil import dependence.

THE REALITIES

The United States consumes about 20 million barrels of oil per day, mostly for transportation use, and the Energy Information Administration (EIA) projects that consumption will increase to a level of 27 million barrels per day by 2030, at a growth rate of about 1%. During this period in the EIA's reference case, our dependence on petroleum imports will increase from 13.7 million barrels per day in 2005 (60% of consumption) to 17.7 million in 2030 (66% of consumption).

EIA projects in its reference case that *world oil consumption* will increase from 80 million barrels per day in 2003 to 118 million barrels per day in 2030. In 2005, OPEC provided about 40% of the world's oil supply, with 27% coming from the Persian Gulf region; and these shares are projected to remain constant.

The first, and most important reality, is that we should expect, at least for the next two decades, the United States to consume greater amounts of petroleum, and to remain dependent on imported oil, much of it from politically fragile and unfriendly states, of the Middle East. Our traditional partners and allies, the developed economies of Europe and Asia, are in the same situation.

The second reality is that we will not "run out of oil" but that the real price of petroleum, on average, should be expected to increase. This is an inevitable consequence of the depletion of low-cost conventional oil resources and the need to turn to progressively more costly sources, at first oil from deep offshore and remote regions, then to tar-sands, shale, and synthetic liquids from coal.

Our dependence is not new; it has been growing at a steady pace since the 1970s. The proportion of oil coming from the politically unstable Persian Gulf region into the world oil market has been significant for some time. The United States has been unwilling to adopt, and to sustain, policy measures that would slow the trend and begin the long process of a transition to a post-petroleum economy. Our citizens, and their elected representatives, do not wish to sacrifice, in the short-run, the convenience and economic benefits of low-cost energy.

Oil import dependence has a serious national security cost. Most fundamentally, dependence on oil imports limits the leverage of the United States and its allies, necessary to achieve its foreign policy objectives. Oil revenues enable producer countries to pursue policies that are not in the interest of the United States. I cite several examples:

- *Iran.* The possibility that Iran might interrupt the 2.5 million barrels of oil per day (of its 4.0 million barrels per day production) that it exports must

be taken into account when considering sanctions against Iran for its nuclear weapons activities or for its intervention in the internal affairs of Iraq.

- *Russia* has made clear its intention to use its considerable oil and gas reserves to promote its global interests. The recent actions of Russia to threaten interruption of gas supplies to Eastern European states must give Europe pause, because of its dependence on natural gas imports from Russia.
- *Venezuela's* oil revenues allow it to pursue domestic and foreign policies that are not in the democratic tradition of that country and which are anti-American.

There are four new elements of international oil trade that have troubling national security implications:

- *Oil demand from large, rapidly growing, emerging economies, such as China and India, are projected to grow dramatically.* These states are moving aggressively to “lock-up” oil supplies, in a manner that will increasingly put them in competition with developed economies and create strains in their relations with the United States and other import dependent countries.
- *A major shift in control of reserves and production is underway in international oil markets from international oil companies to national oil companies (NOCs) of the major resource holders.* The NOCs have both commercial and political objectives. Countries such as Iran, Russia, and Venezuela make clear their intent to use their petroleum resources to advance their political interests.
- *A consequence of the combination of these two elements is a growth in state-to-state agreements between producers and the new consumer countries.* These agreements involve elements beyond commercial terms, such as economic or military assistance, and trade concessions. The purpose of the concessions is to establish a political relationship that will secure advantageous access to resources. India and China are eagerly pursuing such state-to-state agreements; China's activities in Africa, for example, in the Sudan and Angola, illustrate the nature of these agreements. The problem with state-to-state arrangements is that they move away from transparent international oil markets where price allocates available supply to consumers.
- *As oil is produced in more remote locations, and larger quantities travel longer distances to market, the security of the energy infrastructure becomes of increasing importance.* The pipelines, tankers, petroleum storage and processing facilities, the computer systems that monitor and control these operations, are vulnerable, both to natural disasters and to terrorist attack. Industry and government need to devote greater attention to reducing this infrastructure vulnerability.

I have addressed oil import dependence but I note that North America is also becoming increasingly dependent on imports of natural gas, in the form of LNG—Liquified Natural Gas. While at present the level of natural gas imports is low, and because there are substitutes for its use in the electricity generating sector there is less reason for concern about the natural gas imports. However, over time, if action is not taken, imports may grow engendering security concerns about natural gas as well.

SOME MYTHS

I mention a few prominent myths about the nature of and possible solutions to the oil dependence problems:

- The United States can be energy independent.
- Reducing oil imports will reduce the price of gasoline and other oil products for the consumer.
- International oil companies control the world price of oil.
- There is plenty of low cost oil to be tapped.
- The world will run out of oil at some future date certain.
- A “Manhattan or Apollo space project” is necessary and sufficient to acquire new technology that will replace fossil fuels.
- There is one technical pathway—solar, nuclear, hydrogen, take your pick—that will solve our oil dependence problem.

Public leaders—members of Congress, industry executives, educators, and public interest advocates—need to understand the nature of the U.S. energy problem in

order to advocate to the public the need for serious and sustained measures to begin the transition away from oil dependence. Public leaders should avoid the temptation to advocate simple solutions that are popular, but unrealistic.

THE POTENTIAL FOR CHANGE

There are many measures that the United States should take to reduce the adverse consequences of our oil import dependence.

Foreign policy measures

1. *The large emerging developing economies, notably China and India, should be included in the International Energy Agency* (currently restricted to OECD member countries) because of their importance as importing countries. The IEA mechanism is a way to strengthen the common interest of importers in encouraging open and transparent world oil markets and in planning for supply disruptions, through the establishment of national petroleum reserves and other mechanisms.
2. *We should encourage countries to move their internal domestic prices toward world oil prices*, so as not to subsidize petroleum use. This is especially important in countries such as China and India where artificially low domestic prices contribute to the explosion in demand for private automobile use.
3. *Our foreign policy should seek to maintain political stability in the Persian Gulf region.*
4. U.S. trade, diplomacy, economic assistance, and technology transfer efforts should continue to be directed to encouraging production of oil and gas in countries outside the Persian Gulf.
5. The United States should take the lead in the creation of new mechanisms for joint contingency planning, setting standards, and conducting exercises that will *increase the security of the global energy infrastructure*, e.g. ports, pipelines, and facilities.
6. *The United States should promote good governance in smaller resource holder countries*, especially in West Africa, with the objective of seeing that oil revenues improve the economic and social circumstances of the people. Good governance encourages the domestic stability that is needed for uninterrupted production of hydrocarbons.

Domestic and foreign energy policy are linked, however the U.S. policy making apparatus typically does not take this linkage into account. Actions that we take with regard to domestic energy policy can advance or harm energy security interests. The key domestic energy policies that have foreign policy benefits are:

1. *Adopt measures that will reduce the demand for petroleum products*, such as a significant tax on motor gasoline, say \$1 per gallon, and other petroleum products; a petroleum product tradable permit scheme; or a more stringent Combined Automobile Fuel Economy (CAFE) standard. Increasing the domestic price of petroleum will not only moderate demand, but the price increase will make new technologies that are less reliant on oil, more economic.
2. *Encourage vastly more research, development, and demonstration of new technologies that avoid the use of petroleum.* Practical technology will be available in the future, only if significant investments are made today. Both the private sector and the government need to increase their effort.
There are promising technologies for both the near and long term. In the relatively near term (five to ten years), hybrids, cellulosic biofuels, advanced hydrocarbon exploration/production techniques, and more efficient engine/fuel systems deserve attention. *In the longer term*, electricity could be an important source of energy for transportation, both electric cars and for mass transit. This option points to the importance of expanded use of commercial nuclear power in the United States and elsewhere in the world.
3. While *energy efficiency* brought about by response to higher prices or government regulation is the best way to moderate the anticipated growth in demand, we should also be seeking to increasing our *domestic* supply of energy. The United States should also consider some increase in hydrocarbon production in the Gulf of Mexico, off the Atlantic and Pacific coasts, and in Alaska. Incremental domestic production is not only our securest source of supply, it also strengthens the U.S. position when it urges other countries to expand production.

Serious national security challenges are an unavoidable part of our energy future. We will not make progress if we believe in mythical solutions to the difficult problems brought about by our dependence on oil imports. There are important steps that we can take today that will make our energy future more secure, affordable, and more environmentally friendly. If we do not take these steps today and do not make the required investment in energy supply and end-use efficiency technologies, future generations will a greater burden than is necessary.

Chairman LANTOS. Thank you very much, Professor Deutch.
Dr. Yergin.

**STATEMENT OF DANIEL YERGIN, PH.D., CHAIRMAN,
CAMBRIDGE ENERGY RESEARCH ASSOCIATES, INC.**

Mr. YERGIN. Thank you very much, Mr. Chairman, members of the committee. It is an honor to be able to testify in front of you and to be part of this distinguished panel and to follow I think the very wise remarks of Professor Deutch.

In that same trend, I, too, want to try and talk about some of the realities. Certainly the reason we are here today is because energy looms in the province of this committee. The U.S. is very much tied into the global energy markets, as we are into the overall global economy. We have heard about our oil imports.

We are the largest importer of oil in the world. Sixty percent of our oil is in the form of imports. We are also on the track to become a very significant importer of natural gas over the next 15 years.

We at Cambridge Energy do not think the world is running out of oil. We think supply capacity could well increase substantially over the next 10 years, but after 2010 we see that a lot of the growth is concentrated in countries that we call the O-15 or the Oil 15. That is countries in West Africa, the Middle East and Central Asia where issues of transition or turbulence will be very important, and I think this will reinforce the focus on energy security.

We have already talked this morning of course about the Middle East, about the challenges from President Chavez in Venezuela, but if we look around the world we see that energy is going to be either a central or major component in a whole host of international issues.

For instance, today natural gas looms as a central issue between Europe and Russia. We have talked about China's role, but energy is actually a very important component in the United States' relationship with China and is something that should be subject to a high level of continuing dialogue.

We have heard this morning about the rising concerns about oil power, and we also of course recognize that climate change will lead to an increasing focus on energy, and these two sets of issues will become intertwined, increasingly intertwined, in international relations.

I think and I would suspect that these issues of energy will come to more and more concern this committee in the years ahead because inevitably energy security exists in the larger context of overall security and international relationships. Thus, a lot will depend upon how nations manage their relations with each other within a multilateral or bilateral framework, and that is certainly why energy security will be one of the major challenges for U.S. foreign

policy in the years ahead and why this committee will continue to address it.

What I would like to do in the few minutes that I have is to follow from what Professor Deutch did and talk about the fundamentals of energy security. I would agree absolutely that there are two critical new needs: To expand the focus of energy security to include infrastructure in the entire supply chain and, secondly, as Professor Deutch said, to bring China and India into the global system of energy security, and in particular we need a continuing high level dialogue about energy with China.

Three quick observations. One, you have already heard it. I worry about the use of the term “energy independence” if we mean it literally because we are almost certainly headed for great disappointment. If we see it, however, as a metaphor, meaning energy security, resilience, robustness, less vulnerability, then it makes sense.

To think that it works literally, it is just very hard to see that. We have gone from importing a third of our oil to 60 percent. We are on a track now to go from importing 3 percent of our natural gas in the form of LNG to over 25 percent of our natural gas in the form of LNG. Large amounts of natural gas-fired electric generation have been added in the country. They are coming into operation, and that will require more natural gas.

To the degree that coal’s share is reduced we will be importing more LNG. The growth of ethanol production, although we heard about a specific example with methane, but the growth of ethanol production is creating a new industrial market for natural gas and will mean that the marginal supplies again will be imported.

Also, look where our energy comes from. Our largest share of energy imports come from Canada both in terms of oil and natural gas. Mexico is next. Mexico depends upon oil revenues for 40 percent of its government budgets. Of course, when we get to Venezuela, our fourth largest source, we know that those relations will only become more challenging in the years ahead.

The Middle East comprises about 19 percent of our total imports and 11 percent of our consumption, but at the end of the day there is only one world oil market, and we are all participants in it.

The second observation I would like to make is about innovation, which Professor Deutch, who has great expertise, has touched on. I find myself using the term the “great bubbling” to describe what is happening now in terms of energy research and development all across the spectrum.

I have never observed, and I think Professor Deutch could speak with expertise on this, so much effort on energy R&D all across the energy spectrum as today, and that gives me a feeling of optimism about what will be done. We don’t know what the impacts will be, but when you have that much activity there will be impacts. It takes continuity. It takes commitment over time, and it will also be responsive to what happens to price.

Again, we have to keep in mind the scale of our current energy system. You don’t change that overnight. For commercially competitive new technologies to have a scale large enough to be competitive, to really be material, will take time. So I think we need

to push on it and expect things to happen, but not to assume that some dramatic change is going to happen tomorrow.

The third is those numbers that Congresswoman Giffords referred to, those staggering numbers about the world energy scene. Over the next 25 years, even with greater efficiency we see the world at this point using 45 percent more oil. These are very big numbers. There is a need for much greater efficiency so that those numbers are not so high.

I want to just suggest some points about fundamentals of energy security, just a quick list of what they ought to be. One is we need diversification. That is the starting point for energy security. Two, we need a resilience. We need a security margin. Three, we need high quality and timely information.

You all know whenever there is a problem with gasoline prices go up. The rumors, the passions, the conspiracy theories get in the way in terms of resolving things. Given the reality, we need collaboration among consumers and between consumers and producers. We have talked already about expanding the security system to include China and India and infrastructure and supply chain.

Something else. We may not think about it this way, but markets are an important part of energy security—large, flexible, well-functioning markets. We might have expected gas lines and disruptions after those two terrible hurricanes of Katrina and Rita, but the markets came back very quickly because there was flexibility and time to adapt.

We certainly need the renewed emphasis on efficiency for both energy and for the climate change reasons that many of you have discussed. Something else that I think hasn't been talked about; we need to pay attention to the investment environment around the world so that investment can flow into countries.

Finally, of course, we need that focus on research and development, technological advance and new technologies. A little over a decade ago I chaired a task force for the Department of Energy on energy R&D. We worked very hard on it for a year and a half. We produced three volumes and there was not much attention to it.

Today it is a very different environment. There is very high interest in it, and investment in technology is surging all along the energy spectrum. This will not only have a positive effect not only in terms of the future energy picture, but also in terms of the environment and meeting the climate change objectives.

Thank you.

[The prepared statement of Mr. Yergin follows:]

PREPARED STATEMENT OF DANIEL YERGIN, PH.D., CHAIRMAN, CAMBRIDGE ENERGY RESEARCH ASSOCIATES, INC.

“THE FUNDAMENTALS OF ENERGY SECURITY”

I

It is an honor to testify before this Committee. One recognizes the timeliness of this hearing, and its importance. Energy certainly belongs in front of this Committee for many reasons.

- The first is that the United States is deeply tied into global energy markets, as we are in the overall global economy. This is the reality. We are the largest importer of oil in the world, and 60 percent of our total oil demand is met

by imports. The United States is also on track to become a major importer of liquefied natural gas (LNG), also from the global marketplace. What happens in the global energy market—whether in terms of price or disruptions—can have major political and economic reverberations around the world. It also affects the economic and political position of the United States in the world.

- A good part of the growth in world energy supply after 2010 will occur in countries going through transitions or subject to turbulence. This will reinforce the focus on energy security.
- Beyond the obvious importance of the Middle East, energy figures as either a central or significant component in major relationships and issues around the world. For instance, concerns about natural gas loom large in the European Union's relationship with Russia, and energy is an important component in the U.S. relationship with China.
- Concern is rising about “oil power”—that is, about the use of energy as a political instrument rather than a commercial commodity.
- Climate change will lead to a continuing focus on energy, and the two sets of issues will become increasingly intertwined in international relations.

All of these considerations point to a further—and most important—reason for this subject to lie within the province of this committee. For energy security inevitably exists in a larger context of overall security and international relationships. In a world of increasing interdependence, energy security will depend much on how countries manage their relations with one another, whether bilaterally or within multilateral frameworks. That is why energy security will be one of the main challenges for U.S. foreign policy in the years ahead. And that in turn requires us to look, beyond the ups and downs of market cycles, both to the reality of an ever more complex and integrated global energy system and to the relations among the countries that participate in it.

What I will seek to do today is address the fundamentals of energy security—that is, a set of observations and principles based upon U.S. and international experience over several decades, analysis of energy markets, and recognition of the interdependencies, scale and complexity of the energy supply system. In addition, this testimony points to two critical new needs: to expand the focus of energy security to include infrastructure and the entire supply chain; and to bring China and India into the global system (see Table 1).

“Energy Independence” versus “Energy Security”

In framing these issues, I am deliberately using the phrase “energy security” rather than “energy independence.” Energy independence is a very popular and appealing term, with deep political resonance. Yet, if it is taken literally, it is a less useful guide. If, however, it is taken as a metaphor, meaning an energy security system that is robust and resilient and less vulnerable, then it is a much more relevant and useful concept.

Table 1: Fundamentals of Energy Security

1. Diversification
2. Resilience—a “security margin”
3. High-quality and timely information
4. Collaboration among consumers and between consumers and producers
5. Expand “IEA System” to include China and India
6. Include infrastructure and supply chain
7. Robust markets and flexibility
8. Renewed emphasis on efficiency for both energy and climate reasons
9. Investment flows
10. R&D, technological advance, and new technologies

To elaborate, if energy independence is taken in a literal sense, it runs the risk of disappointment and cynicism and loss of focus. Today about 70 percent of our total energy is produced within the United States. But, in terms of oil, the reality is that, in the last 30 years, we have gone from importing a third of our oil to importing 60 percent. Moreover, we are on track to go from meeting 3 percent of our total natural gas demand with imports of LNG today to more than 25 percent in a decade and a half. Large amounts of new natural gas fired electric generation have been added over the last few years. To the degree that coal's market share

is reduced, we will import more natural gas. The growth of ethanol production is creating a new industrial market for natural gas, and again, the marginal supplies will be imported.¹

In 2006, the largest share of our energy imports came from Canada as a part of a very dense overall economic partnership. Canada also supplies about 15 percent of our natural gas. The next largest source of imported oil was Mexico, our key neighbor, which depends upon oil to generate almost 40 percent of government revenues. The third source was Saudi Arabia. The picture changes in Venezuela, which was the fourth largest source of imports and, as this Committee knows, the indications are that relations between the United States and Venezuela will only become more challenging in the years ahead (see Table 2). Middle East imports comprise 19 percent of our total imports, and 11 percent of consumption. Yet, at the end of the day, there is only one world oil market, and upheavals in one part affect all participants.

Table 2: 2006* Top 5 Suppliers: US Crude Oil & Product Imports
(million barrels per day)

	Volume	percent of total imports
Canada	2.29	17%
Mexico	1.73	13%
Saudi Arabia	1.46	11%
Venezuela	1.42	10%
Nigeria	1.13	8%

Source: Energy Information Administration
*average imports January-November 2006

“The Great Bubbling”: Innovation and R&D

What about new technologies and alternatives? Today, there is what we have dubbed “the Great Bubbling”—the R&D efforts all along the energy spectrum, involving both conventional and alternative energies. There has never been so broad an effort. A little over a decade ago, I chaired a Task Force for the Department of Energy on Strategic Energy R&D. It is striking how much less interest there was then in new technologies than today. The change is palpable. In the last couple of years, substantial amounts of venture capital funds have begun to flow into “clean energy,” adding to the funds from government, industry, and research institutions. With this much greater effort there is higher probability that new technologies will make their impact felt on both supply and demand.

One of the most important impacts could come from the application of biotechnology to energy, which has only recently begun in earnest. This could in due course provide alternative liquid fuels for transportation. There is also a good deal of innovation in the electric power sector, but there is very little oil to replace. In 2006, for example, only 1.6 percent of U.S. power was generated with oil.

This level of activity—this great bubbling—should be a source of optimism. But, at the same time, tomorrow’s promise should not be confused with delivery of commercially-competitive new technologies on a scale large enough, with the appropriate logistical infrastructure, to have material impact on the vast U.S. energy supply system. For instance, all the renewable investment in electric power adds up to a fraction of our total system. We have gone through other periods of technological optimism that have faded away. In short, even with continuing innovation, energy security is likely to be a major concern for some time to come. Thus, in terms of anticipating risks, we need to focus on the challenges before us and on how to enhance our energy security.

Meeting the Growth Challenge—and the “0–15”—the Top 15 Sources of Supply Growth

After two decades of working off excess capacity, global energy supply is now dominated by the growth challenge—the ability to increase energy supplies in sufficient volume to meet global energy demand. Perhaps major new technological developments will dramatically transform the energy mix. We seek to explore that possi-

¹ Cambridge Energy Research Associates, *The Ethanol Boom: Creating a New Market for Natural Gas*.

bility in a scenario called *Break Point*, one of three scenarios describing the energy future to 2030 in our new study, *Dawn of a New Age*.² Yet even with major changes in the energy mix, even with increased efficiency, energy demand continues to grow. Over the next 25 years, world oil consumption could still increase by 45 percent. The more successful the world economy, the higher the demand growth.

One of the most striking conclusions from this year-long scenario project is that, in a world of solid economic growth, over half of the future growth in world oil demand takes place in Asia. Demand growth is also quite large in the Mideast itself. All this adds to the imperative for broad cooperation, including on new technologies.

But there is another important observation. CERA sees substantial growth in world production capacity over the next decade or more. But a key feature of CERA's baseline energy scenario is the concentration of *growth* in liquid production capacity within a group of 15 countries that we call the "O-15"—as in "Oil-15"—those countries that have the greatest potential to increase supply over the next one to two decades. Most of the O-15 countries are in Africa, Eurasia, and the Middle East, but Brazil, Canada, and Venezuela are also included (see Table 3).

Table 3: The "O-15": Top Sources of Growth in Net Production Capacity to 2015
(million barrels per day)

	2005	2015	change 2005–2015
Saudi Arabia*	12.7	14.3	1.6
Russia	9.6	11.5	1.9
Iran	4.3	5.7	1.4
Iraq	2.6	5.5	2.9
Canada	3.5	5.3	1.8
Venezuela	3.0	4.5	1.5
UAE	3.1	3.9	0.8
Kuwait*	2.9	3.7	0.8
Nigeria	2.9	3.6	0.7
Kazakhstan	1.2	3.1	1.9
Algeria	2.3	2.9	0.6
Libya	2.0	2.8	0.8
Brazil	1.8	2.6	0.8
Angola	1.2	2.3	1.1
Azerbaijan	0.5	1.0	0.5
O-15 totals	53.6	72.7	19.1
Share of World Liquid Capacity	61%	69%	

Source: Cambridge Energy Research Associates.

*Includes 50 percent of the Neutral Zone.

March 2007

II THE ENERGY SECURITY SYSTEM

The current energy security system was created in response to the 1973 Arab oil embargo to ensure coordination among the industrialized countries in the event of a disruption in supply, encourage collaboration on energy policies, avoid bruising scrambles for supplies, and deter any future use of an "oil weapon" by exporters. Its key elements are the Paris-based International Energy Agency (IEA), whose members are the industrialized countries; strategic stockpiles of oil, including the U.S. Strategic Petroleum Reserve; continued monitoring and analysis of energy markets and policies; and energy conservation and coordinated emergency sharing of supplies in the event of a disruption. The emergency system was set up to offset major disruptions that threatened the global economy and stability. It was not established to manage prices and the commodity cycle.

Since the system's inception in the 1970s, a coordinated emergency drawdown of strategic stockpiles has occurred only twice: on the eve of the Gulf War in 1991 and in the autumn of 2005 after Hurricane Katrina. (The system was also readied in anticipation of possible use before January 1, 2000, because of concerns over potential Y2K computer problems, during the shutdown of production in Venezuela in 2002–3, and in the spring of 2003, before the invasion of Iraq.) We can be sure that the creators of the IEA emergency sharing system in the 1970s never for a moment

² Cambridge Energy Research Associates, *Dawn of a New Age: Global Energy Scenarios—The Energy Future to 2030*.

considered that it might have to be activated to blunt the effects of a disruption in the United States—as happened in the immediate aftermath of the hurricanes.

Principles of Energy Security

Several principles underpin energy security. The first is what Winston Churchill urged more than 90 years ago: diversification of supply. On the eve of the First World War, Churchill—then the First Lord of the Admiralty—made the historic decision to shift the propulsion of the Royal Navy from coal to oil. “Safety and certainty in oil,” he said, “lie in variety and variety alone.”³ Multiplying one’s supply sources reduces the impact of a disruption in supply from one source by providing alternatives, serving the interests of both consumers and producers, for whom stable markets are a prime concern. But diversification is not enough. A second principle is resilience, a “security margin” in the energy supply system that provides a buffer against shocks and facilitates recovery after disruptions. Resilience can come from many factors, including sufficient spare production capacity, strategic reserves, backup supplies of equipment, adequate storage capacity along the supply chain, and the stockpiling of critical parts for electric power production and distribution, as well as carefully conceived plans for responding to disruptions that may affect large regions.

Hence the third principle: recognizing the reality of integration. There is only one oil market, a complex and worldwide system that moves and consumes about 86 million barrels of oil every day. For all consumers, security resides in the stability of this market. Secession is not an option.

A fourth principle is the importance of information. High-quality information underpins well-functioning markets. On an international level, the International Energy Agency has led the way in improving the flow of information about world markets and energy prospects. That work is being complemented by the new International Energy Forum, which will seek to integrate information from producers and consumers.

Information is no less crucial in a crisis, when consumer panics can be instigated by a mixture of actual disruptions, rumors, media images, and fear. Members of this Committee will recognize that kind of situation. Many of you have seen it more than once! Reality can be obscured by accusations, acrimony, outrage, and a fevered hunt for conspiracies, transforming a difficult situation into something much worse. In such situations, governments and the private sector should collaborate to counter panics with high-quality, timely information. The U.S. government can promote flexibility and market adjustments by expediting its communication with companies that are responding to disruptions and permitting the exchange of information among them when necessary, with appropriate antitrust safeguards.

As important as these principles are, recent years have highlighted the need to expand the concept of energy security in two critical dimensions: (1) the recognition of the globalization of the energy security system, which can be achieved especially by engaging China and India, and (2) the acknowledgment of the fact that the entire energy supply chain needs to be protected.

III BRINGING CHINA AND INDIA “IN”

Despite all the attention being paid to China’s efforts to secure international petroleum reserves, for example, the entire amount that China currently produces per day outside of its own borders is equivalent to just a fraction of the daily production of one of the supermajor oil companies. If there were a serious controversy between the United States and China involving oil or gas, it would likely arise not because of a competition for the resources themselves, but rather because they had become part of larger foreign policy issues (such as a clash over a specific regime or over how to respond to Iran’s nuclear program). Indeed, from the viewpoint of consumers in North America, Europe, and Japan, Chinese and Indian investment in the development of new energy supplies around the world is not a threat but something to be encouraged, because it means there will be more energy available for everyone in the years ahead as India’s and China’s demand grows.

It would be wiser—and indeed it is urgent—to engage these two giants in the global network of trade and investment rather than see them tilt toward a mercantilist, state-to-state approach. But, for that to happen, both countries need to be encouraged to see that their interests can be protected in global markets and that they will not be disadvantaged compared to other consumers. Engaging India and China will require understanding what energy security means for them. Both coun-

³Daniel Yergin, *The Prize: the Epic Quest for Oil, Money, and Power* (Simon and Schuster, 1991,) p. 160

tries have already moved from self-sufficiency to integration into the world economy, which means they will grow increasingly dependent on global markets even as they are under tremendous pressure to deliver economic growth for their huge populations, which cope with energy shortages and blackouts on a daily basis. Thus, the primary concern for both China and India is to ensure that they have sufficient energy to support economic growth and prevent debilitating energy shortfalls that could trigger social and political turbulence. And so India and China, and other key countries such as Brazil, should be brought into coordination with the existing IEA energy security system to assure them that their interests will be protected in the event of turbulence and to ensure that the system works more effectively.

A strong continuing high-level dialogue with China on energy-related issues is a very high priority to allay suspicion and misunderstanding and to identify common interests and objectives, including on new technologies. There is much talk of a clash between the United States and China over oil. But there is nothing inevitable about it. Commercial competition need not turn into national rivalry. A fundamental reason for establishing the International Energy Agency in the 1970s was to modulate that mad scramble to preempt barrels. This contest threatened not only to rip apart the Western alliance, but also sent oil prices—after the Iranian Revolution—to what is still their highest level ever. The innovations of the 1970s transformed the scramble into more durable cooperation. That same kind of approach is needed now with the emergence of these two huge (and anxious) consumers, China and India, in the world market.

IV SECURING INFRASTRUCTURE AND THE SUPPLY CHAIN

The current model of energy security, which was born of the 1973 crisis, focuses primarily on how to handle any disruption of oil supplies from producing countries. Today, the concept of energy security needs to be expanded to include the protection of the entire energy supply chain and infrastructure—an awesome task. In the United States alone, there are more than 150 refineries, 4,000 offshore platforms, 160,000 miles of oil pipelines, facilities to handle 15 million barrels of oil a day of imports and exports, 10,400 power plants, 160,000 miles of high-voltage electric power transmission lines and millions of miles of electric power distribution wires, 410 underground gas storage fields, and 1.4 million miles of natural gas pipelines. None of the world's complex, integrated supply chains were built with security, defined in this broad way, in mind. Hurricanes Katrina and Rita brought a new perspective to the security question by demonstrating how fundamental the electric grid is to everything else. After the storms, the Gulf Coast refineries and the big U.S. pipelines were unable to operate—not just because some were damaged, but also because they could not get electric power.

Energy interdependence and the growing scale of energy trade require continuing collaboration among both producers and consumers to ensure the security of the entire supply chain. Long-distance, cross-border pipelines are becoming an ever-larger fixture in the global energy trade. There are also many chokepoints along the transportation routes of seaborne oil and, in many cases, LNG that create particular vulnerabilities: the Strait of Hormuz, which lies at the entrance to the Persian Gulf; the Suez Canal, which connects the Red Sea and the Mediterranean; the Bab el Mandeb strait, which provides entrance to the Red Sea; the Bosphorus strait, which is a major export channel for Russian and Caspian oil; and the Strait of Malacca, through which passes 80 percent of Japan's and South Korea's oil and about half of China's.

The challenge of energy security will grow more urgent in the years ahead, because the scale of the global trade in energy will grow substantially as world markets become more integrated. Currently, every day some 40 million barrels of oil cross oceans on tankers; by 2020, that number could jump to 67 million. The amount of natural gas crossing oceans as LNG could triple to 460 million tons by 2020. The United States will be an important part of that market. Assuring the security of global energy markets will require coordination on both an international and a national basis among companies and governments, including energy, environmental, military, law enforcement, and intelligence agencies. But in the United States, as in other countries, the lines of responsibility—and the sources of funding—for protecting critical infrastructures, such as energy, are far from clear. The private sector, the federal government, and state and local agencies need to take steps to better coordinate their activities. Maintaining the commitment to do so during periods of low or moderate prices will require discipline as well as vigilance. Both the public and private sectors need to invest in building a higher degree of security into the energy system—meaning that energy security will become part of both the price of energy and the cost of homeland security.

V THE IMPORTANT ROLE OF MARKETS

Let me address another element of energy security: markets *themselves* need to be recognized as a source of security. The energy security system was created when energy prices were regulated in the United States, energy trading was only just beginning, and futures markets were several years away. Today, large, flexible, and well-functioning energy markets provide security by absorbing shocks and allowing supply and demand to respond more quickly and with greater ingenuity than a controlled system could. Thus, governments do well to resist the temptation to respond to short-term political pressure and micromanage markets. Intervention and controls, however well meaning, can backfire, slowing and even preventing the movement of supplies to respond to disruptions. At least in the United States, any price spike or disruption evokes the images of the infamous gas lines of the 1970s. Yet those lines were to a considerable degree self-inflicted—the consequence of price controls and a heavy-handed allocation system that sent gasoline where it was not needed and denied its being sent where it was.

Contrast that to what happened immediately after Hurricane Katrina. A major disruption to the U.S. oil supply was compounded by reports of price gouging and of stations running out of gasoline, which together could have created new gas lines in the Southeast and along the East Coast. Yet the markets were back in balance much sooner, and prices came down more quickly, than had generally been expected. Emergency supplies from the U.S. Strategic Petroleum Reserve and other IEA reserves were released, sending a “do not panic” message to the market. At the same time, two critical regulatory restrictions were eased. One was the Jones Act (which bars non-U.S.-flagged ships from carrying cargo between U.S. ports), which was waived to allow non-U.S. tankers to ship supplies bottlenecked on the Gulf Coast around Florida to the East Coast, where they were needed. The other was the set of “boutique gasoline” regulations that require different qualities of gasoline for different cities, which were temporarily lifted to permit supplies from other parts of the country to move into the Southeast.

This experience highlights the need to incorporate regulatory and environmental flexibility—and a clear understanding of the impediments to adjustment—into the energy security machinery in order to cope as effectively as possible with disruptions and emergencies. Markets can more efficiently and effectively—and more quickly—resolve shortfalls and disruptions than controls can.

VI EFFICIENCY, INVESTMENT, AND NEW TECHNOLOGIES

The U.S. government and the private sector should also make a renewed commitment to energy efficiency and conservation. For the first time in many years, energy efficiency is once again a high priority. Although often underrated, the impact of conservation on the economy has been enormous over the past several decades. Over the past 30 years, the United States has doubled its energy efficiency—defined as the amount of energy needed to produce a unit of gross domestic product. We could aim to double efficiency once again.

The basic point remains: conservation has worked. Current and future advances in technology could permit very large additional gains, which would be highly beneficial not only for advanced economies such as that of the United States, but also for the economies of countries such as India and China. In fact, China has recently made conservation a priority. The potential growth highlighted earlier underlines the importance of moving on efficiency. This also is one of the most important things to do for climate change.

Finally, the investment climate itself must become a key concern in energy security and should be on the international energy agenda. There needs to be a continuous flow of investment and technology in order for new resources to be developed. Costs for energy development have been going up dramatically in recent years because of a shortage of people and equipment.

Our new IHS/CERA Upstream Capital Cost Index indicates that the cost for developing new oil and gas projects increased more than 50 percent over the last two years.⁴ It is now estimated that as much as \$20 trillion will be required for new energy development over the next 25 years. These capital flows will not materialize without reasonable and stable investment frameworks, timely decision-making by governments, and open markets. How to facilitate energy investment should be one of the questions for international discussions.

Inevitably, there will be shocks to energy markets in the future. Some of the possible causes may be foreseeable, such as coordinated attacks by terrorists, disrupt-

⁴CERA *Capital Costs Analysis Forum: A White Paper*

tions in the Middle East and Africa, or turmoil in Latin America. Other possible causes, however, may come as a surprise. The offshore oil industry has long built facilities to withstand a "hundred-year storm," but nobody anticipated that two such devastating storms would strike the energy complex in the Gulf of Mexico within a matter of weeks, requiring the activation of the IEA emergency sharing system to relieve a disruption in the United States.

Diversification will remain the fundamental starting principle of energy security for both oil and gas. Today, however, it will likely also require developing a new generation of nuclear power and "clean coal" technologies and encouraging a growing role for a variety of renewable energy sources as they become more competitive. It will also require investing in new technologies, ranging from near-term ones, such as the conversion of natural gas into a liquid fuel, to ones that are still in the lab, such as the biological engineering of energy supplies. Investment in technology all along the energy spectrum is surging today, and this will have a positive effect not only on the future energy picture but also on the environment and in meeting climate change objectives.

Chairman LANTOS. Thank you very much.
Dr. Cohen.

**STATEMENT OF ARIEL COHEN, PH.D., SENIOR RESEARCH
FELLOW, THE HERITAGE FOUNDATION**

Mr. COHEN. Thank you, Mr. Chairman. I want to thank the ranking member and your wonderful staff for facilitating my testimony.

The United States today is the largest oil producer in the world with 63.5 percent of our oil coming from abroad to the tune of \$800 million a day. By 2017, we will be importing 68 percent of our needs. Oil consumption today represents 40 percent of all America's energy needs primarily used in ground and air transportation.

Securing the stability of oil supply to the best extent possible in cooperation with traditional United States allies, while bringing on board the emerging major oil consumers such as India and China, as my two colleagues mentioned, should be the key diplomatic strategy in the intermediate term. At the same time, the United States needs to deter those from Tehran to Caracas whose international behavior harms and destabilizes the world energy chain.

Working with suppliers and consumers to expand transparency and international access to existing oil supply by international oil companies which are actually the most efficient producers, is the policy for the longer term. Vast U.S. domestic oil and gas reserves cannot and should not be outside of the reach of our consumers and our energy corporations.

Expanding our energy mix to include nontraditional oil sources such as oil sands, oil shale, deep offshore and heavy crudes is another important component to diversify supply, as is producing more transportation fuel from coal, gas-to-liquids and other alternative fuels such as, for example, the most efficient ethanol, sugar cane ethanol.

Finally, encouraging investment and innovation in truly competitive fuels and technologies, plug-in hybrids that will eventually compete and possibly replace the 19th century automotive technology, will be the best long-term answer for enhancing energy security for the 21st century.

Now, with your permission I would like to go region-by-region and make some comments. The main region of concern in terms of oil and gas is of course the Middle East. Forty percent of all oil shipped around the world goes through the Strait of Hormuz.

Iran today is the main threat to the stability of the Middle East, of the Strait of Hormuz and of the relatively moderate regimes along the Persian Gulf. The Iranian leadership, including Ayatollah Ali Khamenei, the Supreme Leader, President Mahmoud Ahmadinejad and others repeatedly threaten to disrupt the flow of oil in the Persian Gulf.

At a war game simulation and economic modeling exercise that we undertook at The Heritage Foundation, the short-term increase of prices in case of disruption, dependent of the duration and completeness of such disruption, went up to \$120 a barrel for a short period of time. Historically in today's dollars prices shot up to \$83 a barrel when supply got interrupted, for example, during the Iran and Iraq War.

But today the conditions are different. We have the spare capacity that in the past was controlled by Saudi Arabia and was 3–4 million barrels a day, shrunk to one to 1.5 million barrels a day. To make matters worse, some expert even questioned the veracity of data from Russia, from Gulf countries, including Saudi Arabia, in terms of oil reserves.

As the data is not transparent, we have no clear view of what the reserves are in these key oil provinces, so one of the priorities of U.S. foreign and energy policy should be opening foreign energy reserves for independent audit. We are not doing it today. We are taking for granted and trusting data that oil companies or energy ministries are presenting to us, and your guess, Mr. Chairman, is as good as mine.

We also cannot forget that the leadership of the global jihadi movements, specifically Osama bin Laden and Ayman al-Zawahiri, have repeatedly called for attacks on key western economic targets, including energy infrastructure. Just one quote from Zawahiri from February 2006:

“I call on mujahideen to concentrate their attacks on Muslim stolen oil, most of the revenues of which go to the enemies of Islam, while most of what they leave is seized by the thieves who rule our countries.”

As a long-term project, the jihadi movement is aiming to overthrow the current regimes of the Middle East to create a global caliphate, an Islamic empire based on shari'a, and then push for Islamization of the rest of the world.

For them, it is real, Mr. Chairman, as chilling as it may sound to us. As long as they believe in success of their project, unless they are dissuaded, they will continue this attack, and the oil infrastructure in the Middle East will be at risk.

I talked already about Iran, and specifically on the disruption issue. Iran today has a much larger arsenal than it had during the Iran/Iraq War, including an antiship cruise missile arsenal and sophisticated mines mainly designed and produced in China that can be used by the Islamic Republic to interrupt the flow of oil.

In terms of our policy, we should definitely make all the efforts, including the efforts by this committee, to limit the ability of Iran to wreak havoc in the oil markets. We need to boost or to diversify further geographic sources of U.S. energy imports and open our resources for more exploration and exploitation.

One of the key geographic areas of oil and gas production of course is Russia and Eurasia. Since coming to power in 2000 President Vladimir Putin and his entourage doggedly pursue the policies aimed at concentrating the huge oil and gas assets of the Russian Federation in its pipeline infrastructure in the hands of the state. State prosecutors use tax evasion charges to take over the Yukos Oil Company, other private companies abroad under control of the state today.

Russia is using state-owned energy assets as tools of its foreign policy to make its neighbors of the former Soviet Union and Europe more pliable. It is also actively seeking to prevent and preempt pipeline routes from the Caspian to the west, which would bypass Russia.

Russia is also using oil revenues from the pipeline projects to corrupt the elites of the neighboring countries. If you examine cases such as the murky Russian-Ukrainian gas distribution venture, Rosukrenergo, if you look at the scandals connected to the pipeline called Blue Stream, the gas pipeline from Russia to Turkey, and other cases, you will see how these oil pipelines don't leak only crude. They leak cash in the interests of the Russian foreign policy.

In fact, as I quipped in my testimony, the Arab rulers should take a number and go to Russian's master class about how to use oil and gas as tools of geopolitics.

The issue of Venezuela I believe is extremely important as well. Venezuela is building today an unholy alliance that includes countries like Belarus, countries like Iran. It is buying \$3 billion worth of weapons from Russia. For what purpose, Mr. Chairman?

I do believe that we are limiting ourselves by denying ourselves tools of foreign policy that could affect outcomes and influence developments in Venezuela, and I prefer not to say more about that right now.

Finally, I want to fully agree with my colleagues and talk a little bit more about overregulation and the poor investment environment in the global oil and gas markets. The emergence of national oil companies, NOCs, as a dominant force controlling 80 percent of reserves is something that is to the detriment of American competitors. They are not playing any longer on the level playing field. It is detrimental to American and global consumers.

Here is a challenge for American foreign policymakers: While bringing aboard India and China, create an organization or a caucus of consumers that will send a strong message and influence the oil producing countries in order to open their environments for private investment to make mineral legislation, mineral codes, more transparent and enforceable; to develop court systems to fight corruption; to use together international financial institutions that were mum on the issue of lack of competition in the investment environments and investment climate around the world.

We need to have a comprehensive strategy, and I hope that the National Security Council can take the lead and coordinate Departments of Treasury, State, and Energy on this.

To conclude, energy independence defined as competitive, local production of all energy we need remains a mirage. It is energy security that we need to accomplish in which an abundant and affordable energy supply is within reach of all Americans.

Recognizing in turn systemic and long-term instability of the global oil markets is a first step in addressing the problem the U.S. is facing.

Thank you very much.

[The prepared statement of Mr. Cohen follows:]

PREPARED STATEMENT OF ARIEL COHEN, PH.D., SENIOR RESEARCH FELLOW, THE HERITAGE FOUNDATION

The United States is the largest oil importer in the world, bringing in 13.5 million barrels per day (mbd), which accounts for 63.5 percent of total U.S. daily consumption (20.6 mbd).¹ Oil from the Middle East (specifically, the Persian Gulf) accounts for 17 percent of U.S. oil imports, and this dependence is growing. By 2017, the U.S. will be importing approximately 68 percent of its oil needs. Oil consumption represents 40 percent of America's energy needs, primarily used in ground and air transportation. The dependence of the U.S. and the global economy on oil is growing—which can have dire consequences for the economic wellbeing of the United States, our national security and American way of life.

Securing the stability of our oil supply to the best extent possible in cooperation with traditional U.S. allies, while bringing on board the emerging major oil consumers, such as India and China, should be the key diplomatic strategy for the intermediate term. At the same time, the U.S. needs to deter those, from Teheran to Caracas, who are seeking to harm and destabilize the world energy supply chain.

Working with suppliers and consumers to expand the transparency of, and international access to, existing oil supply by international oil companies, is a policy for the longer term. Vast U.S. domestic oil and gas reserves cannot and should not be outside of the reach of our consumers and our energy corporations. Expanding our energy mix to include non-traditional oil sources, such as oil sands, oil shale, deep off-shore oil and heavy crude is another important component in diversifying supply, as is producing more transportation fuel from coal and liquids-to-gas. Finally, encouraging investment and innovation in truly competitive alternative fuels and technologies, from sugar cane ethanol to plug-in hybrids, which will eventually compete with and possibly replace the current 19th century automotive technology, may be the best long term answer for enhancing our energy security in the 21st century.

SECURING THE U.S. ENERGY SUPPLY

The security and availability of global energy resources directly affects the U.S. economy. U.S. policies should enhance the security, stability, and economic development and the rule of law in oil-producing countries to ensure that energy resources remain readily available, ample, affordable, and safe—for everyone's benefit.

In his 2006 State of the Union address, President George W. Bush said, “[W]e have a serious problem: America is addicted to oil, which is often imported from unstable parts of the world.”² Recognizing the problem is laudable; however, relatively little has been done to solve it. There is a broad consensus in America, from the President to the man on the street, that the current situation is detrimental to the country's economic health.

The world, both developed and developing, is dependent on unstable or otherwise inhospitable regions for its oil supply. This social and political instability characterizes all of the major oil provinces: the Middle East, Venezuela, and Africa. Russia presents a separate set of issues which will be dealt with *infra*. Dealing with security and political factors limiting the development of oil and gas production needs to be a high priority for any administration—Republican or Democrat. This is particularly challenging because there so many moving parts in this complex system.

One of the most important avenues for dealing with the oil shortage is through conservation. Another is developing substitute and alternative fuels, such as ethanol, methanol, and gas-to-liquid. Higher oil prices are likely to dictate new engine and car designs which will work more efficiently and/or run on different fuels. The plug-in hybrids and other technological breakthroughs may eventually wean the world from the internal combustion engine and oil dependence. However, such technological and structural transformations are, as many things, likely to take longer than many expect, are certain to require massive investments, and are beyond the scope of this testimony.

¹U.S. Department of Energy, International Energy Administration, “U.S. Weekly Petroleum Products Product Supplied,” at tonto.eia.doe.gov/dnav/pet/hist/wrpupus2w.htm (March 31, 2006).

²George W. Bush, “State of the Union Address by the President,” January 31, 2006, at www.whitehouse.gov/stateoftheunion/2006 (March 5, 2006).

For the near term, let us focus on the principal avenues of securing our oil supply, which include:

- Deterring anti-status quo players, such as Iran, Venezuela, and the global jihadi movement with its terrorist organizations;
- Cooperating with local governments to enhance the protection of critical shipping choke points, such as the Suez Canal, the Bosphorus, Bab-el-Mandeb, the Straits of Hormuz, the Straits of Malacca, etc. and developing contingency plans for sea-born terrorism/piracy aimed at tanker ships.
- Boosting an international coalition of oil consumers, bringing aboard India, China and other major emerging markets, such as Brazil and Turkey.
- Securing open access and a level playing field for international oil companies (IOCs) and national oil companies (NOCs). Specifically, consumer countries should make openness of investment regimes; stable, predictable and transparent energy regulatory systems based on the rule of law in producing countries; and fighting corruption their top foreign policy priorities.

The Middle East

The Middle East and the Persian Gulf is the richest and most important oil province in the world. 40 percent of the daily shipment of oil passes through the Gulf. Approximately 20 percent of U.S. oil comes from the Gulf.

Currently, the security and stability of Middle East oil is threatened by ongoing conflicts in Iraq; an aggressive and nuclear Iran; and radical Islamist movements, with their terrorist arms, whose goals include toppling regimes throughout the Gulf, including the swing producer of oil, Saudi Arabia.

Jihadi movements, nurtured to a great extent by oil revenues from Gulf states, aim to eventually create a global Islamic empire—the Caliphate. These movements ultimately strive to subjugate and convert non-Islamic countries to their brand of Islam. This is a very long term project, and ultimately, it is hopefully a futile one. However, in the meantime, the existence and the goals of these movements pose an immediate threat to the security of some of the most crucial sectors of the world oil supply.

Sellers' Market. Today's global oil market is operating without the benefit of additional production capacity or significant strategic petroleum reserves beyond the U.S. reserves. The Saudi spare capacity has deteriorated over the past decade and a half from 3–4 million barrels per day (mbd) to 1.0–1.5 mbd. To make matters worse, some experts question reserve estimates provided by national oil companies in the Gulf and elsewhere, as these numbers are not independently audited. Without a clear understanding of how much oil is available, the world may be up for more nasty surprises.

Terror attacks that have been carried out to date on the oil infrastructure have clearly caught oil producers unprepared. For example, al-Qaeda's February 24, 2005, attack on the Aramco facility in Abqaiq, Saudi Arabia, sent shock waves through the world's financial markets. On the same day, the price of oil on international markets jumped nearly \$2, despite the attack's complete failure (the terrorists and two security guards were killed.)³

Most analysts agree that the February attack and an attempt on March 28, 2005, which was successfully averted, were merely trial runs in a much longer campaign designed to disrupt the global economy in general, and the oil and gas industry in particular.⁴ As the September 2001 World Trade Center attacks demonstrated, al-Qaeda tends to return to the scene of the crime, so another strike on Abqaiq and other oil targets is likely.

Both Osama bin Laden and Ayman al-Zawahiri have repeatedly called for attacks on key Western economic targets, especially energy sources.⁵ In a tape aired by Al Jazeera in February 2006, Zawahiri said:

³ Aljazeera.net, "Al-Qaida Says It Hit Saudi Oil Facility," February 25, 2006, at english.aljazeera.net/NR/exeres/A429E32C-D484-424E-9C58-D9E287580817.htm (March 6, 2006).

⁴ Stratfor, "Saudi Arabia: Abqaiq Attack Thwarted," March 29, 2006, at www.stratfor.com/products/premium/read—article.php?selected=Situation%20Reports&sitrep=1&id=264105 (March 31, 2006). See also "Saudi Arabia Nabs 40 Terror Suspects," *Kuwait Times*, March 31, 2006, at www.kuwaittimes.net/Navariednews.asp?dismode=article&artid=829180313 (March 31, 2006).

⁵ "Bin Laden' Tape Urges Oil Attack," BBC News, at news.bbc.co.uk/2/hi/middle—east/4101021.stm (March 29, 2006). See also Agence France-Presse, "Bin Laden Threat Drives Oil to Four-Month High," *The Taipei Times*, January 21, 2006, p. 12, at www.taipeitimes.com/News/worldbiz/archives/2006/01/21/2003290110 (March 5, 2006).

I call on the mujahideen to concentrate their attacks on Muslims' stolen oil, most of the revenues of which go to the enemies of Islam while most of what they leave is seized by the thieves who rule our countries.⁶

The unfortunate reality is that the Middle East remains the strategic center of gravity of the global oil market—a position that is not likely to change in the medium term. As long as radical Islamists, China, Russia, India, and Europe continue the struggle for the world's limited oil supply, the region will remain unstable. If the U.S. is to protect itself from these economic and political threats, it must use all the tools at its disposal to protect energy assets around the globe, while decreasing the world's dependence on Middle Eastern oil as quickly and efficiently as possible.

Oil as a Weapon. Many Arab leaders understand the dynamic of the world's oil dependence. For example, as early as 1990, the late Yassir Arafat said:

When the North Sea oil dries up in 1991, the United States will want to buy Arab petroleum. And when the American oil fields themselves run dry and oil consumption in the United States increases, the American need for the Arabs will grow greater and greater.⁷

This observation has not been lost on the current generation of politicians and terrorist leaders. However, bin Laden and Al-Zawahiri are not satisfied with the unwieldy weapons of oil boycotts and buying political influence in the West. Instead, they are clearly zeroing in on the oil-rich kingdoms of Saudi Arabia and the Gulf as their principal targets. They also appear increasingly interested in attacking the entire global oil industry, from wells to wheels.

The failed February 2005 strike and the prevented March 2005 attack on Abqaiq, mentioned earlier, were not the first times that al-Qaeda has targeted energy assets in the region. In October 2002, al-Qaeda attacked the *Limbourg*, a French oil tanker, off the coast of Yemen with a suicide boat filled with explosives. In 2002, American and Saudi intelligence agencies uncovered a plot by al-Qaeda sympathizers inside Saudi Aramco to destroy key Saudi oil facilities. In 2003–2004, al-Qaeda attacked the Saudi port of Yanbu and murdered five Western engineers working there.⁸

Some analysts have warned that a carefully targeted terrorist attack on oil facilities in Saudi Arabia could reduce Saudi oil production to 4 million barrels per day or less for up to three months, which would have disastrous results for the global economy.

Iran

The leadership of the Islamic Republic is engaged in operational planning to intercept the flow of oil in the Gulf. Despite Iranian President Mahmoud Ahmadinejad's earnest and ongoing attempt to project the image of an irrational leader of what international relations theorists have called a "crazy state," many analysts have yet to recognize fully the dire ramifications of Iran's professed intention to develop a nuclear weapons program.

If diplomacy fails, Iran's pursuit of nuclear weapons will leave the U.S. and its allies with few choices, all of them unpalatable.

In June 2006, Iran's oil minister cautioned, "If the country's interests are attacked, we will use all our capabilities, and oil is one of them." Perhaps most alarming are the remarks of Iran's Supreme Leader Ayatollah Ali Khamenei in the same month: "If the Americans make a wrong move toward Iran, the shipment of energy will definitely face danger, and the Americans would not be able to protect energy supply in the region."

The economic consequences of a military strike on Iran's nuclear facilities to the world energy market would likely be significant, if not disastrous. Immediately following military action, according to a Turkish assessment, uncertainty about Iran's ability to sustain oil production at the current level of 4 mbd could drive oil prices

⁶"Bin Laden War on West Just Starting: Deputy," *The Age* (Melbourne, Australia), December 8, 2005, at www.theage.com.au/news/world/bin-laden-war-on-west-just-starting-deputy/2005/12/07/1133829660913.html (March 29, 2006).

⁷*Al-Musawwar*, January 19, 1990, cited in Mitchell G. Bard, "Middle East Policy and Oil," Jewish Virtual Library, at www.jewishvirtuallibrary.org/jsource/US-Israel/usoil.html (March 29, 2006).

⁸Saudi-US Relations Information Service, "Gunmen Attack in Yanbu," *Special Report* No. 3, May 3, 2004, at www.saudi-us-relations.org/newsletter2004/saudi-relations-interest-05-03.html (March 5, 2006).

above \$80 per barrel.⁹ If Iran retaliated and escalated by shutting down the Strait of Hormuz, which would merely require placing anti-ship mines in the strait,¹⁰ the temporary loss of more than 15 million barrels of oil to the international market could drive oil prices above \$83 per barrel, the historic height of the 1970s (adjusted for inflation).¹¹ In fact, a recent Heritage Foundation war game and economic study speculated that oil prices could go as high as \$120/barrel for a limited time.

On the other hand, Iran's aspirations in the region are far-reaching. Allowing Iran to join the nuclear club introduces the possibility of Iranian interference throughout the Middle East, especially given Iran's proximity to so many of the world's largest oil fields. The large Iranian military, if amply supplied by Russia and China, would be in a position to dominate the Persian Gulf under a nuclear umbrella, particularly if U.S. ground forces were pinned down in Iraq.

Currently, Iran enjoys the support of some Shi'a forces in Iraq, especially Muqtada Sadr's Mahdi Army, and in the Shi'ite-populated Ash Sharqiyah (Eastern) Province of Saudi Arabia. This could facilitate a pro-Iranian Shi'a takeover of some of the largest oil fields in the world. In a worst case scenario, a nuclear Iran could threaten the United Arab Emirates and Kuwait. If this were to happen, the Islamic republic could quickly secure a sizable part of the world's oil supply, bringing the nuclear-armed militant Iran close to a virtual monopoly over the world's energy market.

Iran's Dangerous Arsenal. Since the 1990s, Iran has been upgrading its military with a host of new weapons from China, Russia, and North Korea as well as with weapons manufactured domestically.

Today, Iran boasts an arsenal of Iranian-built missiles based on Russian and Chinese designs that are difficult to counter both before and after launch. Of particular concern are reports that Iran has purchased the SS-N-22 Moskit/Sunburn anti-ship missile. The supersonic Sunburn is specifically designed "to reduce the target's time to deploy self-defense weapons" and "to strike ships with the Aegis command and weapon control system and the SM-2 surface-to-air missile." Iran is also well-stocked with older Chinese HY-1 Seersucker and HY-2 Silkworm missiles and the more modern C-802 anti-ship cruise missile (ASCM)—designs that Iran has successfully adapted into their own Ra'ad ad Noor ASCMs.

Iran has a large supply of anti-ship mines, including modern mines that are far superior to the simple World War I-style contact mines that Iran used in the 1980s. They include the Chinese-designed EM-52 "rocket" mine, which remains stationary on the sea floor and fires a homing rocket when a ship passes overhead. In the deep waters in the Strait of Hormuz, such a weapon could destroy ships entering or exiting the Persian Gulf. According to one expert, Iran "can deploy mines or torpedoes from its Kilo-class submarines, which would be effectively immune to detection when running silent and remaining stationary on a shallow bottom just outside the Strait of Hormuz." Iran could also deploy mines by helicopter or small boats disguised as fishing vessels.

Mines are only one of a host of potential Iranian threats to shipping in the Persian Gulf. The naval commandos of Iran's Revolutionary Guards are trained to attack using fast attack boats, mini-submarines, and even jet skis. The Revolutionary Guards also have underwater demolition teams that are trained to attack offshore oil platforms and other facilities. Finally, Tehran could use its extensive terrorist network in the region to sabotage oil pipelines and other infrastructure or to strike oil tankers in port or at sea.

Consequences of a Supply Disruption in the Persian Gulf. With supplies growing and the price of oil falling, there has been a shortsighted tendency to underplay the threat posed by a major disruption in the Persian Gulf.

Although oil prices fell precipitously after the outbreak of the Iran-Iraq War, it is important to remember that global energy needs are much different today from what they were during the 1980s. Oil production is at record levels, but global demand has increased significantly, especially in the past 15 years. Under today's conditions, the slightest disruption could drive oil prices back up toward historic levels.

⁹Anadolu News Agency, "Iran Warns of Excessive Oil Prices," *Zaman* (Istanbul), February 14, 2006, at www.zaman.com/?bl=hotnews&alt=&trh=20060214&hn=29790 (March 6, 2006).

¹⁰Kenneth R. Timmerman, "Iran Readies Plan to Close Strait of Hormuz," *Newsmax.com*, March 1, 2006, at www.newsmax.com/archives/articles/2006/2/28/181730.shtml?s=1h (March 6, 2006).

¹¹Hong Kong Trade Development Council, "Reassessing the Impacts of Higher Oil Prices," *tdctrade.com*, August 1, 2005, at www.tdctrade.com/econforum/boc/boc050801.htm (March 6, 2006).

THE U.S. DETERRENT?

U.S. military forces in the Persian Gulf could quickly establish superiority over Iran's conventional ground, air, and naval forces in any crisis, but Iranian mobile missiles, mines, commando attacks, unconventional warfare, and terrorist sabotage would pose more persistent threats that would be much harder to neutralize. The United States and its allies could eventually defeat Iranian attempts to close the Strait of Hormuz. Yet Iran could intensely threaten Gulf shipping for short periods, deter commercial ships from entering the Gulf, drive up insurance rates for Gulf shipping, and boost world oil prices on nervous markets.

The Administration is already maintaining a strong U.S. and allied naval presence in the Persian Gulf. Washington should also encourage its NATO allies, Japan, India, and Australia to deploy their naval forces periodically to the region. The Pentagon should conduct naval, air, and ground exercises with the Gulf Cooperation Council (GCC) states of Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, and the United Arab Emirates—particularly in the areas of minesweeping, port security, and missile defense—to demonstrate the capability and resolve to defeat potential Iranian threats. In particular, the U.S. Navy's mine warfare capability is potentially inadequate and under-prepared for the increasingly sophisticated arsenal that Iran can deploy. The U.S. should further upgrade its naval capabilities, including mine-sweeping and anti-ship missile defense. Washington should also encourage the GCC countries to invest in their own naval minesweeping capabilities.

The Administration should work with allies to develop contingency plans. The U.S. should encourage other nations to develop or increase their emergency oil reserves. Washington should also encourage Saudi Arabia and other Gulf oil producers to stockpile materials and equipment needed to rapidly repair damaged oil infrastructure and build new oil pipelines that bypass the Strait of Hormuz. Any such efforts would take time to complete, which is why it is imperative to begin now.

Beyond these crisis-specific guidelines, it is crucial that the U.S. follow through with these specific measures:

- Boost efforts to roll back Iran's subversive ideological, terrorist, and military threats;
- Diversify geographic sources of U.S. energy imports;
- Diversify the energy basket by expanding the domestic production of oil and gas, including drilling in ANWR and off-shore along both the Pacific and Atlantic the continental shelves and in the Gulf of Mexico;
- Expand extraction from market-based, non-traditional oil sources such as oil sands (tar sands); oil shale; and super-heavy oil; expand gas-to-liquid fuel production;
- Encourage expanded methanol and ethanol production and imports based on market principles; and waive punitive importation tariffs on sugar cane ethanol.

Russia and Eurasia

Since coming to power in 2000, President Vladimir Putin and his entourage have doggedly pursued policies aimed at concentrating the huge oil and gas assets of the Russian Federation and its pipeline in the hands of the state. State prosecutors used tax evasion charges to take over the YUKOS oil company, which has had its highest market valuation, in excess of \$43 billion. Other oil companies are now merging with government-controlled entities, albeit less violently. Russia is using state-owned energy assets as tools of its foreign policy to make its neighbors in the former Soviet Union and Europe more pliable. It is also actively seeking to prevent or preempt pipeline routes from the Caspian to the West which bypass Russia.

The natural gas sector is also at risk. These days Russia, Iran, Venezuela, Qatar and Algeria are reportedly pursuing the creation of a "natural gas OPEC," an important strategic development in energy markets in view of projections that liquid natural gas (LNG) will quadruple its trading volume in the next 15–20 years or sooner.

Three major Eurasian energy developments in the month of March made Washington policy makers jittery. First, Hungarian Prime Minister Ferenc Gyurcsany announced that his country would prefer Gazprom's Russian gas pumped via Turkey to the much-lauded, but much delayed NABUCCO project. The NABUCCO pipeline, spearheaded by the Austrians, was supposed to bring up to 30 billion cubic meters of gas from the Caspian to Europe through Turkey, Bulgaria, Romania, Hungary and Austria.

Second, Russia, Bulgaria and Greece signed an agreement to construct a Burgas-Alexandroupolis oil pipeline to bypass the Turkish-controlled Bosphorus Straits, a dangerous oil transport chokepoint. The project, which some call "the Orthodox

Pipeline,” will neutralize Turkey’s control of the vital oil artery, and reduce the liability which could occur as a result of a catastrophic event, such as a tanker fire or explosion in the middle of the 14 million city of Istanbul. The Burgas-Alexandroupolis pipeline will have a 51 percent majority control of three Russian government companies: Transneft, Gazpromneft and Rosneft, with the remaining 49 percent split between Bulgaria and Greece.

On March 6, 2007, Vagit Alekperov, chairman of LUKoil, announced that his company and Gazpromneft would create a joint venture to develop future projects, which would be 51 percent controlled by Gazpromneft—another step down the path of creeping nationalization.

Finally, British Petroleum hinted that its Russian partner, TNK, may sell out its share in the TNK-BP joint venture to a Russian state-owned company. At the same time, Russia is developing plans to build the second Bosphorus bypass from a port on the Black Sea such as Samsun, or Trabzon, to the Mediterranean.

These strategic moves, which took place in just one month—clearly indicate that the Russian state is pursuing a comprehensive strategy which masterfully integrates geopolitics and geo-economics.

On the geo-economic side, Russia aims at pre-empting Caspian oil and gas from being transported to world markets through countries and pipelines which Russia does not control. Moscow viewed the Western-controlled Baku-Tbilisi-Ceyhan (BTC) oil pipeline and the Baku-Erzurum gas pipeline with a jaundiced eye. Now it is dead-set upon preventing the creation of trans-Caspian arteries—from Kazakhstan and Turkmenistan—to enhance the viability of either or both.

Thus, from Moscow’s perspective pumping Russian gas via the Blue Stream across the Black Sea to Turkey, and then through connectors to Greece, Italy, and possibly via Bulgaria and Romania to Hungary, makes a lot of sense. This would preclude or delay the construction of a Trans-Caspian gas pipeline which would transport Turkmenistani or Kazakhstani gas.

Pumping more oil to the Mediterranean via the Burgas-Alexandroupolis pipeline, or in the future, the Samsun-Ceyhan pipeline which will be supplied with Kazakh oil through the port of Novorossiisk makes sense as well, denying Kazakhstan a viable trans-Caspian pipeline option to connect to BTC.

These proposed sea-pipeline routes are going to be problematic: tanker loading and unloading of crude in the trans-Black Sea leg, or extending the gas route under the Black Sea and via Turkey and Southern Europe make these pipelines very expensive and environmentally challenging. By selecting these routes Russia clearly chooses strategy over economics.

Russian strategic goals are to prevent countries on its borders from becoming pro-American. By locating pipelines and gas storage facilities in Hungary, Bulgaria, Greece and Turkey, Russia connects them to Moscow by “ties that bind”—pipelines. Oil projects tend to leak not just crude, but cash.

The elites in these countries have reportedly personally benefited from Russian energy developments to the tune of hundreds of millions of dollars. The opaque Russian-Ukrainian gas marketing venture Rosukrenergo, former German Chancellor Gerhard Schroeder’s chairmanship of Nordstream, Turkish ministers’ bribe scandals connected to the Russian Blue Stream gas pipeline, and other scandals prove this point.

The best strategy, wrote the great Chinese general Sun Tzu in the third century BCE, is to win a war without firing a single shot. This also includes, according to Sun Tzu, penetration and subversion of the enemy camp. To paraphrase another great strategic theorist, the Prussian Carl Clausewitz, foreign policy is the continuation of war by other means, at least in the view of some retired Russian colonels and generals who call the shots in the Kremlin.

Thus, there is no better way to “win the war” than to maximize geopolitical clout without firing a shot—and making money as you go. Russia is attempting to do so by building and extending a network of politically influential pipelines to adjacent countries. As the result, a Russian-influenced *cordon sanitaire* appears along its borders.

When it comes to oil and gas strategy, the Kremlin is in a league of its own. This is like watching a chess great master playing multidimensional chess with oil and gas fields and pipelines over decades. Middle Eastern rulers would so well to attend this master class.

The Bush Administration should be taking some diplomatic steps to oppose this Russian gambit. It is already conducting consultations with the European Union to coordinate energy policy. Washington wants to raise awareness of Russia’s energy strategy and condition Moscow’s access to downstream operations in Europe on Western companies’ access to Russian upstream energy resources.

However, the EU, including its Brussels apparatus, is split, as Germany is already deferential to Russia's energy interests. German companies such as E.ON are in partnerships with Gazprom to develop gas fields and downstream operations in Russia and Europe. It is also possible that The State Department may intervene with Bucharest to prevent a proposed Gazprom pipeline from Turkey from crossing Romanian territory. Clearly, the two small US military bases in Romania and Bulgaria and the proposed missile defense base and radar in the Czech Republic and Poland are not going to stop Russian expansion. Pipelines are much more effective tools of foreign policy than missiles.

Economic Freedom and the Oil-Producing Countries

Many oil fields around the world are headed for depletion.—National statistics are unreliable at best, or classified at worst, and national oil companies control up to 80 percent of oil and natural gas reserves. The main problem of oil shortages today is not lack of reserves in the ground but lack of access above ground.

Overregulation and a Poor Investment Environment. Laws requiring the government to own and/or control significant shares in oil ventures are common in many oil-producing countries. Overregulation and economic nationalism prevent international oil companies from owning mineral rights, while weak rule of law and insufficient protection of property rights in many oil-rich regions makes multibillion-dollar investments too risky.

In many oil-producing countries, arbitrary laws, failing and corrupt legal systems, selective taxation, conflicting legal codes, and government failure to enforce contracts have created a murky investment environment. Nationalization has a particularly chilling effect. Venezuela destroyed tens of billions of dollars in shareholder value. Russia frightened many investors away by breaking up its major oil company, Yukos, pushing Shell out of the Sakhalin Island project, and suing British Petroleum's Russian partner TNK for \$790 million in back taxes. Saudi Arabia abandoned its much-touted privatization of natural gas production.

Two-thirds of the world's oil reserves are concentrated in the increasingly unstable Middle East and are controlled by members of the quasi-monopolistic Organization of Petroleum Exporting Countries (OPEC).¹² Over the years, OPEC has been quick to cut supply and slow to increase production, bringing oil prices to today's high levels.¹³ Most OPEC member countries and other oil producers have high levels of government economic regulation and corruption, as documented in the *Index of Economic Freedom*, published by The Heritage Foundation and *The Wall Street Journal*.¹⁴ Thus, consumers are effectively paying two premiums on oil: one for security and one for suppliers' economic inefficiency and monopolistic behavior.

The U.S. needs to develop a comprehensive strategy to change the oil investment climate. Such a strategy should involve the Departments of State, Energy, and Treasury and be coordinated by the National Security Council.

Consumer countries, including the G-8 and major oil consumers, especially China and India, should join the G-8 to coordinate positions of the buyers' club. Consumers should use diplomatic and economic means to pressure OPEC and non-OPEC suppliers to liberalize their foreign investment laws, break up state monopolies, and phase out undue government intervention.

Efforts to promote such policies through international financial organizations such as the World Bank and EBRD should be increased. Economic assistance should emphasize economic freedom in potential recipients, including a liberal investment climate similar to Millennium Challenge Account requirements.

In many countries, lending institutions are weak, and excessive taxation diverts oil revenues before appropriate investments for future development are made. This limits the funds available to develop new fields and tempers the profit motive to expand production. These anti-business barriers have hindered investors from expanding oil and natural gas supplies, even in the face of surging demand. Oil buyers must coordinate policies to reduce these barriers.

Arms and vital equipment sales should be conditioned on improving the investment climate in the energy sector. The U.S. should also condition accession to the

¹²The 11 OPEC members are Algeria, Indonesia, Iran, Iraq, Kuwait, Libya, Nigeria, Qatar, Saudi Arabia, United Arab Emirates, and Venezuela.

¹³Ariel Cohen, Ph.D., and William Schirano, "Congress Should Lift OPEC's Immunity," Heritage Foundation *WebMemo* No. 777, June 27, 2005, at www.heritage.org/Research/EnergyandEnvironment/wm777.cfm.

¹⁴For example, in terms of economic freedom, Iran, Venezuela, and Nigeria were ranked 156th, 152nd, and 146th out of 157 countries, respectively. See Marc A. Miles, Kim R. Holmes, and Mary Anastasia O'Grady, *2006 Index of Economic Freedom* (Washington, D.C.: The Heritage Foundation and Dow Jones & Company, Inc., 2006), at www.heritage.org/index.

World Trade Organization (WTO) on policy changes that facilitate foreign investment.

U.S. State Department and Departments of Energy and Commerce, as well as international financial organizations such as the World Bank, should champion property rights protection to enhance access to resources and prevent expropriation, unrestricted and fair competition, free markets, business and governance transparency, and political accountability. If applied, these principles will allow significant increase of oil supply. Specifically, the U.S. should seek full access for international oil companies to mineral rights in OPEC and non-OPEC countries, including development of oil fields and energy transport infrastructure. The U.S. also should make privatization of national oil companies and economic liberalization one of the pillars of G-8 and OECD foreign and energy security policy.

CONCLUSION

Energy independence, defined as competitive local production of all the energy we need, remains a mirage. It is energy security that we need to accomplish, in which abundant and affordable energy supply is within reach of all Americans. Recognizing inherent, systemic and long-term instability of the global oil markets is the first step in addressing the problem the U.S. is facing.

Securing the stability of our oil supply to the best extent possible in cooperation with traditional U.S. allies, while bringing on board the emerging major oil consumers, such as India and China, should be the key diplomatic strategy for the intermediate term. At the same time, the U.S. needs to deter those, from Teheran to Caracas, who are seeking to harm and destabilize the world energy supply chain.

Working with suppliers and consumers to expand the transparency of, and international access to, existing oil supply by international oil companies, is a policy for the longer term. Vast U.S. domestic oil and gas reserves cannot and should not be outside of the reach of our consumers and our energy corporations. Expanding our energy mix to include non-traditional oil sources, such as oil sands, oil shale, deep off-shore oil and heavy crude is another important component in diversifying supply, as is producing more transportation fuel from coal and liquids-to-gas. Finally, encouraging investment and innovation in truly competitive alternative fuels and technologies, from sugar cane ethanol to plug-in hybrids, which will eventually compete with and possibly replace the current 19th century automotive technology, may be the best long term answer for enhancing our energy security in the 21st century.

Chairman LANTOS. I want to thank you, and I want to thank all three witnesses for extremely enlightening and substantive testimony.

I would like to pose one question to start with. What is the relationship of nuclear energy to the subjects you have dealt with, Professor Deutch?

Mr. DEUTCH. Mr. Chairman, I happen to be an individual who very much favors a reconsideration of the expanded use of nuclear power in this country. It is in the near term only indirectly related to the issue of oil or natural gas dependence because it is principally of course used as an electricity generating source.

In the longer term, however, the path which goes from hybrids to plug-in hybrids and eventually perhaps even to an electric car is one of the technology pathways that would take you away from a reliance on fossil fuels in general, natural gas for electricity generation, so in the longer run should nuclear prove to be less expensive, safe, we make progress on the waste problem and we manage to assure that it is not a source of nuclear weapons, this use of nuclear power, in the long run it does have the prospects of being a source of electricity for a car, for transportation, mass transit or individual automobiles. That is the pathway I see.

Chairman LANTOS. Dr. Yergin?

Mr. YERGIN. Yes. I think we tend to think of nuclear as stymied in the United States. It is about 20 percent of our electricity. No

new plants, although we might see some start in the next few years.

If we look outside the United States, we see that nuclear never stopped. Twenty-eight new nuclear power plants have been hooked up since 2000. Of course, most of them are in Asia.

Professor Deutch referred to the proliferation and the waste issues. I think in terms of the rebirth resurgence in the United States, you see the same problem that you see in all the energy industries. There is a real shortage of people.

There is a missing generation. Either they are close to retirement or young people haven't gone into the field. So the people constraint is actually affecting not only the oil and gas industry, but would affect a rebirth a nuclear power as well.

Chairman LANTOS. Dr. Cohen?

Mr. COHEN. Today nuclear is particularly attractive because it is a no greenhouse gas emission industry.

My concern is about the long-term cost of storage, of security of storage so you don't have low-grade nuclear materials that can be used and abused, the issues of proliferation as the Iranian case amply demonstrates, and the question about technology, for example, for fast-breeder reactors that burn more fuel or more efficient, but the byproduct is plutonium.

As long as somebody gives me satisfying answers to all these four questions, I will be happy.

Mr. YERGIN. Mr. Chairman, I have just one other thing; that substitution question. Nuclear doesn't do anything, to underline what Professor Deutch said, for oil directly because almost all the oil has been squeezed out of our electric power system. Less than 2 percent, actually 1.6 percent of our electricity, is all that is generated with oil today.

Chairman LANTOS. But you do agree with Professor Deutch in terms of the long-term substitution possibility?

Mr. YERGIN. Yes, particularly if we move to electricity playing more of a role in transportation.

Chairman LANTOS. Right. The second issue I would like to raise relates to the role of markets in the energy field since on the supply side we are fundamentally dealing with a less than perfect cartel, but nevertheless with a cartel or a series of interlocking or disjointed cartels.

To what extent are the consumers at a profound disadvantage at a time when the producers are moving toward a cartel, either the old-fashioned OPEC or new relationships within national oil companies?

Professor Deutch?

Mr. DEUTCH. Well, I think you are correct to have this concern. This is not a perfect operating market, and it is the political consequences of those imperfections that we have been stressing here today.

I would also mention again that the internal markets of these countries are also highly imperfect, especially in India and China where there are regulated prices and distributions done by a market system so that the absence of a—well, any steps which could be taken to make the markets more transparent and more open

will lead to greater efficiency and avoid the political risks that we are talking about here.

Chairman LANTOS. Dr. Yergin?

Mr. YERGIN. I think that OPEC is there. Sometimes its obituaries are written and then it is back again. I think that what ultimately governs here is supply and demand, and what we look at very carefully is spare capacity, how much additional physical capacity is there to produce because that is what controls the price.

We saw in 2004 a tremendous surge in world oil demand. It was unprecedented. It was as though we had 2½ years of growth in a single year, reflecting the success of a global economy that was best performing in the generation, and we have moved into a period of a very tight oil market.

We see that improving. We see investment coming in. I would go back to that issue that we have already talked about, which is the investment regime, the timing of decisions, are investments being made in a timely fashion, because ultimately that is what will govern price and availability, and I think that is where the concern—delay, what decisions governments made about resource development.

Chairman LANTOS. Dr. Cohen?

Mr. COHEN. I will try to take a harder line on the issue of OPEC and somewhat legalistic. By controlling production quotas OPEC behaves as a cartel. In 1979, a legal case was brought against OPEC as a cartel under the Sherman Act.

The U.S. State Department, if I am not mistaken, and I will need to consult my records, but I do believe that the U.S. Government intervened with the court and said that there is no interest in prosecuting OPEC and advised the court to accept the defense of sovereign immunity.

Under the prevailing legal doctrine, state-owned companies that are engaged in economic activities, do not enjoy protection of sovereign immunity, and therefore I do believe from the legal point of view OPEC is liable to be prosecuted under the Sherman Act in the United States and quite possibly that the U.S. Congress can intervene and make this point that the Sherman Act should apply to state-owned companies that are behaving in a cartel-like fashion.

Chairman LANTOS. Thank you very much.

Any comment from either of you on this?

[No response.]

Chairman LANTOS. Congresswoman Ros-Lehtinen.

Ms. ROS-LEHTINEN. Thank you so much, Mr. Chairman.

There has been some discussion, some press reports, about a gas OPEC. The Russian leader is pushing for it. There have been some other countries that have expressed interest in creating this, the countries that are the leading natural gas exporters—Russia, Iran, Venezuela, Qatar, Algeria.

Do you think that this will be created, and if it is created how will this impact our United States energy interest? Also, what is the likelihood that this gas OPEC could be used by countries such as Iran and Venezuela, Russia, as a political weapon, particularly given that these countries have used energy as a weapon in the past?

Is there anything that the United States and our allies can do in an effort to prevent such an organization from forming? Thank you.

Mr. YERGIN. The subject was given an extra boost when Mr. Putin a few weeks ago said it was a subject of consideration.

I think it is inevitable that many of the gas exporters are going to talk to each other and form some sort of association. Will they be able to come together and try and set volume quotas? I think it is going to be more challenging in the gas business because the LNG business is a very capital intensive business, and you have an enormous amount of money tied up in it.

I think that although others may disagree, I think the notion that there is going to be an organization that is going to function like OPEC is the gas area, although that possibility is there, is not as high.

I think that when we look out we see the LNG business actually doubling over the next 7 years, but I would go back to the point I made before. The big concern is the timing of the investment. You know, these are multi-billion-dollar projects. Are they going to go forward, and are they going to be there in time?

When you look at our gas demand, and we are going to be more dependent upon that global gas market, our biggest interest is to see that that investment is made and that we don't have a tight market, but rather that the supply is available.

Mr. COHEN. At the current levels of LNG production I think the value of this gas cartel, gas OPEC, is public relations for Russia and Iran. Perceptions do matter, and if Russia and Iran, number one and number two producers, Qatar, number three producer, Turkmenistan, number four or five producer, are all in this cartel, they are perceived by the outside world to have more clout.

However, in the future when LNG trade is increasing, as Dr. Yergin mentioned, the actual concerns about rates of production will come into play, and I do believe that this leads us to consider more production, more prospecting and exploration, exploitation of natural gas in both continental shelves of the United States and in Alaska.

Ms. ROS-LEHTINEN. And just one comment, if I could, from the panelists. Russia has already used its supply of natural gas as a weapon against Georgia, Ukraine, Belarus and other countries. Do you fear that this could be a precedent?

Mr. COHEN. So far the Russians coached their moves in terms of adjusting price up. Both the Ukraine and Georgia used to pay prices that were considerably lower than what the Europeans are paying.

Having said that, I am looking at what Russia is doing with gas pipelines, for example, in the Baltic, the Nordstream pipeline, that goes directly from Russia to Germany, what Russia is doing in Hungary with the MOL. Russia is using pipelines as means of influencing political outcomes, as means of neutralizing country's foreign policies, making them more friendly to Russia and potentially denying the United States either the presence or influence in those countries.

Mr. DEUTCH. I would like to make a couple comments if I could. The first is we should recognize that for the United States this is

a North American natural gas market. It is Canada, the United States and Mexico. We are tied together inevitably here, and that is a good thing. I don't think there is any problem with that.

I do believe, generally speaking, that the supplies of gas from Canada are reliable in a different way, but it is a North American problem, not just a United States problem, in the case of natural gas. That is the first thing.

The second is Gazprom is not your most socially reliable agency in the world. It is probably one of the most problematic organizations. I think that the use that Russia will make of Gazprom and of its natural gas both with respect to implicit uncertainties in Europe and with respect to the placement of their gas pipelines and their gas supply going east are a genuine national security concern. I consider that a greater concern than the possible formation of an OPEC-like price conspiracy.

Ms. ROS-LEHTINEN. Thank you so much, Mr. Chairman.

Mr. YERGIN. Congresswoman?

Ms. ROS-LEHTINEN. Yes?

Mr. YERGIN. One point. The fact of your question I think is very important because we do tend to focus when we talk about energy in terms of oil imports, but, as Professor Deutch says, now North America is pretty much a distinct unit, but as we become more integrated into global markets, because, among other things, the decisions we have made about what we want to do for electric power, that means what happens in those global gas markets will be more important.

One difference between oil is that still the pipeline gas will tend to dominate, including the Russians, as opposed to LNG. But that does again pose the question that both the other panelists talked about to at least have an understanding of what is their full resource base that we have here in North America as we consider the growth of gas imports into this country.

Mr. DEUTCH. North America today, not in the future. North America now is more or less balanced in gas production and demand, and interestingly so is Asia.

The Indian and Chinese problem is more an oil problem than an actual gas problem, but Europe is not. Europe is greatly out of balance with respect to the gas, and that is why this dependency on Russian imports for Europe must be of tremendous concern for them from a security point of view.

Ms. ROS-LEHTINEN. Thank you. And Russians have cut off supplies temporarily to Belarus and to Ukraine and are attempting to secure a monopoly over Turkmenistan's gas supply to the world by pipeline, so it is indeed very critical.

Thank you, Mr. Chairman.

Chairman LANTOS. Thank you very much.

Ambassador Watson.

Ms. WATSON. Dr. Yergin, in your book, *The Prize*, you describe the reaction of American consumers and markets in response to some of the energy price shocks of the last 40 years.

What strikes me about these accounts is how quickly energy consumers can adjust to new price and supply realities, yet when we talk here in Congress about policies to reduce consumption of oil we tend to talk in generational terms so my question is should we

as policymakers think more boldly about how we can reduce energy consumption?

If we create the right policy incentives, can't we reduce our consumption significantly within the next few years rather than the next few decades?

I am sitting here counting my age and saying I won't be around, and so my fear is that based on history we will either make these changes of our own accord, or the laws of supply and demand will make them for us, and they will be more painful than if we took the initiative. How would you respond?

Mr. YERGIN. Thank you, Ambassador Watson, for the question.

I think first you point out the rather quick responses, more so than one would expect. In a sense, one of the surprising things this time is that the increase in energy prices has had less effect on the overall economic performance than might have been anticipated in 2004.

I think what you are pointing to is demand, and I have always thought, and I think Professor Deutch said, that our biggest near term energy resource is conservation or energy efficiency.

I think what is new, it is old and new. This is the first time in a couple of decades that we have really seen what you have just described, this new, renewed emphasis on energy efficiency, and it seems to be something that is now seen across the spectrum that this is something that we need to address and we can.

The U.S. is twice as energy efficient today as we were in the 1970s, and to put it in simple terms I don't see why we can't strive to be twice as energy efficient again. The question is how do you get there?

Some of it is behavior. Some of it is turning over your capital stock. Some of it is what you do about things like CAFE standards and regulations, and some of it is about price and even that word that Professor Deutch uttered, gasoline tax.

But there is some mixture in there that can stimulate it, and I think that there is a consensus for both energy and energy security and for climate change reasons to try and move in the direction that you have suggested and to do it at a speed that is significant.

Ms. WATSON. We have been struggling over should we go out and explore and go to ANWR and so on, and because of the environmental concerns that have been brought to our attention more recently it just seems like an idea that would be retrogressing our country so I am just hoping that those of you who are really talking about sustainable sources of energy will get that word out for us.

Thank you, Dr. Yergin, but I want to go to Professor Deutch. We are looking at where we can seek these resources we need. We are at looking at South America, and we know the oil producing nations are giving us a discount and that that is satisfying some of our need.

The continent of Africa. One of the things that we run into when we look at various countries in Africa is the corruption that comes about, the threats that we are finding when we go in, and I think of diamonds, but we are going to have to look at that continent.

How would you suggest that we approach greater exports from the continent, and how would you recommend we do it in a more transparent way? I mean, what can we do diplomatically and politi-

cally with some of the countries that we know are in turmoil right now, but have the resources we are going to need for the future? Can you comment, please?

Mr. DEUTCH. Well, I did mention in my testimony, and I believe quite strongly—

Ms. WATSON. Yes.

Mr. DEUTCH [continuing]. That both our private sector companies and our Government would be well advised to always work for better governance in these countries in Africa, West Africa especially, but other parts of the world as well, where it is in our interests to see improved social and economic circumstances for the people as we tell them that they should maintain and then increase their production of oil and gas.

There have been different efforts to try to do this. The World Bank has taken some initiatives. There have been some efforts to tie assistance to particular pipelines I believe is it in Gabon in the Central African Republic? They have had mixed success, but it is very, very important because the level and the magnitude of corruption is really remarkable, and it affects the people. The people will rise up, and it will influence oil production.

In this regard I am especially mindful, for example, of the Chinese practices in Angola and the Chinese practices in the Sudan, which I think go against what is in the long-term interests of we as importing countries jointly to have stable markets which give economic advantage to all the people who participate, including the people in these countries, so it is a very important point, and we don't devote enough effort to it diplomatically or in the private sector.

Chairman LANTOS. Dr. Cohen?

Mr. COHEN. Ambassador Watson, one particular case of how difficult things are is the Chad-Cameroon pipeline. In the Chad-Cameroon pipeline the World Bank was intimately involved, but nevertheless the Government of Chad unfortunately diverted the revenue that they promised the World Bank to use for development and bought arms with it and did other things.

I believe, looking at the poorer African countries, if mechanisms are established to divert some of this oil revenue for education, because the African school system is broken, it would benefit these kids. This is a multigenerational project. Give the kids better education. You have hope. Without that it is going to be extremely difficult.

One other thing. Not only oil and gas has a great potential in Africa. I do believe as sugar cane ethanol is a more competitive ethanol and as the climate in Africa is conducive to grow sugar cane, Africa could become the second Brazil or maybe even bigger than Brazil in the future for development of sugar cane ethanol.

Very little effort is being done to look into that, to study that, and I really hope that now that President Bush went to Brazil, the United States and Brazil will work on sharing technology and R&D and investment. They will look together because both Brazil and ourselves have long, historic ties to Africa. American and Brazilian companies can work together to develop sugar cane production for ethanol.

Chairman LANTOS. Professor Deutch?

Mr. DEUTCH. It is my understanding though that the United States still has an import duty both on ethanol and on sugar and so if we were sensible about this we would remove those duties.

Chairman LANTOS. Thank you very much.

Mr. Tancredo.

Mr. TANCREDO. Thank you, Mr. Chairman. There are so many questions this whole issue develops, and I want to thank you, sir, for having this hearing because it certainly is enlightening in many ways.

I guess, first of all, let me start off with when we talk about the issue of the use of commodities, the use of other products, alternative fuels for ethanol in particular, what do you determine, any of you determine, to be the impact of that on the markets for those products themselves? If we use more corn for ethanol, what is going to happen to the market? How will this play out throughout the world?

The second thing is to the extent that we can actually begin the process of encouraging development of alternative fuels and alternative fuel vehicles through government either subsidies or tax credits or mandates, is it logical for us, and I suppose, Mr. Cohen from The Heritage Foundation, I would direct this to you.

Is it a logical case for us to make that although we are loathe on our side of the aisle, certainly I am, to government mandates and restrictions and that sort of thing and we want markets to take the lead in actually determining prices, but if you consider OPEC does skew the market. I mean, it isn't a free market in oil.

So is it not true that as oil prices decline to a certain point OPEC can control the process by turning the spigot down a little bit, changing the prices, and therefore we really don't have a free market in value. Therefore, does that give us the right, I guess, to say we can get into this thing on the other side through subsidies and/or mandates?

One of those mandates I would like you to comment on, because I think you started to talk about it, is the idea of flex-fuel vehicles. To what extent can we expect the market to allow those to just develop as quickly as we need them, or should we actually mandate that by a certain point in time all vehicles produced or sold in the United States be flex-fuel vehicles so that we can start the process of supply and demand?

If you have enough vehicles out there that can use it, that is the demand side. Pretty soon we will see supply develop. I guess because the votes are starting, let me just end right there.

Well, one last thing in terms of nuclear energy and its use in the production of electricity. We are now seeing that there is an interesting development in shale oil. We have gone through this a lot, you know, the boom and bust cycle in shale oil, but the new technology is to go into boreholes to heat the shale, melt it, bring it up.

The question is how much energy is used in the production of the heat to bring up the energy that you need, but atomic energy can be used much more efficiently for that very purpose to actually create the heat much less expensively, and also it is, as I understand it, in that tradeoff we win. Atomic energy, production of heat that brings up shale.

Anyway, please address those to the extent that you can and we have time.

Mr. COHEN. Let me kick off, and I am sure that Professor Deutch and Dr. Yergin will chime in. We do believe at The Heritage Foundation the market——

Chairman LANTOS. If I could ask of you to be very brief because we have a vote that we must make?

Mr. COHEN. Yes, sir.

Chairman LANTOS. Please.

Mr. COHEN. We do believe that the market should be the driving force to define the prices of fuel.

I was looking for an opportunity to mention that the Europeans are paying more than twice than we do for gasoline, and they are still driving. The numbers in Europe and here are quite comparable. Given a tax or increase in price of gasoline by 100 percent is not going to change it that much.

On the alternative fuels, I do believe personally, and we believe at The Heritage Foundation, institutionally that alternative fuels should be competitive without subsidies and without taxation. Therefore, on sugar cane ethanol, as Professor Deutch mentioned, it is time to waive that punitive tariff.

The question of subsidy or tax, subsidy through tax breaks on corn you should probably take up with your colleagues from the Midwest. That is the best way to address that.

In terms of flex-fuel vehicles, if you are looking from the purely market perspective, you probably cannot mandate that, but there is a national security aspect to it, and the costs are not very high.

My understanding is, and I may be wrong, that it costs about \$150 to pay an extra premium for a flex-fuel vehicle, and I myself personally would pay the \$150 just in case something bad happens with the oil supply and I need to pour some other fuel into my small car.

Thank you.

Chairman LANTOS. Dr. Deutch?

Mr. DEUTCH. I will be brief. The first issue has to do with whether you want to do some kind of mandating, which is something that I would advise against, a renewable fuel standard or something like that.

I would much, much prefer to see a tax placed on the oil to show its national security premium, if you like, and then the market will adjust automatically without tinkering about what the numbers should be, so I would prefer use of a tax vehicle if we had the political will to do that to substitute for the portfolio standard.

Secondly, you are quite right about the possibility of nuclear heat being used to get the kerogen and turn it to liquid and bring it up. That is a low CO₂ producing route as well. But it requires that we have nuclear power meeting all the criteria, the four criteria that I mentioned before of waste, cost, nonproliferation and safety; then nuclear heat itself becomes a quite interesting intermediary to producing liquid fuels.

Chairman LANTOS. Let me express my deep appreciation to all three of our most distinguished witnesses and apologize to my colleagues, but we have a live vote that each of us will have to make. We are deeply in your debt.

This hearing is adjourned.
[Whereupon, at 11:42 a.m. the subcommittee was adjourned.]

