The UNIVERSITY of OKLAHOMA
PRICE COLLEGE OF BUSINESS
Energy Institute
*Enhancing the Business of Energy*

# ENERGY SYMPOSIUM

## *A Comprehensive Look at Strategic Imperatives for the United States*

## CONFERENCE REPORT
## March 5, 2013

# 2013 Energy Symposium - Conference Report

## Contents

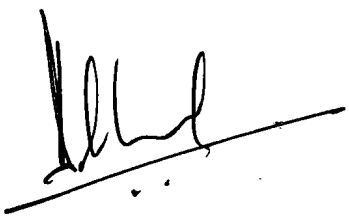
The UNIVERSITY of OKLAHOMA
PRICE
COLLEGE OF BUSINESS
Energy Institute
*Enhancing the Business of Energy*

Dear Energy Industry Colleague,

Thank you for attending the inaugural Energy Symposium on March 5, 2013, organized by the Energy Institute at the Price College of Business, University of Oklahoma. The Energy Institute was established to fulfill the growing need to provide a balanced, unbiased link between energy policy-makers and the multi-faceted energy sector. It is dedicated to fostering advanced energy-related business education, research and policy-relevant outreach on cutting-edge issues facing all stakeholders in the energy space, and seeks to create a community of academics and practitioners. For more information about the institute, please visit http://price.ou.edu/energy

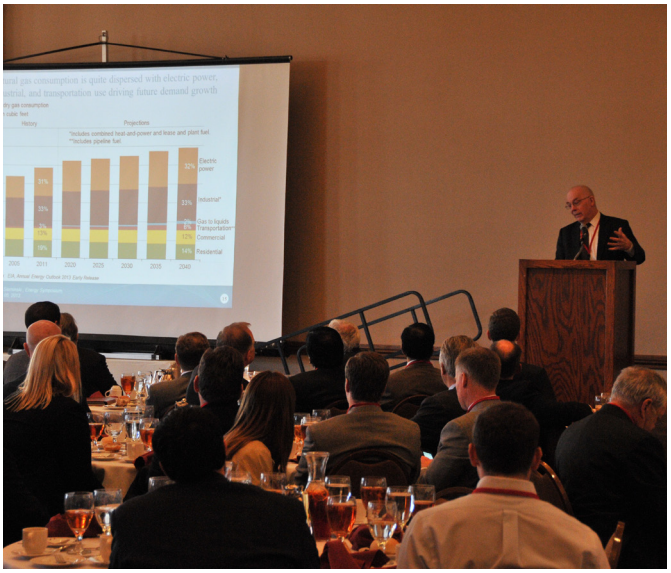
This symposium was designed to discuss the critical importance of developing and implementing a pragmatic and enduring energy strategy for America's future. We had an impressive array of speakers with diverse backgrounds in energy participating in our symposium. They discussed (i) The Evolving Global Energy Marketplace, (ii), Energy Challenges for the US, and (iii) An Energy Strategy for Our Future. The dialogue was thought provoking as the speakers discussed the variables in the energy equation associated with the above topics and provided several key elements that should be addressed in a comprehensive strategy for energy in the U.S.

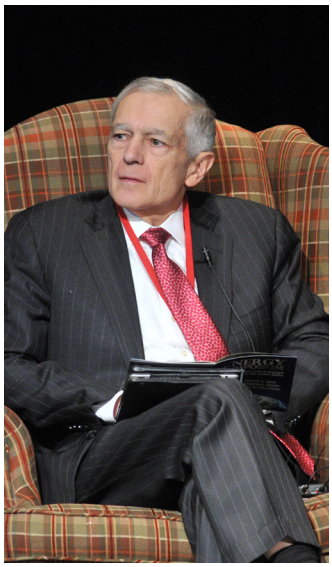
We hope you will find the conference report of the inaugural Energy Symposium a convenient and useful reference. Please feel free to pass it along to your colleagues. We look forward to seeing you at our future conferences.



Dr. Dipankar Ghosh
David C. Steed Professor of Accounting, and
Executive Director, Energy Institute
Price College of Business, University of Oklahoma


OKLAHOMA
ENERGY
1





# ENERGY SYMPOSIUM

*A Comprehensive Look at Strategic Imperatives for the United States*
*March 5, 2013*

## EXECUTIVE SUMMARY

On March 5, 2013, the Energy Institute at the University of Oklahoma's Price College of Business hosted an Energy Symposium focused on the theme of defining a comprehensive and coherent long-term energy strategy for the United States - for the benefit of our economy, our national security and our environment.

The symposium featured 17 speakers from diverse areas of knowledge and experience in the global energy sector, representing oil, gas and coal resource developers/suppliers, electric power generators/suppliers, oil and gas transmission sectors, energy analysts, economists and geopolitical/military experts. The program was not sponsored by, nor did it favor, any special interest groups or political agendas. It was designed to address the most compelling attributes of a prospective national strategy for energy that will benefit all Americans. The strategy would consider pragmatic, economically sound principals applied to our significant portfolio of energy-related opportunities, with due consideration of practical solutions to the challenges that lie ahead.

It was the consensus of the panelists that a comprehensive and balanced approach to long-term energy strategy and policy, grounded in consistent economic principles, can be the most efficient and effective path to accelerating and sustaining economic growth and job creation in our country - our most compelling and urgent need. Furthermore, the consensus of the speakers was that this far-reaching strategy could also provide material and sustainable benefits to our national security and our environment.

The United States today is in the enviable position to be able to control what its energy future (and to a large degree, its economic future) will look like. However, we must begin by embracing "win-win" solutions focused on energy resource supply diversity, level-playing-field economics, global competitive awareness and resilience, and demand-side energy efficiencies. All of these strategic principles should be supported by enabling policy and commitment to focused, pragmatic research and development.

Key observations and conclusions from the consensus of the speakers are as follows:

- Hydrocarbon fuels will realistically be the primary resource for our future energy needs for many years to come. We must encourage the responsible development of domestic supplies to their fullest, economically viable potential.

- Alternative renewable energy sources are important to the overall energy portfolio, but will remain a marginal contributor. Their future impact will be constrained by economic viability and technical limitations. Continued research and development aimed at removing longer-term barriers to economic and volumetric supply viability should be a priority.

- The physical and geopolitically driven supply-demand gap for oil on a global basis will continue to grow and put pressure on both price and availability in the increasingly competitive global market place. Price volatility will likely continue, even as the country becomes

less reliant on non-North American sources.

- Due primarily to the renaissance of oil and gas exploration and development in the United States, plus downward impact on energy demand due to consumption efficiencies, the nation is in a position to secure its longer-term energy future.

- As a result of increasing reserves and production of oil and gas in the United States and Canada, proven long term supplies of low cost coal and growing contribution from economically viable wind and solar, the country has a reliable, abundant and diverse portfolio of energy resources from which to drive sustainable economic growth, strengthen national security and make material, directionally positive impact on our environment.

- The United States needs, as a matter of urgency, a coherent, pragmatic long-term **STRATEGY for Energy:**

  1. **DIVERSITY** - Rely on and optimize the utilization of our diverse portfolio of energy resources. Diversity is good. It provides healthy competition - yielding the lowest cost to the consumer, driving technological advancements that continue to create economically viable options as well as providing a good hedge against global forces outside our control.

  2. **LEVEL PLAYING FIELD ECONOMICS** - Allow natural market forces to shape how we employ these diverse energy resources. Don't pick winners and losers by policies that subsidize one over another. The health and viability of our long-term energy portfolio will be optimized with "level playing field" economics. Natural market forces are the best determinant of our future energy mix.

  3. **ENABLING POLICY AND REGULATION** - Provide policies and regulations that enable (as opposed to dictating or mandating) the execution and success of our long-term strategy.

     (a) Maximize oil and gas production in the United States - with reasonable and pragmatic boundaries for expected conduct and performance of producers and suppliers.

     (b) Encourage North American oil and gas supply infrastructure development - particularly with Canada.

     (c) Embrace coal as our current low-cost foundation and long-term safety net for US energy supply and encourage the development of "clean coal" technology.

     (d) Encourage technological development that makes renewable energy resources a viable, but important marginal component of our energy mix on their own economic merit.

     (e) Continue a focus on encouraging the development and implementation of new energy efficiency measures as these have the same effect as developing additional energy resources.

     (f) Do not prohibit the export of energy resources in the global energy marketplace. This includes natural gas. Competition and market forces will provide the ultimate balance of exports vs. domestic supply, with optimum benefit to consumers and producers. There will be ample and relatively low-cost natural gas resources to drive the resurgence of manufacturing in the United States.

4. **ENERGY UTILIZATION TECHNOLOGY** - Encourage technological advancements of the most economically viable forms of energy utilization:

(a) Transportation sector transitioning away from refined oil products to natural gas (as well as to electricity where economically viable) for personal, commercial and long haul transportation should be our highest priority. Natural gas for transportation is the quickest, least costly path to energy security. The technology is available now and the economics and environmental benefits are compelling. This conversion will have the added benefit of driving the reversal and eventual cessation of our use of ethanol as a supplement to gasoline, a practice that has well-known economic and social shortcomings.

(b) Focused research and development on materials, engine efficiency and energy waste recapture to reduce overall consumption of all primary forms of energy to sustain current positive trends in energy efficiency.

(c) Regard safe nuclear technology as a priority and consider nuclear power as a material part of our longer-term energy mix for electric power generation.

## SUMMARY OBSERVATIONS AND CONCLUSION

Global economic and geopolitical forces will continue to set the price and drive volatility of supply for oil. An effective, long-term strategy for oil as a decreasing part of the energy mix for the United States will moderate price, reduce the influence of supply volatility and have a lasting impact on our economy, security (and the cost thereof) and environment through the intermediate bridge of abundant, lower cost and cleaner burning natural gas in the transportation sector.

A diverse fuel base for the manufacturing and electric power generation sectors, grounded in level playing field economics, will assure a reliable business environment for the continued revival of domestic manufacturing and resulting job creation, and provide affordable electric power for consumers over the long-term.

Our energy strategy should also include encouragement of breakthrough technologies for safe nuclear as a material component in our long-term energy mix. Safe nuclear could be the next act and our "greenest" long-term energy resource for electric power generation.

Access to secure and low cost long-term supplies of energy will increasingly drive global economies, competition and geopolitical forces that will impact our future. We must not isolate ourselves as we implement our strategy. In the end, our national security and prospects for sustainable, positive environmental advancement is directly linked to the global community's progress as well. A strong alliance with our North American neighbors is imperative.

To accelerate and maximize the benefits of a long term energy strategy, we believe that all stakeholders in the energy space - resource providers, electric power producers, transportation infrastructure operators, refiners, consumers, labor associations, and pragmatic environmental interests must embrace the "win-win" nature of the plan and its prospects. We have an extraordinary opportunity to secure our economic future, while having a material impact on our national security and quality of our environment. What we do in the US will influence the rest of the world as well. If we are successful, we will drive similar results as other countries adopt comparable strategies. Government should embrace the vision, provide the boundaries through enabling policy and allow the private sector and market forces to work out the implementation and realization.

# THE SYMPOSIUM
## DISCUSSION & ANALYSIS

The following sections of this report will serve to provide more specific commentary from our speakers in three subject areas relating to the overall theme of the symposium:

1. The Evolving Global Energy Marketplace

2. Energy Challenges and Opportunities for the US

3. An Energy Strategy for Our Future

Each panel session was directed by a moderator who asked questions of the panelists related to each session's overall topic and also guided questions from the audience to further clarify the speakers' opinions.

## Panel Session 1: The Evolving Global Energy Marketplace

**Moderator:**
Bruce Stover - Retired Oil & Gas Executive
**Speakers:**
General Wesley Clark - Retired Supreme Allied Commander Europe, NATO
Philip Lambert - CEO, Lambert Energy Advisory
Edward Morse - Global Head of Commodities Research, Citigroup
Robert Sheppard - Former CEO, BP-TNK
R. James Woolsey - Former Director of Central Intelligence

# Importance of Energy for Economic Development

Energy is the foundation of mankind's existence and is essential to sustain its future growth. The development of indigenous energy resources in the United States was the catalyst for growth in this country, particularly after WWII, and has enabled our global economic strength and political influence. The rise of other countries' economies and geopolitical influence also can be connected to their ability to effectively secure, distribute and utilize relatively low-cost energy. However, according to Philip Lambert, of Lambert Energy Advisors in London, "The energy industry in the western democracies has endured 15 to 20 years of propaganda from the political and media elite, trying to besmirch and darken the industry that has fundamentally driven our economic and social advancement. That view must be changed." Panelists for this session agreed that the importance of energy is not well understood and its benefits are largely taken for granted. They also expressed their belief that competition for limited supplies of energy resources will drive economic and geopolitical tensions between developed countries and shape the economic future of developing countries.

"Despite the recent depressed economic conditions in the United States, the oil and gas industry has provided, and continues to provide, great innovation and massive investment which led to and expanded the shale revolution. As a result, the United States now finds itself in a position where it can continue to grow its economy and create jobs through an increased emphasis on securing abundant, reliable and low cost supplies of domestic energy resources, while reducing its reliance on supplies from other more volatile regions. Because of this unexpected development, the prospects for the United States' future have never been brighter," said Lambert. This emerging advantage is in sharp contrast to the energy challenges facing Europe and Asia where economic growth and security of energy supply are more precarious.

# Different Fuels for Power Generation and Transportation

Electric power generation and transportation fuels come largely from separate sources. With an abundance in natural gas, coal, and the potential for renewable energy, the United States is fulfilling most of its electricity demand from domestic sources while advancing environmental progress. Ed Morse of Citigroup noted, "Natural gas has eliminated 100 million tons of the 900 million tons of coal that the power generation system was burning. Because of the

decrease in coal use, the United States' carbon footprint has declined by just under 20% in half a decade." James Woolsey, former director of the Central Intelligence Agency, discussed the increasing impact of renewable energy technologies, particularly with high capacity wind generators, more efficient solar panels, improved large capacity batteries, and micro grids providing important new options. Philip Lambert was cautionary on renewable energy as a major long-term component for power generation citing their unproven reliability and high cost in many regions, but recognized that renewables can play a meaningful role. Fuels used for electric power generation will be a function of availability, technical reliability, relative economics and, to some degree, environmental concerns. All panelists agreed in principle that renewable energy will provide an important but likely marginal role in electric power generation. Market forces will (and should) shape the mix in the United States, with natural gas and coal supplying the primary source and renewables, which can economically compete on their own merits, providing the rest. Globally, electric power generation resources vary significantly from coal dominant countries like China to nuclear dominated France.

Transportation is predominantly dependent on oil derived products, which the country, until recently, had a decreasing domestic supply. In fact, 70% of United States oil consumption is due to demand from the transportation sector. Oil resources had, until 2006, increasingly come from foreign sources. Until recent developments in the United States, two-thirds of the global oil reserves were controlled by three percent of the population - primarily in the Middle East. This fact has to be viewed as a strategic security threat to the country. However, recent impacts from United States and Canadian onshore oil exploration and development have reversed the import trend. Seven years ago, the United States imported 60% of its oil supplies. Today, thanks to the revolution in onshore oil development, and, to some extent, deep water offshore, the United States imports 40% of its needs and that figure is dropping. "In spite of this success, our country still spends about $1 billion a day on foreign oil imports," said General Wesley Clark. Furthermore, oil is a commodity that is traded globally, and prices are determined by international supply and demand. Oil prices may moderate and stay below $100 per barrel in the near future, but the volumetric supply and price will remain volatile. Replacing a portion of our use of oil derived products in the transportation sector with natural gas and electricity will minimize the impact of oil's volatility, materially impact the cost of imported oil, strengthen our national security and make sustainable improvement to the environment. Oil will, however, remain essential to mankind's quality of life since it is the feed stock for chemicals, plastics and other products that touch every part of our everyday life. Globally, oil will remain the predominant fuel source for transportation until natural gas and electricity are more widely utilized.

## Price Volatility and Uncertainty of Oil

The supply and price of oil will remain volatile, driven by the competitive clamor for economic survival and growth, geopolitics and issues related to the world's two most significant suppliers, the Middle East and Russia.

**The Middle East:**

"The best predictor under any circumstances of the price of oil is the Saudi budget," said James Woolsey. Saudi expectations for sustained high prices are reflected in increased spending forecasts and vice versa. Bob Sheppard, former BP executive, projects, "We're going to see soft prices for the next five to ten years. I think Saudi Arabia is going to be under real pressure because they're the choke valve. They'll have to decrease production to try to prop up prices as US production increases. While Saudi lifting costs may be as low as $2 a barrel, they need $100 oil because of their high social costs. Their ability to sustain revenues is going to be under pressure. They were able to mitigate the Arab Spring by making social payments

to potential dissidents. If they are unable to do that at the level that they have historically done, there will be greater instability in that region." This volatility risk is a real threat and could trigger future economy-killing oil price spikes. The United States can insulate itself to a large degree from the impact of such volatility by its increasing self-sufficiency for oil and diversifying its sources for transportation fuels.

**Russia:**

Since 50% of Russia's revenues come from oil and gas, Russia also needs $100 dollar oil to balance their budget. In Bob Sheppard's opinion, Russia will be financially squeezed, for he expects oil prices "south of the $100 mark in real terms for the Russians." This will dampen Russia's abilities to invest in the development of new supplies for the global market. Additionally, Russia's natural gas business is under tremendous pressure, because Europe is diversifying its sources away from Russia to new, competitively priced LNG sources from other countries. Consequently, Russia will have less oil and gas export income to invest in new domestic oil and gas projects and their future export capacity will remain under pressure.

Ed Morse explained that high oil prices "have had a magical impact on capital expenditures." Recent trends in sustained high prices have led to investments, which have opened up three areas of frontier oil in North America: shale oil, oil sands, and deep water. Although the industry succeeds when prices are high, consumers are hurt when oil prices become too high. Philip Lambert's view "is that when the oil price goes to $120 dollars a barrel, the world catches a cold, and when it goes to $150 dollars a barrel the world catches severe flu. The global economy cannot take any more of the oil price spikes we experienced in 2005-2007." What the right balance is for oil price is uncertain, but the volatility will continue as a threat to economic progress. The continuing impact of the Arab Spring and other regional conflicts will keep pressure on oil supplies and sustain volumetric and price volatility.

# International Shale Development - New Global Oil Supplies

Many experts believe that the global oil supply potential to meet growing demand is great, but the timing and cost to realize that potential is uncertain. Ed Morse assured the audience the world has an abundant supply of hydrocarbons, and the growth in production is accelerating faster than expected. Philip Lambert stated his belief that the shale oil revolution will sweep the world as it did in the US, and "there could be over 200 years of remaining oil and over 250 years of natural gas in terms of global reserves." Lambert explained however, that shale development needs to occur elsewhere outside of North America to meet world demand and forecasts that shale oil development will have to become widespread to meet the growing global oil supply-demand gap. That gap by 2040 could mean that we must develop new sources of production equal to "four new Saudi Arabias to meet even moderate demand growth." Qualifying this potential, Bob Sheppard explained how difficult it will be for other countries to replicate the United States' shale development in the near term. Even though the resources are there, because of complex mineral rights ownership, inconsistent regulation, constrained financial resources, the lack of infrastructure, and an absence of entrepreneurial service companies, international shale development will be challenging and slow to evolve. For example, the Bazhenov oil shale in Russia is possibly 80 times the size of the Bakken shale in the United States, but because of all the challenges mentioned, it is not a high priority for the Russian government. It is likely that new oil production will not fill the global supply demand gap for many years, despite the positive view of reserves. This will keep upward price pressure on oil.

## Foreign Policy and National Security

Our country's dependence on foreign oil impacts national security and foreign policy. General Wesley Clark stated, "A direct or indirect factor in recent military conflicts has been the protection of our access to foreign oil. United States dependence on foreign oil puts the nation in a vulnerable position." The annual United States military budget since 9/11 has increased by over $200 billion, largely in response to the real threats of terrorist acts on our home soil and threats to our interests abroad. This level of military spending can be reversed by greater energy security. James Woolsey also discussed the specific security issues surrounding the domestic electricity grid, which was built for ease of access and affordability, but no thought was given to security. The country functions on electricity and 17 of the 18 critical infrastructures in the United States depend on power from vulnerable electric grids. These vulnerabilities can be eliminated by investing some of the proceeds of lower imports and lower military spending into our infrastructure and its physical security.

Viewing the issues from a European perspective, Philip Lambert explained that because of the global marketplace for oil and gas, the energy industry brings people together unlike any other industry. "Energy can help the country to build bridges with formerly unfriendly people." Reliable, low-cost access to energy resources can dampen global tensions that are economically driven. The country's foreign policy should recognize this. Global participation by the United States in the wider energy sphere is important. Our leadership in becoming more energy secure as a nation will ease the price pressure on oil and help drive the behavior of others.

## Energy Independence

With recent oil and natural gas developments, the United States is increasing domestic production and is on the road to North American energy independence. As James Woolsey stated, "Independence does not mean economic isolation, it does not mean not buying something overseas; it means not being ordered around." All the panelists agreed that the country would always be a part of the global energy market and continue to import and export energy commodities, but that our increasing ability to be independent from foreign oil suppliers will make us more able to control our own destiny.

General Clark commented, "Last year we spent $300 billion dollars importing oil. As Jim Woolsey said, "That money went to a lot of people who don't agree with us; it's a direct tax on the American economy. The United States cannot be energy independent as long as OPEC controls much of the supply. Increasing domestic production and decreasing imports cannot fundamentally alter the global market for oil, but it can reduce the impact of volatility and the risk of economy killing price spikes. The country needs a strategy to promote a diversified portfolio of energy resources to replace up to eight million barrels of foreign oil per day that we import." Consumer choice of transportation fuels driven initially by natural gas will enable this to occur. "Other countries like Brazil, Israel and China offer the choice of gasoline, ethanol, CNG or methanol at the pump," said Jim Woolsey. "We too need to offer that diversity." Methane is the principle component of natural gas for compressed natural gas. It is cleaner burning than gasoline and, more important, saves consumers as much as two-thirds on the cost per gallon equivalent. Broadening United States sources of transportation fuel would lower the price at the pump to consumers and keep more money in the domestic economy by reducing the balance of payments and military spending, perhaps by as much as $500 billion per year. That is real economic impact.

"Our country needs the right plan and the right leadership from government and the private sector to reignite American economic growth. Energy is fundamental to expand the economy and generate higher paying jobs which will keep America strong and our values alive in the 21st Century and beyond," said General Clark.

# Panel Session 2: Energy Challenges and Opportunities for the US

**Moderator:**
Randy Brogdon - Partner, Troutman Sanders
**Speakers:**
Alan Armstrong – CEO, Williams Companies
Joe Craft - CEO, Alliance Resource Partners
George Kaiser - Energy Investor
Harry Pefanis - President & COO, Plains All-American Pipeline
J. Mike Stice - CEO, Access Midstream Partners

## Technological Advancement

The energy industry underestimated the role of technology in driving new prospects of energy independence. Just ten years ago, the prevailing world-view was that natural gas supplies were running out. Now, due to the shale gas revolution that has swept the United States, North America is now essentially self-sufficient in its natural gas supply for at least the next 100 years. The phenomenon is now also positively impacting our oil supplies.

The advancement in drilling and completion technology continues to accelerate. Horizontal drilling and hydraulic fracturing advancements have driven our success in shale development, but they are not new technologies. The oil and gas industry has been drilling directional wells and utilized hydraulic fracturing to enhance production rates for more than 50 years. The main factors that enabled the shale revolution were the advancement in drilling techniques and equipment such as bits, pressure control, and top drives which all enabled faster, lower-cost drilling. George Kaiser, an experienced and successful energy investor, asserted that "the greatest advancement has been our ability to drill wells horizontally and mechanically separate the wellbore into segments and stimulate, through hydraulic fracturing, each segment of a long horizontal hole section as if it was a separate vertical wellbore."

## Job Creation

Joe Craft, with Alliance Resource Partners, stated his belief that, "The energy industry is the greatest contributor to our well-being and that the energy renaissance in the United States has created more new jobs than any other sector." During one the most severe economic downturns in country's history, increasing domestic production has created good-paying jobs that have helped the economy grow, both on the local and national level. "The development of domestic sources of energy helps to keep money here in North America," said Joe Craft. Alan Armstrong with Williams Cos. explained, "The United States has a competitive advantage because of cheap energy prices, which will help manufacturing return to the country, but the United States needs new infrastructure to take advantage of this opportunity." The revival of manufacturing and the expansion of infrastructure will create many new high-paying jobs. The United States is already seeing this happen. The oil and natural gas energy revival has been primarily responsible.

## Challenges

In the United States, various public perception, political, environmental and policy challenges have constrained our ability to effectively develop our energy resources. One major challenge is that the general public

seems to take for granted the availability of low cost energy in the country and fails to grasp the costly ramifications of policies and regulations that limit domestic production of fossil fuels. Mike Stice of Access Midstream Partners holds an optimistic perspective, noting, "The benefits of the opportunities far outweigh the challenges," but recognizes that the challenges remain.

Harry Pefanis, president and COO with Plains All-American Pipeline, outlined some of the major challenges with domestic production including the need to develop infrastructure to move product to the appropriate markets, a shortage of experienced labor caused by an age gap in the labor force, and the need for refinery conversion to efficiently process the type of oil that is currently being produced in North America.

Over-reaching regulation was highlighted as the major challenge to realizing full potential of domestic oil and gas production. While it is difficult for government regulators to halt development on private land, regulation is heavily enforced on public lands and at the midstream level. The most notable case in point is the Keystone Pipeline project linking Canada's vast heavy oil reserves to the United States' markets. Alan Armstrong stated, "Stringent regulations are a result of the public's opposition to drilling in certain areas of the country." Regulation of onshore infrastructure is also being developed and implemented at several different levels (local, state and federal), which makes doing business more complex. According to Alan Armstrong, "It costs two to four times more time and money to lay an onshore pipeline in the Northeast United States than it does to lay pipeline in 7,000 feet of water in the offshore Gulf of Mexico." Joe Craft echoed the sentiments of fellow panelists indicating, "Overbearing regulations have resulted in significant negative impacts to the coal industry as well." Finally, the concerns of various environmental interests continue to affect the country's energy resource development. The panelists all observed that the United States' industry has been highly responsive to the concerns of environmental interests and that procedural and technological advancements are working effectively to minimize risks.

## Communication

The consensus of the panel was that it is critical to educate the public about the energy industry and how it impacts the economy, quality of life, and the environment. Horizontal drilling and hydraulic fracturing were highlighted as key examples of revolutionary technology that, while widely credited with driving the reversal of United States' oil and gas production trends, are highly criticized by environmental interest groups. Concerns include endangering water reservoirs, creating toxic surface sites, the excess use of fresh water resources, and the source of new earthquake activity. George Kaiser explained, "Minor earthquakes are the closest to being a real concern, because the injection of water under high pressure lubricates naturally-occurring fault zones which can stimulate minor seismic events." Several panelists stated that the real issues for environmental concern are associated with the actual vertical drilling of wells, not hydraulic fracturing. Long proven procedures for isolating fresh water zones from oil and gas wellbores using steel pipe and cement, are the only real areas of technical concern for environmental risk to shallow fresh water formations. With a proper near-surface casing and cement procedures, it is very unlikely that the contents in the wellbore will impact the water in any given reservoir. While people familiar with the industry understand the facts surrounding hydraulic fracturing, the technology is foreign to the average individual. It is important to communicate accurate information regarding industry activities to negate the erroneous claims being asserted by those less familiar with the issues. The industry in general is doing a better job of promoting an accurate view of the risks in this technology through the wider national media campaigns, but the consensus was that there is much work still to do in this area.

## Coal Resources

Joe Craft discussed the current domestic coal situation and the role coal will play in the future. "Eighty-two percent of country's coal production is utilized for domestic utilities, only five percent is exported, and the remaining is used for steel manufacturing. Primarily because of natural gas, coal demand from electric utilities has declined by 200 million tons over the last four years." Craft stated that unless natural gas prices significantly increase, he expects domestic coal demand to remain around 800 to 900 million tons per year. According to Joe Craft, "The prices that coal can effectively compete with natural gas are $2.50 per MCF in the Powder River Basin, $4.50 to $5.00 per MCF in Central Appalachia, and $3.00 to $3.50 per MCF in Northern Appalachia and the Illinois Basin." Coal, despite concerns by some regarding its environmental impacts, remains our country's long-term, low-cost energy safety net. It was the consensus of the panel that coal must remain a pillar of long-term strategy and that reasonable development of clean coal technology should be encouraged. Internationally, coal continues to be heavily utilized to drive economic growth in countries like China and India. Coal-generated electricity has lifted much of the world's population out of poverty, improving the quality of life and standard of living for billions of people. The panel acknowledged that the use of coal and other fossil fuels increases global CO2 emissions, but noted that the priority to address this concern should focus on encouraging the development of technological solutions rather than imposing politically driven impediments to the production and use of fossil fuels. United States-led technological advancements will certainly be embraced in China and India, the other two largest energy consuming nations most impacting global CO2 emissions.

## The Future of Domestic Supply & Commodity Prices

In George Kaiser's opinion, "The equilibrium price for gas has been held back by the pace of drilling and the resulting supply bubble. In some cases, gas is uneconomical to develop and produce with current prices. In the long run, gas can't be produced for less than its drilling and production costs. The equilibrium price should be about $5.50 per Mcf for North America. Over the last year, production has flattened out and demand has kept going up resulting in modest increases for the country's realized prices." According to Alan Armstrong, "There is a tremendous amount of gas waiting on infrastructure, which includes pipelines and processing plants." Over time, with new demand in the transportation sector and other market drivers, gas prices should modestly increase to levels that are acceptable to producers and consumers yet still well below the global cost of gas.

The panel agreed that liquefied natural gas will likely be (and should be) exported from the United States, but before making investments in the infrastructure, the industry must be realistic on the volumes that will be available for export. Mike Stice believes, "The country should be exporting five Bcf of LNG a day by 2020. The only thing that should stop LNG export is some kind of political insanity, and not to say that political insanity couldn't happen, I'm just saying that that is what it would take. LNG tankers are so large now that the incremental cost to get to prime markets, like Asia, where gas is sold for $16 a million Btu and Europe which pays $10 a million Btu, is well within the money. Competition for global natural gas market is the right direction to go." All panelists agreed.

It also was pointed out that associated products of natural gas influence natural gas prices. Several panelists noted that natural gas liquids are currently in oversupply and have had an impact on lowering natural gas prices. It takes about six months to three years to drill wells and develop a new field, build a processing plant, and get the pipelines in place, but because of the permitting process, it takes four to five years to build a major petrochemical complex. There is limited export capacity, so the country needs to wait

for the domestic petrochemical market to absorb the oversupply. The market is working. The petrochemicals sector is recognizing the ample supply of domestic natural gas to build expanded capacity and have very robust economics to do so. In doing so, this sector is creating new, higher-paying job opportunities here in the United States and even bringing back those jobs from former foreign operating locations.

Turning to oil, the panel all agreed that the Keystone Pipeline will likely be approved because it is in the best interest of the nation. There is substantial tight oil production in Canada and sufficient capacity to refine the oil along the Gulf Coast. Rail will likely be part of the permanent solution to handle the transportation of crude oil as well. Because of the high demand in the Far East for non-U.S. oil supplies and the limited ability to export any crude oil from the United States, except for refined products, Harry Pefanis forecasted a "price differential of $5 - $10 per barrel between UK Brent's crude pricing and West Texas Intermediate crude pricing will continue over the next two or three years." In the near term, the price of oil in U.S. markets will remain lower than those prices in the rest of the world.

## Transportation Fuels and Energy Independence

The panelists agreed that any plan or policy that embraces a "protectionist" energy policy would be a huge mistake for our country. The United States needs to be a part of the global economy and not segregate itself and restrict trade. However, it is important that the country reduce its reliance on foreign oil imports and breaks the link to the volatility of supply risk from certain areas of the world, notably the Middle East. The panel concurred that the best way to do this is through the conversion of the United States' transportation sector to include more natural gas and electric vehicles. Liquefied natural gas can be used in long distance trucks, compressed natural gas is an effective fuel for government and commercial vehicle fleets and personal transportation, and small electric cars will also be part of the solution. Since 70% of the country's oil consumption is used in the transportation sector, the conversion of vehicles from oil to alternative fuels will provide the most immediate, impactful and low cost means of reducing foreign oil imports. Combining this impact with increasing North American oil supply will assure reliable, relatively low cost oil resources for other purposes well into the future.

# Panel Session 3: An Energy Strategy for Our Future

**Moderator:**
Tom Flaherty - Senior Partner, Booz & Co.
**Speakers:**
Greg Ebel - CEO, Spectra Energy Corporation
Tom Fanning - CEO, Southern Company
Jeff Holzschuh - Vice Chairman, Morgan Stanley
Mark Mills - CEO, Digital Power and Senior Fellow, Manhattan Institute
Al Walker - CEO, Anadarko Petroleum Corporation

## Introduction

In the foreseeable future, most of the world's energy needs will continue to be satisfied with hydrocarbon fuels (that is oil, gas and coal). Although oil and gas industry watchers did not foresee the shale revolution, which has drastically transformed the domestic energy industry, Mark Mills with the Manhattan Institute, stressed, "This is not a bubble, but a permanent structural shift. The world has abundant remaining reserves of hydrocarbon resources, and technological advancements will allow the industry to continue to produce from both conventional and unconventional resources for generations. There is so much more patented hydrocarbon technology that is about to be introduced compared to what has emerged in past years. This technology is changing the game and securing our ability to sustain supplies and assure future growth." Effectively, the United States is in the enviable position to secure its energy future built on an abundant, low cost supply of domestic hydrocarbon resources. The panel then addressed key areas where a comprehensive, cohesive long-term strategy for energy should focus.

## Taxes

The corporate tax scheme is important to all businesses, but particularly the energy industry. It is crucial that the corporate tax scheme does not distort the allocation of capital. The panel all agreed that the energy industry does best with free markets and stable regulation. Greg Ebel of Spectra Energy stated, "The government should be an enabler of the allocation of resources, not the allocator of resources. It should be the role of the private sector to allocate resources." Tom Fanning with Southern Co. was in favor of simplifying the tax code with a flat tax and removal of tax breaks to assure a more predictable long-term tax environment. Al Walker of Anadarko Petroleum argued, "If the tax benefit of the depletion allowance is taken away, exploration costs will rise by 20%, and this increase will be passed on to consumers." The consensus was that tax policy should enable a reliable environment in which investments in continuing development of domestic oil and gas resources can be made with confidence.

## Regulation

Jeff Holzschuh with Morgan Stanley pointed out, "Corporations are delaying capital expenditures because of uncertainty in the regulatory environment, and the market does not know how to price that uncertainty. Regulations, when unstable or unpredictable, can impede the ability to raise capital. The industry and financial backers are less willing to take risks when there are legal, regulatory, and environmental uncertainties."

Several panelists emphasized that the Environmental Protection Agency is essentially setting energy policy because of its overreaching regulations. There are multiple regulators on the local, state and federal levels, and many of the regulations being formulated make little sense from a scientific or economic perspective. Regulations have and will continue to increase the cost of energy. Reactionary regulatory policy has resulted in higher energy cost to the consumer and exacerbated the economic crisis hitting every American family through higher costs of gasoline and every product they consume that has the cost of transportation imbedded in the price tag. Regulation, when implemented in a fair and balanced manner, can be beneficial and would be embraced by industry. For instance, Al Walker favors the disclosure of the contents fluids used for hydraulic fracturing. He believes the real risk in the technology is the well design, as well as drilling and completion techniques, not the makeup of the injection fluid.

Al Walker also discussed the potential for LNG exports from North America. His position is that there is a misguided view that the industry has the resources to export large volumes of LNG. He explained, "There is no domestic reinvestment motivation at $3.50 gas prices, and the industry needs over $5.00 natural gas prices to have material new supplies for LNG export." It also is difficult for unconventional sources to contribute large production volumes towards LNG compared to new and larger sources internationally. Regardless of this supply constraint, the panel unanimously agreed that there should be no regulatory interference with emerging LNG export projects.

The consensus of the panel was that a certain amount of regulation is important for assuring proper behavior and performance, but that excessive, over-reaching regulation would stifle our drive to real, long-lasting energy security.

# Perception of the Industry

The energy industry must overcome the negative image it has received from the media, correct the misinformation that is presented, and ensure the public that the industry never stops striving for improvement. As CEO of Anadarko, which previously owned a 25% interest in BP's Macondo well, Al Walker, stressed, "Great steps have been taken to put the industry in a much better position to be responsive to a similar catastrophe if it occurred today and to prevent its occurrence in the first place." Deep-water exploration is a risky business, but improved technology and "best practices" in operations will prevail.

Most companies continue to be good stewards of environment and go beyond EPA standards, despite the negative consequence to the bottom line. It was suggested that companies should inventory these environmental efforts and explain to the public their standards of going "above and beyond." The efforts taken to preserve the environment, particularly on the local level need to be articulated in a convincing way.

It also was suggested by Tom Fanning that when disagreeing with an individual or group, it has a negative perception of the industry. "The most respectful thing you can do is listen and engage them. Once a common approach is found, you can humanize the issues and make progress."

The United States is making convincing and directionally positive progress in environmental quality, even with increasing energy consumption. Environmental quality and economic progress driven by energy security need not be mutually exclusive. In fact, the increasing use of natural gas in our energy mix will accelerate clean air initiatives and new technologies will assure constant improvement in all areas of environmental stewardship.

## Energy's Role in Our Society

Energy is essential and integral to our society. It has enabled the high standard of living that Americans enjoy. The energy industry invests a significant amount of capital every year to increase the supply of low cost energy to United States consumers. Reliable, low cost energy supplies underpin our economy. A long term strategy aimed at ensuring we will have abundant, reliable supply of relatively low cost energy will enhance our ability to realize sustainable, material economic growth and create more higher paying jobs. The significant return of manufacturing industry to the United States, due to reliable low cost energy, is now a real driver in job creation. We must sustain that trend. Despite its clear contribution to current positive economic trends, the energy industry continues to have a negative image. The panelists emphasized that the energy industry's message to combat its negative reputation should be centered on themes of jobs and economic growth, as well as the role our growing energy security plays in our national security and the sustainable, directional improvement of our environment.

## Energy Strategy and Policy

It was the consensus of the panel that current United States energy policy is nothing more than a patchwork of regulations. The energy policy of the nation cannot be left up to congress, the administration and regulators. Our country needs an enduring, cohesive strategy for energy that urgently embraces our very real opportunities. We can achieve this with 1) a diverse supply of energy resources, 2) continued and responsible development of domestic supplies of oil and gas throughout North America to their fullest extent, 3) greater use of natural gas/electricity in transportation, 4) "level playing field" economics for renewable and alternative energy resources and 5) focusing research and development efforts on driving new technologies for efficient energy utilization - all supported by enabling policy. Business leaders and a coalition of all stakeholders must lead the effort to adopt such a strategy. Leaders of this effort need to work together to find the common ground and common messages, and then work with the government to create an effective energy policy that enables the strategy to be successful. Politics have become so divisive. There must be collaboration. Greg Ebel said, "there is a rational middle, and that's our challenge - to meet the short term interest of politicians and yet make sure we're looking after the long term interest of our shareholders." These shareholders are the American public and future generations. This strategy for energy can only be achieved through bold leadership, collaboration of all stakeholders and the exercise of good common sense. The success of this broader vision for energy is vital for America's future. The opportunity is great, but we must act with a sense of urgency and unified commitment to make the opportunity a reality.

# KEYNOTE SPEAKERS

## Mary Fallin

### Governor of the State of Oklahoma

Governor Fallin, in her keynote speech, stated that energy is vital to the state of Oklahoma, as it supports one-third of the state's gross domestic product. Energy states like Oklahoma can help achieve North American energy independence, which will improve national security and the economy. The energy industry faces many challenges that come from Washington, including constraining regulation and anti-fossil fuel positions.

The state of Oklahoma created an energy plan to grow the state and position it for future success. The plan is centered on the areas of Oklahoma's strength and is pragmatic, actionable, functional, and far-reaching. Governor Fallin expressed how natural gas will move the United States forward towards energy independence, and allow the country to wean itself from foreign oil, providing a cleaner environment and strengthening national security.

Part of the plan is to create new marketplaces for natural gas, one being the conversion of automobiles to run off compressed natural gas. Wind power also is an abundant resource in Oklahoma. Electricity generated from wind power complements natural gas generated power, providing clean and reliable power at less volatile prices. Another initiative of the plan is energy efficiency in government buildings, which reduces both cost and energy consumption.

"The country needs creative solutions to the energy issues, and Oklahoma is a leader in this area, being good stewards of the environment and stimulating economic growth."

# Adam Sieminski
## Administrator, Energy Information Administration

### Status and Outlook for Shale Gas and Tight Oil Development in the United States

Adam Sieminski, administrator of the EIA, spoke on the shale gas and tight oil development in the United States. Projections made in the Annual Energy Outlook 2013 concluded that growth in energy production will outpace consumption growth, crude oil production will rise sharply over the next decade, and that the United States will become a net exporter of natural gas in the early 2020s. Because of the slow, extended economic recovery and improving energy efficiency, domestic energy consumption is projected to grow slowly.

## Natural Gas

Technically recoverable natural gas resources have grown considerably since 2000, and shale gas production has exponentially increased to over 25 billion cubic feet per day. Shale gas is projected to continue to be the largest area of growth in total gas production through 2040. Because the average shale gas well has steep decline rates, continued drilling is required to grow production.

Natural gas consumption is predicted to grow from transportation, led by heavy-duty trucks fueled from LNG, CNG buses and trucks, and gas to liquid fuels for light-duty vehicles. Natural gas also is fueling manufacturing in the United States, because it is reliable and affordable. Because of the abundance of domestic natural gas, the United States is expected to be a net exporter of natural gas. The EIA projects natural gas exports to nearly quadruple by 2040, with the bulk delivered to Mexico and Canada.

## Oil

Tight oil has contributed significantly to increase the estimated United States crude oil supply over the last few years. Domestic production of tight oil has grown dramatically, particularly in the Eagle Ford of south Texas and Bakken in North Dakota and Montana. The country's dependence on imported liquids depends on both supply and demand. The EIA model predicts that oil prices will initially drop and then rise steadily, but there is uncertainty about the future trajectory. Both the EIA Outlook 2013 and BP Energy Outlook 2030 expect tight oil production to grow internationally, but there exist uncertainties that could slow down the global growth of shale gas and tight oil. Uncertainties include resource quantities and distribution, ownership structure of surface and minerals, the risk appetite of industry participants, infrastructure and technology, as well as environmental constraints.

## Electricity and Emissions

Over time, the EIA expects the electricity mix to shift toward natural gas and renewables, but coal remains the largest electricity fuel source through 2040. Energy is becoming cleaner and more efficient. The EIA forecasts that energy use per capita will continue to decline and that energy-related C02 emissions will remain below their 2005 level.

# KEYNOTE SPEAKERS, PANELISTS AND MODERATORS

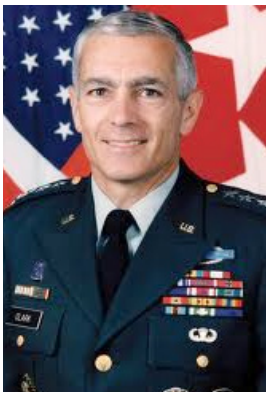
**Mary Fallin** has been governor of Oklahoma since 2011. She was first elected to the Oklahoma House of Representatives in 1990. Four years later, Fallin was elected lieutenant governor of Oklahoma, an office she would hold for 12 years. During that time, she chaired the Fallin Commission on Workers' Compensation, and served on 10 other boards or commissions involving business and quality-of-life issues in Oklahoma. Fallin also served as president of the Oklahoma State Senate and, in 2006, was elected to the U.S. Congress, where she represented the Fifth District of Oklahoma. In Congress, she served on the committees for small business, transportation and infrastructure, natural resources and armed services. Fallin is the vice chair of the National Governors Association and is a graduate of Oklahoma State University.

**Adam Sieminski** is administrator of the U.S. Energy Information Administration. Prior to his current role, he served as senior director for energy and environment on the staff of the National Security Council and was the chief energy economist for Deutsche Bank after also serving as the bank's director and energy strategist for the oil and gas equity team. Sieminski also served as an energy analyst for NatWest Securities in the United States, and acted as a senior advisor to the Energy and National Security Program at the Center for Strategic and International Studies. He is a senior fellow and former president of the U.S. Association for Energy Economics, and served as president of the National Association of Petroleum Investment Analysts. Sieminski is a member of the Washington, D.C., investment professional society, and holds the Chartered Financial Analyst designation. He received both an undergraduate degree in civil engineering and a master's degree in public administration from Cornell University.

**Alan Armstrong** became president and chief executive officer of Williams in January 2011 and serves as chairman and chief executive officer of Williams Partners, LP. He joined Williams in 1986 as an engineer, and since then has served various roles at the company, including director of commercial operations, vice president of retail energy services, vice president of commercial development, vice president of gathering and processing, and president of Midstream. Armstrong is a member of the National Petroleum Council, Business Roundtable and American Petroleum Institute's board of directors. He also serves as a member and past chairman of the OU College of Engineering advisory board as well as the board for Junior Achievement of Oklahoma. Armstrong is a member of the executive committee of the Tulsa Metro Chamber, Tulsa's Future II Oversight Committee, the Williams Foundation, Teach for America – Oklahoma, Philbrook Museum of Art and the Oklahoma Business Education Coalition. Armstrong earned his bachelor's degree in civil engineering from the University of Oklahoma.

**Greg Armstrong** is chairman and chief executive officer of Plains All American Pipeline, L.P. He was president, chief executive officer and director of Plains Resources Inc. from 1992 to May 2001, and served various other roles at the company since 1984, including treasurer, corporate secretary, executive vice president and chief financial officer. Armstrong is a director of the Federal Reserve Bank of Dallas, Houston Branch, and National Oilwell Varco, Inc. He also is chairman, chief executive officer and director of PNGS GP LLC, a 100 percent owned subsidiary of PAA, which is the general partner of PAA Natural Gas Storage, L.P., a publicly traded MLP that is majority owned by PAA.

**Randy Brogdon** is the co-practice group leader for the Environmental and Natural Resources Practice Group at Troutman Sanders, an international law firm with more than 600 attorneys. He has broad-based regulatory and litigation experience in the areas of environmental permitting and enforcement response, and counsels clients on environmental issues regarding the construction, acquisition and modification of power-generation and manufacturing facilities. Brogdon also has extensive experience with energy/environmental policy issues associated with fossil-fuel power plants, nuclear power plants, biomass facilities, utility-scale solar and wind projects, and a wide range of industrial operations. He has been recognized as one of America's Leading Lawyers for Environmental Law by Chambers USA; recognized in The Best Lawyers in America in Environmental Law; and selected by Law & Politics and Atlanta Magazine as a Georgia Super Lawyer in Environmental Law. Brogdon earned his bachelor of arts degree in political science and his juris doctorate from the University of Oklahoma.



**Wesley Clark** is retired supreme allied commander Europe - NATO. He spent 34 years in the Army and the Department of Defense, earning many military decorations, several honorary knighthoods, and a Presidential Medal of Freedom. Clark currently leads a political action committee, WesPAC, which was formed after the 2004 primaries and used to support numerous Democratic Party candidates in the 2006 midterm elections. Clark serves as the co-chairman of Growth Energy, an ethanol lobbying group, and on the board of directors of BNK Petroleum. Since July 2012, he also acts as an honorary special advisor to Romanian Prime Minister Victor Ponta in economic and security matters. Graduating as valedictorian of the West Point class of 1966, he attended the University of Oxford, where he obtained a degree in philosophy, politics and economics, and later graduated from the Command and General Staff College with a master's degree in military science.

**Joe Craft** is president, chief executive officer and a director of Alliance Resources since 1999 and has indirect majority ownership of its managing general partner. He also serves as president, chief executive officer and chairman of the board of directors of AGP, the general partner of AHGP. Previously, Craft served various roles at MAPCO Coal Inc, including president, senior vice president, general counsel and chief financial officer. He currently serves as director for the Bank of Oklahoma, the Tulsa Community Foundation, the Kentucky Chamber of Commerce and the U.S. Chamber of Commerce. Craft holds a bachelor of science degree in accounting and a juris doctorate from the University of Kentucky. He also is a graduate of the Senior Executive Program of the Alfred P. Sloan School of Management at Massachusetts Institute of Technology.

**Greg Ebel** is president and chief executive officer of Spectra Energy Corp. and a member of the company's board of directors. Ebel also serves on the board of directors for DCP Midstream, a joint venture between Spectra Energy and Phillips 66, and chairs the Interstate Natural Gas Association of America. Prior to his current role, he was Spectra Energy's chief financial officer and president of Union Gas, Spectra Energy's major Canadian natural gas utility company. Prior to serving as vice president of investor and shareholder relations and as managing director of mergers and acquisitions for Duke Energy, Ebel served as vice president of strategic development for Westcoast Energy. Earlier in his career, he was advisor to the executive director of the World Bank Group in Washington, D.C., and also held positions as chief of staff to the minister of finance and deputy prime minister of Canada, and as senior advisor on privatization. Ebel received a bachelor of arts degree from York University, Toronto, Ontario, and is a graduate of the Advanced Management Program at the Harvard Business School.

**Tom Fanning** is chairman, president and chief executive officer of Southern Company, where he has served various leadership positions for more than 30 years. Before he began his current role in 2010, Fanning was the company's chief financial officer after serving as president and CEO of Gulf Power. Fanning serves on the board of directors of the Federal Reserve Bank of Atlanta and the Georgia Tech College of Management advisory board, and the board of trustees for the Georgia Tech Foundation. He also is a member of the Business Roundtable and co-chairs the group's North American Energy Policy Development Committee. Fanning earned his bachelor's and master's degrees in industrial management from Georgia Tech. His executive education includes programs at the International Institute for Management Development in Lausanne, Switzerland, the Harvard University School of Business and the University of Virginia's Darden School of Business.

**Tom Flaherty** is a senior partner with Booz & Co. and has more than 39 years of experience with the power and natural gas sectors. During this period he has directed a range of engagements in the areas of corporate planning, growth strategy, business restructuring, mergers and acquisitions, business diversification, performance transformation, market entry, project and construction management, financial planning, operating model and organization design. He has authored articles and viewpoints addressing mergers and acquisitions, risk management, construction management, operating models and cost management. He also is a contributing author to Booz & Co.'s "Merge Ahead" publication on mergers and acquisitions. Prior to joining Booz Allen Hamilton in 2004, he was a senior partner with Deloitte Consulting. He holds a bachelor of business administration degree in accounting from the University of Oklahoma and is a certified management consultant and member of the Institute of Management Consultants.

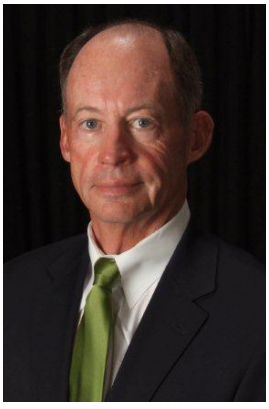
**Jeff Holzschuh** has worked at Morgan Stanley for the past 29 years and is the chairman of Institutional Securities Group, which includes the Investment Banking, Capital Markets, Equity, Fixed Income and Commodities Divisions. In addition, he is a member of Morgan Stanley's Management Committee and serves as chairman of the firm's Global Power and Utility Group and Environmental Policy Committee, as well as president of the firm's investment in venture capital business. He serves on the United States Electricity Advisory Board, is chairman of the EEI Wall Street Advisory Group and is a founding member of the U.S. Partnership for Renewable Energy Finance. Holzschuh also serves as chairman of the board of his alma mater, Niagara University in Lewiston, N.Y., where he graduated from the school's College of Business Administration in 1982.

**George Kaiser** is president, CEO and owner of GBK Corp., parent of Kaiser-Francis Oil Co., which he has managed for over 45 years. He is chairman of the board and majority shareholder of BOK Financial Corp., and a majority shareholder of several oil and gas, mining, manufacturing and technology companies. He also founded Excelerate Energy and, through Argonaut Private Equity, has controlling or significant minority interests in more than 50 companies in various industries, including the United States, India and Australia. Kaiser founded the Tulsa Community Foundation and Tulsa Educare, Inc. He has served as an Oklahoma Regent for Higher Education, was a trustee for the University of Tulsa, a national elected director of the Harvard Alumni Association and chaired the board of trustees of Hillcrest Medical Center. Kaiser earned both his bachelor of arts and master of business administration degrees from Harvard University.

**Philip Lambert** is chief executive officer of Lambert Energy Advisory Ltd, which is one of London's leading mergers and acquisitions and strategic advisory firms dedicated solely to the global energy sector. Before co-founding the company in 1999, Lambert served as head of the global investment banking team at the former investment bank Dresdner Kleinwort. Lambert joined Kleinwort Benson, which was later acquired by Dresdner Bank, in 1986 as an analyst and later served in the bank's corporate finance division. Before joining Kleinwort, Lambert was a stockbroker at Sheppards & Chase. He is a graduate of Edinburgh University, where he studied history.

**Mark Mills** is founder and CEO of the Digital Power Group, a tech-centric capital advisory group. He was formerly the co-founder and chief tech strategist for Digital Power Capital, a boutique venture fund, and was co-founder, chairman and CTO of ICx Technologies. Mills also served as a technology advisor for Banc of America Securities, and co-authored an energy-tech investment newsletter, the Huber-Mills Digital Power Report, published by Forbes and the Gilder Group. He served in the White House Science Office under President Reagan, and early in his career he was an experimental physicist and development engineer at Bell Northern Research in fiber optics, defense and solid-state devices, fields in which he holds several patents. Mills is a member of the advisory council of the McCormick School of Engineering and Applied Science at Northwestern University, serves on the board of directors of the Marshall Institute and is a senior fellow of the Manhattan Institute. He holds a degree in physics from Queen's University, Canada.

**Edward Morse** is a managing director and the head of global commodities research at CitiGroup Global Markets, Inc. in New York. He previously held similar positions at Lehman Brothers, Louis Capital Markets and Credit Suisse. Widely cited in the media, he is a contributor to such journals as Foreign Affairs, Financial Times, The New York Times and The Washington Post. He worked in the U.S. government at the State Department and later was an advisor on issues related to oil, natural gas and the impact of financial flows on energy prices to the United Nations Compensation Commission on Iraq, as well as to the U.S. Departments of State, Energy and Defense and to the International Energy Agency. Morse is a former Princeton professor and author of numerous books and articles on energy, economics and international affairs.



**Bob Sheppard** is chairman of IPM Advisors, an international consulting firm that provides senior-level advice to the oil and gas and related industries. He also is a senior advisor to BP on Russia and CIS, is a non-executive director of the Eastern European Trust and is a member of the company's audit, management engagement and nominations committees. Sheppard also is a member of the supervisory board for DTEK, a private energy company operating in the Ukraine, and served as a board director for TNK-BP. Prior to launching IPM Advisors, he was a senior vice president at BP, and was first chief operating officer and then president of Sidanco, the fourth-largest integrated oil company in Russia. Sheppard also held various positions at Amoco for 25 years before it merged with BP in 1999. Sheppard earned a bachelor of science degree in physics from the University of Wyoming and an executive master's of business administration from Columbia University School of Business.

**Bruce Stover** is a retired executive vice president and was a founding member of Endeavour International Corp., an independent U.S. and North Sea-focused oil and gas exploration and production company. With 40 years of U.S. and international experience in the oil and gas industry, Stover has an extensive background in engineering operations, business development, and mergers and acquisitions. Prior to joining Endeavour, Stover held a number of management positions with Anadarko Petroleum Corp. over a 23-year period after beginning his career with Amoco Production Co. He is a 1971 graduate of the University of Oklahoma and has received the university's Regents Distinguished Graduate Award as well as being named to the College of Engineering's Distinguished Graduates Society. He currently serves as chairman of the OU Energy Institute advisory board and is a member of the board of directors of Bristow Group Inc., a global offshore helicopter service provider to the oil and gas industry.

**J. Mike Stice** is chief executive officer of Access Midstream, formerly Chesapeake Midstream Partners. Prior to joining the company, Stice served as president of ConocoPhillips Qatar in Doha, Qatar, from 2006 to 2008. He has more than 25 years of exploration, production, midstream and gas marketing experience working for ConocoPhillips in Australia, Singapore and a variety of domestic locations. Stice is a member of the University of Oklahoma's board of visitors for the Mewbourne College of Earth and Energy and the College of Engineering. He also is a member of the American Institute of Chemical Engineers and was recently named a member of the Southern Gas Association's board of directors. Stice is a 1981 graduate of the University of Oklahoma, a 1995 graduate of Stanford University and he recently completed a doctorate of education at George Washington University.

**Al Walker** is president, chief executive officer and director of Anadarko Petroleum Corporation. He joined Anadarko in 2005 as senior vice president and chief financial officer, later serving as president and chief operating officer. Walker is a director of CenterPoint Energy Inc., Western Gas Equity Holdings, LLC, and Western Gas Holdings, LLC, subsidiaries of Anadarko and general partners of Western Gas Equity Partners, LP and Western Gas Partners, LP, respectively. He currently is on the board of trustees for the Houston Museum of Natural Science. Walker previously served on the Board of Trustees of Temple-Inland Inc. in Austin, Texas, and the Board of Trustees for the United Way of Greater Houston.

**James Woolsey** is former director of the U.S. Central Intelligence Agency. Before serving as director from 1993-1995, he was an ambassador and U.S. representative for negotiations on Conventional Armed Forces in Europe and, prior to that, served on various President's Commissions, including Strategic Forces, Defense Management and Federal Ethics Law Reform. He also was a delegate-at-large for the U.S.-Soviet Strategic Arms Reductions Talks and Nuclear and Space Talks in Geneva. Woolsey's early career includes serving as a captain in the U.S. Army and program analyst for the Office of the Secretary of Defense. He later served on the National Security Council staff and was an advisor with the U.S. Delegation to the Strategic Arms Limitations Talks I in Helsinki and Vienna. He also served as general counsel for the U.S. Senate's Committee on Armed Services and was a partner for Shea Gardner law firm.

The UNIVERSITY of OKLAHOMA
PRICE
COLLEGE OF BUSINESS
Energy Institute
Enhancing the Business of Energy

University of Oklahoma
307 W. Brooks
Norman, Ok 73019-4002

price.ou.edu/energyinstitute



## EQUAL OPPORTUNITY STATEMENT

This institution in compliance with Title VI and VII of the Civil Rights Act of 1964, Title IX of the Education Amendments of 1972, and other Federal laws and regulations does not discriminate on the basis of race, color, or national origin, sex, age, religion, handicap, or status as a veteran in any of its policies, practices or procedures. This includes but is not limited to admissions, employment, financial aid, and educational services.

Front cover photo of oil well on the state capitol grounds, courtesy of Fred Marvel, Oklahoma Department of Tourism.