

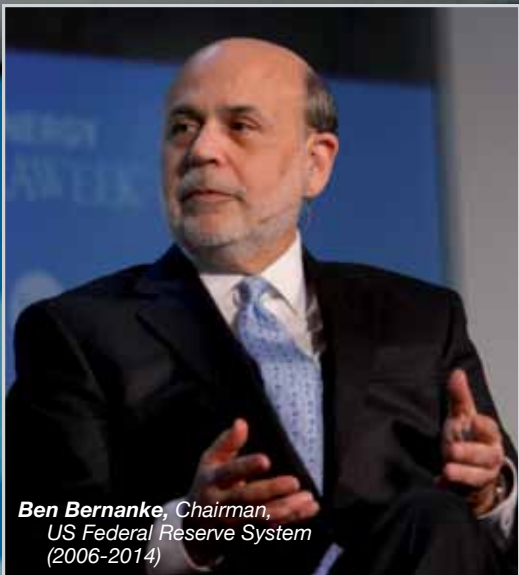
CONFERENCE REVIEW 2014

IHS ENERGY CERAWEEK®

The world's premier conference on the energy future



Energy and the New Global Competition



Ben Bernanke, Chairman,
US Federal Reserve System
(2006-2014)



Ernest Moniz,
US Secretary
of Energy



Diezani Alison-Madueke,
Minister of Petroleum Resources,
Nigeria, Alternate President, OPEC



John Watson,
Chairman & CEO,
Chevron Corporation



Joe Kaeser,
President & CEO,
Siemens AG



Christophe de Margerie,
Chairman & CEO,
TOTAL S. A.



Emilio Lozoya,
Chief Executive
Officer, Pemex



Lisa Murkowski, US Senator, State of Alaska,
Ranking Member, Senate Energy Committee
with **Daniel Yergin**

Mission Statement

“... [offering] a comprehensive and integrated global framework for understanding what’s ahead on the energy landscape ... and the implications for strategy, investment, and leadership.”

— IHS Energy CERAWEK Mission



Gina McCarthy,
Administrator,
US Environmental Protection Agency



Lynn Good,
President & CEO,
Duke Energy

IHS Energy CERAWEK® 2014 — IHS Energy's 33rd annual executive conference — “Energy and the New Global Competition,” focused on the new global realities resulting from the unconventional oil and gas revolution, regulatory uncertainties, emerging technologies, market volatility, electric power restructuring, environmental considerations, and the emerging cyber threats facing companies and countries.

IHS Energy CERAWEK annually offers a comprehensive and integrated global framework for understanding what’s ahead on the energy landscape — markets, technology, geopolitics, environment — and the implications for strategy, investment, and leadership. It provides a combination of presentations by senior energy officials, thought leaders, and IHS experts from across the energy spectrum and the globe.

We also foster interactive discussion and dialogue among participants, over 3,000 senior executives, officials, and experts from over 50 countries.




A handwritten signature of Daniel Yergin in black ink.

Daniel Yergin
IHS Energy CERAWEK
Chairman



A handwritten signature of James Rosenfield in black ink.

James Rosenfield
IHS Energy CERAWEK
Co-Chairman



*“Energy is key to who we are
as a nation.”*

— Lisa Murkowski, US Senator, Alaska

US Energy Policy Crossroads

Lisa Murkowski, US Senator from Alaska and Ranking Member of the Senate Energy Committee, gave the Monday opening keynote address. Senator Murkowski highlighted the importance of acting quickly to take advantage of America's newfound energy assets, including crude oil exports.

Economic and Geopolitical Outlook

Nariman Behraves, Chief Economist for IHS, and **Richard Haass**, President of the Council on Foreign Relations, laid out the key economic and geopolitical forces reshaping the global landscape. The session was chaired by **Zbyszko Tabernacki**, Vice President of Economics & Country for IHS. The IHS Energy Watch featured two panels of IHS experts discussing energy markets in transition and regions in which geopolitics will affect energy in 2014 and beyond.



A

Mexico's Energy Future

IHS Vice Chairman **Daniel Yergin** opened Monday's keynote dinner session by welcoming Pemex Chief Executive **Emilio Lozoya** to IHS Energy CERAWEK. Mr. Lozoya outlined the implications across the entire value chain of opening Mexico's oil sector. He discussed the primary drivers of Mexico's energy sector liberalization, citing declining crude oil production and high electricity costs. Mr. Lozoya noted that the main impact of the reform would be to substantially increase upstream investment. New opportunities also will emerge for midstream and downstream infrastructure.



D

(A) Lisa Murkowski
(B) Zbyszko Tabernacki, Richard Haass, and Nariman Behraves
(C) Emilio Lozoya
(D) IHS President & CEO Scott Key opening CERAWEK 2014



B



C

Partner/Member Leadership Circle Program

at IHS Energy CERAWEK 2014

The Leadership Circle, part of the IHS Energy CERAWEK Partner/Member Program, comprises invitation-only senior level dialogues centered on core professional communities. Four concurrent Summits were held on

- Upstream Oil and Gas
- Global Gas
- African Energy
- Upstream Technology and Innovation

Sessions provided focused, highly interactive, off-the-record discussion on key issues shaping the energy future.

Participation in the program allows access to Partner Suites and Member Lounges.



(A) Upstream Technology and Innovation Summit
(B) Africa Energy Summit
(C) Africa Energy Summit Co-Chairs: **Bob Fryklund**, **Daniel Yergin**, and **Dan Berkove**

(D) Global Gas Summit, **Rob Franklin**, President, ExxonMobil Gas & Power Marketing Company
(E) Upstream Oil & Gas Summit, Co-Chair, **Jerry Kepes**





(A) Africa Energy Summit, **Timothy Okon**, Executive Director, Strategy, Nigerian National Petroleum Corporation (NNPC)



(B) Africa Energy Summit, **Salvador Namburete**, Minister of Energy, Mozambique
(C) Africa Energy Summit, **Irene Muloni**, Minister of Energy & Minerals Development, Uganda
(D) Africa Energy Summit, **Francis D. Cook**, Chair, The Ballard Group LLC



(E) Upstream Oil and Gas Summit, **Lee M. Tillman**, President & CEO, Marathon Oil Corporation
(F) Africa Energy Summit, **Tewodros Ashenafi**, Chairman & CEO, SouthWest Energy, **James Rosenfield**, IHS Energy CERAWEEK Co-Chairman



IHS Energy CERAWEK Opening and Keynote Addresses were delivered by **John Watson**, Chairman and CEO of Chevron Corporation, followed by **Andrew Mackenzie**, Chief Executive Officer of BHP Billiton.

Mr. Watson discussed the enormous changes that have taken place in the energy industry over the past 10 years. He addressed some of the major investment and policy challenges currently facing the industry, such as the search for stable investment environments and returns that benefit companies and the world's growing middle class.

Mr. Mackenzie discussed rising global energy demand and the need to increase access to electricity in emerging economies. Fossil fuels will continue to supply the vast majority of the world's energy mix. Noting that the energy industry should increase efforts to reduce carbon emissions, Mr. Mackenzie stated that greater energy security for the planet and its people is achievable while also adapting to climate change.



Ministerial Address

The Minister of Petroleum Resources for Nigeria and Alternate President of OPEC, **Diezani Alison-Madueke**, outlined issues facing the oil industry in developing economies and the need for international cooperation in solving the problems of theft and piracy. She emphasized the importance of allowing natural resources to benefit the local economy and improve the standard of living for the whole population.

“To have significant impact on world oil, solutions to these myriad challenges must be initiated more than a decade in advance. Therefore, the time to act is now.”

— Diezani Alison- Madueke, Minister of Petroleum Resources, Nigeria, Alternate President, OPEC



(A) John Watson
(B) Diezani Alison-Madueke

Strategic Dialogues

Strategic Dialogue sessions included a wide range of topics:

- Oil Expert Discussion Tables
- Energy Innovation Pioneers
- Changing Fortunes: Impact of Unconventional Oil and Gas Production on the North American Petrochemical Industry
- The Future of Canadian Crude and LNG - A Dialogue with Minister Joe Oliver
- Latin America Upstream Poised for Change?
- Prospects for Tight Oil in Russia
- Future of Upstream Cost: Strategies Operators Can Adopt to Mitigate Risk
- Setting the Pace: What's Ahead for Asian Demand and Supply
- Journeys in Operational Excellence: The Leadership Challenge
- Finance in the Upstream Industry
- Gas and Oil: Competing for Transport Demand
- Pipes, Trains, and Barges: The Transformation of North American Oil Logistics
- Tight Oil New Frontiers: North America and Beyond
- Geography and Refining: How Location Shapes Competitive Position
- E&P Strategies: New Challenges, New Business Models
- Oil Market Outlook in a Competitive World
- The Middle East at a Crossroads: Oil Geopolitics and the New Realities
- Operating in a World of Change: Mitigating Risk and Maximizing Performance

Energy Dialogue

IHS Vice Chairman **Daniel Yergin** spoke with **Christophe de Margerie**, Chairman and CEO of Total S.A. Mr. de Margerie identified cost control as the main challenge of 2014, and the need for oil and gas companies to cooperate to decrease costs. He stated that oil and gas will continue to play a significant role in the energy mix and also that renewables are gaining importance, noting Total's investment in a solar company. Mr. de Margerie said that Total is looking worldwide for shale gas, despite whatever France does.



STRATEGIC DIALOGUE

Tight Oil New Frontiers: North America and Beyond



STRATEGIC DIALOGUE

E&P Strategies: New Challenges, New Business Models



Christophe de Margerie

(A) **Tim Probert**, Strategic Advisor to the CEO, Halliburton; **Robert Ryan, Jr.**, Vice President, Global Exploration, Chevron Upstream; **Gaurdie Banister**, President & CEO, Aera Energy LLC; **Pete Stark**, Senior Research Director & Advisor, IHS; **Stephen Trammel** (Chair), Director, Energy Technical Unconventionals, IHS Energy

(B) **Bruno Chabas**, Chief Executive Officer, SBM Offshore N.V.; **Patrick Schorn**, President, Operations & Integration, Schlumberger; **Lars Christian Bacher**, Executive Vice President Development & Production, International, Statoil; **Susan Farrell** (Chair), Vice President, Upstream, IHS; **Yves-Louis Darricarrère**, (speaking) President, Upstream, Total S.A.

Crisis in Ukraine: New Reality for Geopolitics and Energy?

Oil

A timely panel on the crisis in Ukraine was chaired by **Daniel Yergin**. Joining him were **Thane Gustafson**, Senior Director, Russian and Caspian Energy, IHS Energy; **Matthew Sagers**, Senior Director, Russian and Caspian Energy, IHS Energy; **Michael Stoppard**, Chief Strategist, Global Gas, IHS Energy; and **Angela Stent**, Director of the Center for Eurasian, Russian and East European Studies and Professor of Government and Foreign Service at Georgetown University.

The impact of the crisis on Europe will be muted because of measures taken since 2009 to reduce vulnerabilities through expanded storage and more pipeline interconnections within Europe. Although Russia is integrated into the world economy in a way that the Soviet Union was not, Dr. Stent cautioned that “this is the worst time in Russia’s relations with the West since the breakup of the Soviet Union.”



Keynote Addresses

Paolo Scaroni, Chief Executive Officer of Eni, discussed Eni’s focus on Africa, including successful investments in Mozambique. The topic of energy security was also discussed. Mr. Scaroni emphasized the importance the company places on maintaining stable supplies to Europe. He indicated that the company is well positioned to meet the region’s gas needs this winter and next.

Panel discusses the crisis in Ukraine. eBook with link to video coverage available at CERAWEEK.com.

Nizar Al-Adsani, Chairman and Managing Director, Kuwait Petroleum Corporation (KPC), shared his company’s vision for the future of oil and gas in Kuwait. KPC has been increasing its productive capacity of oil and plans to continue being a reliable oil supplier to the country and the world. Mr. Al-Adsani emphasized the need to partner with international oil companies and to attract the best skills and technology available. KPC plans to develop heavy crude reserves and increase its production of nonassociated gas. He noted that half of KPC’s productive capacity by 2020 will come from new, more challenging fields.





Policy Dialogue: The Future of Global Oil

Daniel Yergin, Vice Chairman, IHS, moderated the policy dialogue joined by **Orlando Cabrales**, Vice Minister of Energy, Ministry of Mines and Energy of Colombia; **Jin-Yong Cai**, Executive Vice President and CEO, International Finance Corporation (IFC); **Irene Muloni**, Minister of Energy and Minerals Development, Uganda; and **Carlos Pascual**, Special Envoy for International Energy Affairs, US Department of State.

The panel discussed emerging markets in the context of global energy developments and strategies. The challenges include remaining competitive in the face of changing price dynamics and creating a transparent regulatory framework to attract investment. Among the opportunities are affordable energy for developing other industries and steady revenue for supporting economic growth and employment.

Concurrent Oil Plenaries

Upstream Plenary: Opportunity Rich or Poor? State of the Global Upstream

Peter Jackson, Vice President, Upstream Research, IHS Energy, chaired the session and was joined by **Doug Lawler**, President and CEO, Chesapeake Energy Corporation; **Russ Girling**, President and CEO, TransCanada Corporation; and **Javier Gutiérrez**, President, Ecopetrol.

The panel tackled the question of whether the global upstream is opportunity rich or opportunity poor. The panelists agreed that the upstream industry was

indeed faced with a tremendous opportunity, with technology and efficiency gains driving the recent growth in production. The panel also highlighted challenges within the industry, focusing on recent pressures that have held up pipeline construction, exploration, and production.

Downstream Plenary: Is a Peak in Oil Demand on the Horizon?

James Burkhard, IHS Vice President, Research chaired the Downstream Plenary with panelists **Bill Klesse**, Chairman of the Board and CEO, Valero Energy Corporation; **Philip Rinaldi**, Chief Executive Officer, Philadelphia Energy Solutions; and **Abdallah Al-Saadon**, Senior Vice President of Finance, Strategy & Development, Saudi Aramco.

The panel discussed the dynamic interplay between the resurgence in the US refining industry and capacity growth in global refining markets. Oil demand in non-OECD countries is growing along with demand from the manufacturing and transportation sectors. Energy plays an increasingly critical role in economic competitiveness.

(A) Orlando Cabrales, Jin-Yong Cai, Irene Muloni, Carlos Pascual, Daniel Yergin (Chair).

(B) Russ Girling, Javier Gutiérrez, Doug Lawler, Peter Jackson (Chair).



IHS Energy Expert Briefings offered presentations and outlooks in key energy areas, followed by interactive discussion in an informal setting. Concurrent sessions covered the following topics:

- Facts and Perceptions: Public Attitudes Toward Unconventional Oil and Gas Activity
- US Crude Oil Exports
- North American LNG Exports and the Global LNG Market
- “Tangram”: Chinese Gas Demand and Global Markets
- Iraq Oil Production: Potential versus Reality
- Russian Oil: New Horizons, New Directions
- The Next Generation of IHS Scenarios: Exploring Uncertainty, Risk, and Opportunity in Global Energy Markets
- Future Trends in the Dynamic Markets for Natural Gas Liquids
- What are today’s E&P hotspots? Where will the next ones be? What criteria determine the next E&P hotspot?
- The Anatomy of the Major Shale Plays: The Bakken
- Drivers & Strategy of Oilfield Waste Water Reuse
- Oil and Gas and the Future of the Arctic

Innovation Pioneers

Now in its ninth year, the IHS Energy CERAWEK Innovation Pioneers program featured 24 promising energy technology companies, including presentations by each company’s CEO. See a list of Showcases on page 16.



(A) James Rosenfield
(Chair), Senior Vice President, IHS;
IHS Energy CERAWEK Co-Chairman

(B) Kristian Bodek,
Senior Principal Researcher,
IHS Energy

“The US will most likely become the world’s largest oil and gas producer this year. That’s affordability, availability, and sustainability all in one.”

— Joe Kaeser, President & CEO, Siemens AG

Natural Gas





Joe Kaeser, President and CEO of Siemens, delivered the Opening Gas Address. Mr. Kaeser contrasted the successes of energy policy in the United States with the failures of that in Europe. Mr. Kaeser praised the US innovative spirit, and in the subsequent question and answer session, Mr. Kaeser drew parallels between US energy advancements and the innovative culture of Siemens. He said the United States is “the place to be” owing to the country’s willingness to pursue new opportunities and warned that Europe will need to become more opportunistic in order to continue innovating.

Global Gas Plenary

Michael Stoppard, IHS Energy’s Chief Strategist for Global Gas, chaired the Global Gas Plenary, joined by **Chris Finlayson**, Chief Executive Officer, BG Group; **Rob Franklin**, President, ExxonMobil Gas & Power Marketing Company; and **Sam Laidlaw**, Chief Executive, Centrica PLC. Significant growth is expected in gas demand in the next several years, particularly in the Asia Pacific region, with gas likely to replace coal as the second largest energy source after oil in the coming decades.

The panel discussed the challenges of maintaining investment in supply and managing costs as demand grows rapidly. Liquefied natural gas trade will grow faster than overall gas demand. Panelists also touched upon the issues of replicating shale gas development outside the United States, and the difficulties of and potential solutions to stagnant demand and growing import dependence in the European market.



Keynote: Ernest Moniz

Ernest Moniz, US Secretary of Energy, delivered the Wednesday lunch keynote address. The US “all of the above” national energy strategy is working both economically and environmentally. The Department of Energy (DOE) will continue to support US fuel sources and advance US technology while pursuing a low-carbon future. He highlighted five areas of focus for the DOE: the implications of the hydrocarbons boom for policy and infrastructure, the uncertainty around trends in future demand, low-carbon technology, the need to adapt to maintain security of supply, and the need to invest in the energy workforce of the future. eBook with link to video coverage is available at CERAWEEK.com.

(A) **Michael Stoppard**
(B) **Chris Finlayson**
(C) **Rob Franklin**
(D) **Sam Laidlaw**



“We will continue to support all fuel sources and advanced technologies across the board even as we pursue a low carbon future.”

— Ernest Moniz, US Secretary of Energy

Natural Gas Dialogue

The Future of the Shale Gas Revolution

IHS Vice Chairman **Daniel Yergin** moderated the Natural Gas Dialogue. He was joined by **Marvin Odum**, President of Shell Oil Company; **Fred Krupp**, President of the Environmental Defense Fund; and **John Hickenlooper**, Governor of Colorado. Dr. Yergin asked the panel to assess the state of the shale gas revolution today and its prospects in the coming decade. The panelists discussed the need to balance the economic benefits of shale gas development with environmental stewardship, the challenges in expanding the shale revolution internationally, and the importance of trust in stakeholder engagement.

Concurrent Plenaries

Future of Global Gas: The New Map

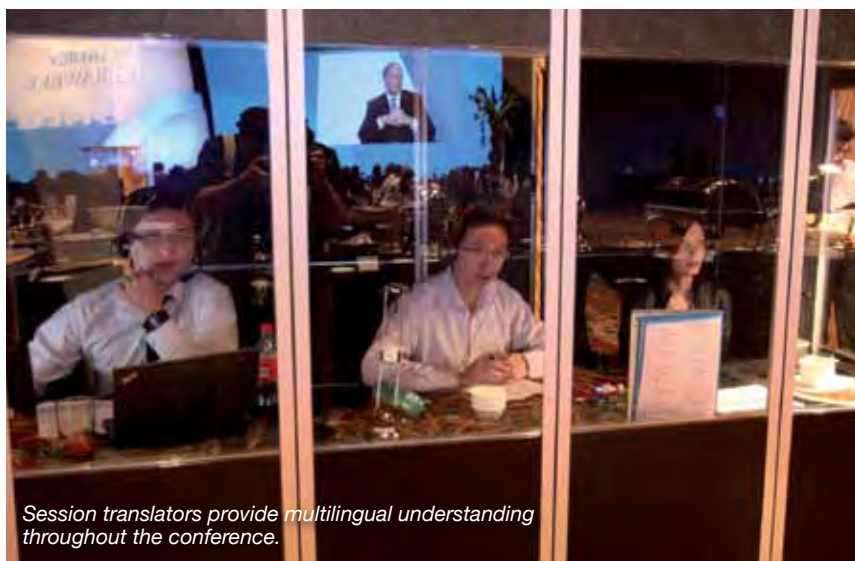
Shankari Srinivasan, Vice President and Head of Research and Consulting, Power, Gas, Coal, Renewables—EMEA/APAC, IHS Energy, chaired the Plenary with **Peter Coleman**, CEO and Managing Director, Woodside Energy; **Jean-Marie Dauger**, Executive Vice President, GDF SUEZ; **Arsenio Mabote**, Chairman, National Institute of Oil (INP), Mozambique. Recent developments in the discovery and development of natural gas have changed the industry by allowing access to previously unknown or undeveloped resources. Discussion ensued over the ripple effects these developments have on the supply chain, and the challenges the industry faces.



Changing Landscape of North American Gas

Bob Ineson, Managing Director, North American Natural Gas, IHS Energy, chaired the Plenary with **Gregory Ebel**, President & CEO, Spectra Energy, President & CEO, Spectra Energy Partners; **Lamar McKay**, Chief Executive, Upstream, BP Plc; **Colin Parfitt**, President Supply and Trading, Chevron Corporation. The panelists shared optimism about the North American gas resource base and the constant innovation taking place in exploration and production, while acknowledging that additional infrastructure is necessary to ensure enhanced reliability of pipeline operations. Regulatory obstacles still impede the progress of major projects, and stakeholders need to find ways to streamline the regulatory process.

(A) Daniel Yergin, Marvin Odum, Fred Krupp, John Hickenlooper



Session translators provide multilingual understanding throughout the conference.

Natural Gas



(A) Daniel Yergin, Andrew Liveris, Harald Schwager, Takayuki Sumita, John Larson

Daniel Yergin, IHS Vice Chairman, introduced the Plenary topic of energy's role in determining national economic advantage. **Andrew Liveris**, President, Chairman, and CEO of The Dow Chemical Company, and **Harald Schwager**, Member of the Board of Executive Directors of BASF SE, described the significant impact of both regional energy prices and national energy policies on their companies' investment decisions. **Takayuki Sumita**, Japan's Director-General for Oil, Gas and Mineral Resources, offered the perspective of a government attempting to lower energy costs in order to maintain industrial competitiveness. **John Larson**, Vice President of IHS, offered insight from recent IHS studies on how divergent energy policies and resources have spurred employment and economic growth in the United States but have retarded both in Germany. The US unconventional oil and gas revolution has had a major impact on competitive dynamics among nations.

Strategic Dialogues

- Gas Expert Discussion Tables
- Energy Innovation Pioneers
- Russian Gas: East or West?
- Opening Up the Southern Gas Corridor: From the Caspian to Europe
- Southeast Asia Gas & Power
- Shale Gas & the Environment: Methane Emissions and Water
- Residential and Commercial Natural Gas Consumption: Rethinking Regulation Post the "Shale Gale"

- Africa Rising: Oil and Gas Trends
- Managing Energy Price Reform in Emerging Markets: The End of Low Gas Prices?
- LNG Trading: Will Regional and LNG Prices Converge?
- Infrastructure Boom: Financing Pipes, LNG, and Processing
- License to Operate: The Growing Importance of Stakeholder Engagement
- Energy Security: Redefining the Boundaries
- Keeping Pace: Can North American Gas Supply Meet the Coming Demand Surge?
- Mega Projects: Mega Risks or Mega Opportunities?
- China's New "Third Plenum" Reforms: What It Means for Chinese and Global Energy
- Mitigating Operational Risks: Strategies for Energy Supply Chain Resilience



Insight Dinners

IHS Energy CERAWEK Insight Dinners allowed delegates to interact informally in a relaxed setting with industry experts and senior officials. Each dinner featured thought-provoking remarks by distinguished guests, followed by moderated discussion with dinner participants. The wide-ranging topics included

- Threats to Recovery: What's Ahead for the Global Economy
- New Dimensions of Risk: Cyber Security, Terrorism, and Social Turmoil
- Securing Public Trust in a Hyperconnected World
- Redefining Leadership in a World of Change
- Energy's Innovation Dilemma: Scaling New Technologies
- Africa's Energy Future: A Conversation with African Officials and Ernest Moniz

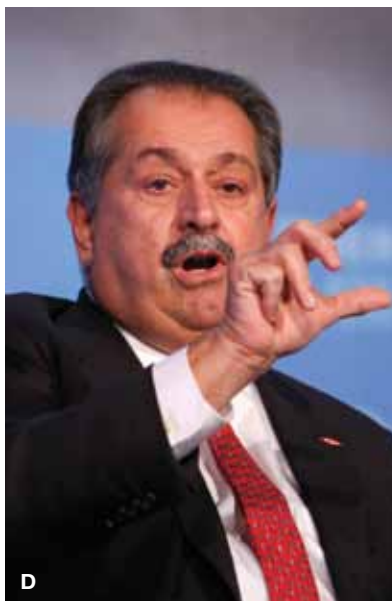
(A) Michael Chertoff, Co-founder and Chairman, Chertoff Group, former US Secretary of Homeland Security

(B) John Hickenlooper, Governor, State of Colorado

(C) Jerre Stead (Chair), Executive Chairman, IHS

(D) Andrew Liveris, President, Chairman, & CEO, The Dow Chemical Company

(E) Diane McQueen, Minister of Energy, Alberta, Canada



Innovation Pioneer Showcases

Featuring leading entrepreneurs from emerging technology companies.

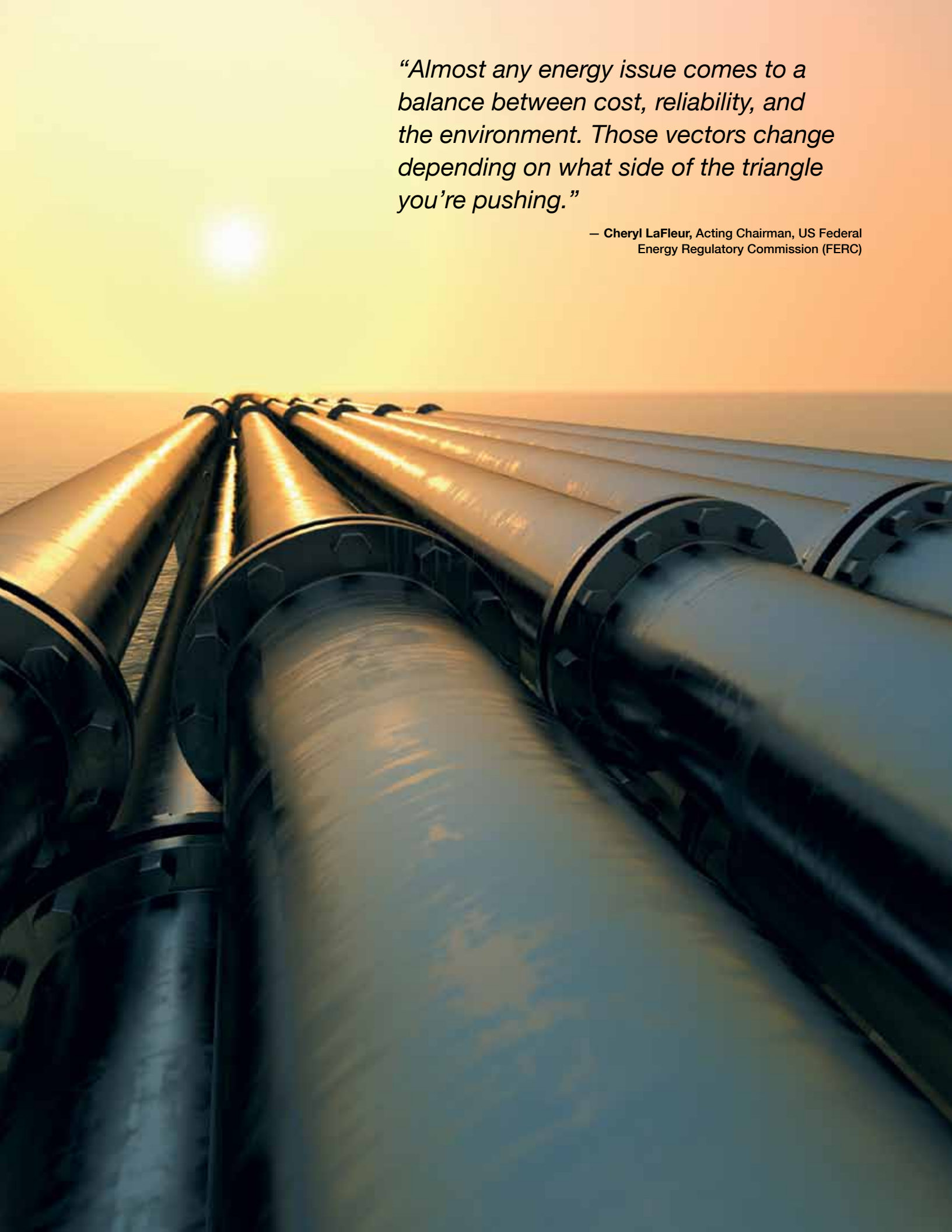
Taxon Biosciences - Glenn Nedwin, CEO
Senscient - Rajat Barua, President & CEO
Glori Energy - Stuart Page, President & CEO
itRobotics - Anouar Jamoussi, President & CEO
Sekal - Bill Chmela, President, Americas
GlassPoint - John O'Donnell, Vice President
Microseismic - Peter Duncan, President & CEO
Liquid Robotics Oil & Gas - Rod Nelson, President & Managing Director
Silixa - Mahmoud Farhadiroushan, CEO
Modumetal - Christina Lomasney, CEO
Sakti3 - Ann Marie Sastry, President & CEO
XL Hybrids - Tod Hynes, President & Founder
LanzaTech - Jennifer Holmgren, CEO
NET Power LLC - Bill Brown, CEO
AquaMost - Todd Asmuth, CEO
AlertEnterprise - Jasvir Gill, Founder & CEO
Gradiant Corporation - Anurag Bajpayee, CEO & Co-Founder
OsComp Systems - Pedro Santos, CEO
Phononic - Anthony Atti, CEO
Powerit Solutions - Kevin Klustner, CEO
Retroficiency - Bennett Fisher, CEO & Co-Founder
EarthRisk Technologies - John Plavan, CEO & Chairman
TerraPower - John Gilleland, Chief Executive Officer
Eos - Steve Hellman, Co-Founder & President



(A, B) Reception

“Almost any energy issue comes to a balance between cost, reliability, and the environment. Those vectors change depending on what side of the triangle you’re pushing.”

— Cheryl LaFleur, Acting Chairman, US Federal Energy Regulatory Commission (FERC)



Power



*“We don’t have to choose
between a healthy environment
and a healthy economy.”*

— Gina McCarthy, Administrator,
US Environmental
Protection Agency

North American Power Plenary

Lawrence Makovich, Chief Power Strategist at IHS Energy, chaired the Power Plenary with **Nick Akins**, Chairman, President, and CEO of American Electric Power; **Andrés R. Gluski**, President and CEO of The AES Corporation; and **Lynn Good**, President and CEO of Duke Energy.

The panel discussed the challenges facing the North American power business and stressed the importance of grid reliability during peak demand events, such as the recent polar vortex that brought unusually cold weather to North America; coal retirements; and the buildup of intermittent renewable supply. Panelists agreed that infrastructure development and technological advances are key to meeting customer needs and that the pace of implementation will be a significant factor for the industry.

The Global Power Challenge

Jone-Lin Wang, Vice President and Head of Research and Consulting, Power, Gas, Coal, Renewables—Americas, IHS Energy, chaired a plenary session with **Leonhard Birnbaum**, Member of the Board of Management—Markets, Services, E.ON; **Dawn Farrell**, President and CEO, TransAlta Corporation; and **Jim Hughes**, Chief Executive Officer, First Solar.



The panelists discussed how utilities can deliver the services their customers want while contending with low energy prices in deregulated power markets, the withdrawal of government policies supporting renewable energy, and the changing risk profile of large utility projects.

(A) Lawrence Makovich, Nick Akins, Andrés R. Gluski, Lynn Good
(B) Jone-Lin Wang, Leonhard Birnbaum, Dawn Farrell, Jim Hughes
(C) GE's private reception



Keynote: Gina McCarthy

Gina McCarthy, the Administrator of the US Environmental Protection Agency (EPA), delivered a Keynote Address at IHS Energy CERAWEK. She focused on the Obama Administration's goal of reducing US carbon emissions. Throughout the address, Administrator McCarthy emphasized the EPA's commitment to continuous dialogue with the energy industry, state regulators, and the environmental community as it formulates emissions standards for existing power plants. She stressed that EPA intends to provide state-level regulators with as much implementation flexibility as possible and to ensure that new regulations do not compromise the reliability of the electric power system.



Gina McCarthy

Power

Keynote: Global Power Dialogue

IHS Energy Chief Power Strategist

Lawrence Makovich chaired the keynote with **Cheryl LaFleur**, Acting Chairman of the Federal Energy Regulatory Commission (FERC). The discussion began with lessons learned from the polar vortex that swept across the United States this winter, which put stress on the increasingly interconnected gas and power systems. Other issues covered included the challenges associated with early retirements of coal and nuclear generating capacity, creating incentives for needed interstate transmission infrastructure, and FERC's more active role in the civil prosecution of market manipulation. Acting Chairman LaFleur expressed the importance of working with industry to meet energy security and environmental goals, and noted that "a voluntary solution is always a little faster than a regulatory one."



*Cheryl LaFleur and
Lawrence Makovich*

Plenary: Customer Needs and Wants

IHS Vice Chairman **Daniel Yergin** chaired the plenary joined by four distinguished panelists. **Sharon Burke**, Assistant Secretary for Operational Energy Planning and Programs at the US Department of Defense, discussed the enormity of Defense Department energy usage and cost as well as notable advancements in efficiency. **Badar Khan**, President and CEO of Direct Energy, gave a presentation on how modern communication and real-time data are keeping customers apprised of their energy usage and leading to energy savings. Schneider Electric Chairman and CEO **Jean-Pascal Tricoire** discussed his company's principles for customer satisfaction—"cheap, safe, green"—and said that technology and innovation will drive greater energy efficiency. In a discussion on cyber security, the panelists agreed that massive investment in research and development is required, along with a thorough identification of vulnerabilities.

"We've seen time and time again, in whatever energy source you want to talk about an accident anywhere is an accident everywhere."

— **Daniel Poneman**, US Deputy Secretary of Energy



The Future of Power Technology and Infrastructure

Lawrence Makovich, IHS Energy Chief Power Strategist, chaired the plenary on "The Future of Power Technology and Infrastructure." Dr. Makovich began the session by asking **Steve Bolze**, President and CEO of GE Power & Water, about the current state of the power industry. Mr. Bolze emphasized that the power industry's long-term outlook shows very steady growth. He noted that 70% of the growth in the power industry is in developing regions, citing China, Africa, and the Middle East as examples of where demand growth is the strongest. US Deputy Secretary of Energy **Daniel Poneman** agreed with Mr. Bolze that the lion's share of electricity demand is in emerging markets. **Steven Edwards**, President and CEO of Black & Veatch, added that the US

(A) **Badar Khan**, **Jean-Pascal Tricoire**, **Sharon Burke**

(B) **Daniel Poneman**

(C) **Steve Bolze**

(D) **Lawrence Makovich**

(E) **Steven Edwards**

(Continued on next page)



The Future of Power Technology and Infrastructure

(Continued from p. 21)

power market has recovered but has yet to reach pre-recession levels.

Mr. Bolze noted the big shift toward mainstream renewables, particularly wind and solar energy. Over the past four years, the cost of wind and solar energy has fallen substantially. Mr. Bolze noted that while a big shift toward renewables is occurring, there is still plenty of room to grow in the power industry space.

The panelists also discussed the role of coal in the power generation sector. Dr. Makovich noted that coal retrofitting has been on the decline in the United States. Mr. Edwards agreed and added that China has been very aggressive in coal retrofitting and already has made plans to shut down 50,000 coal-fueled furnaces. Mr. Poneman

added that despite the decline of retrofitting in the United States, coal will remain a major source of energy.

Mr. Poneman noted that the United States has been very successful in developing nuclear power, largely because it has some of the highest safety standards in the world. Mr. Bolze noted that nuclear projects are currently being built in the United States and that the success of these projects is very important.

Strategic Dialogues

- Power Expert Discussion Tables
- Energy Innovation Pioneers
- Texas Power at the Crossroads

Power

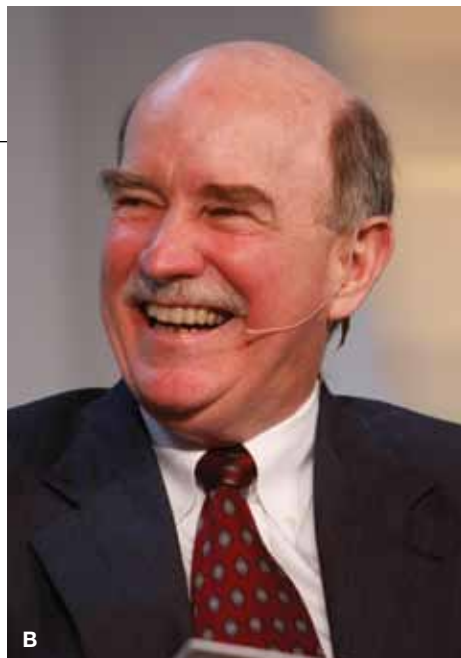
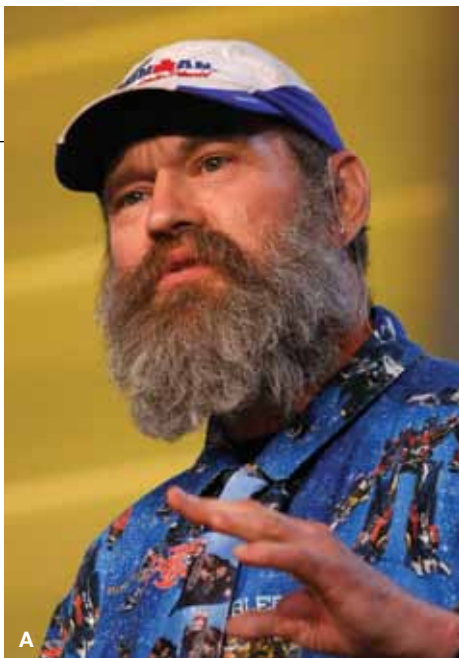
- Meeting Coastal China's Power Supply Challenge Amid Heightened Environmental Pressure
- Africa Power Ministerial Dialogue
- Latin American Power Markets: Heating Up?
- The Future of Global Nuclear Power
- European Power: Home or Away?
- Power Supply Cost Recovery: Bridging the Missing Money Gap
- The New Mix: Transition of US Generating Portfolio
- Electric Policy Agenda: Market Rules and the GHG Management
- Paying for Power: Financing the Power Infrastructure
- Global Coal: Divergent Paths
- Pipes and Wires: The Critical Networks for the Power Business
- Renewable Energy: Going Global?

IHS Energy Expert Briefings: Regional Power Markets

IHS Energy Expert Briefings offered presentations and outlooks in key energy areas, followed by interactive discussion in an informal setting. Concurrent sessions covered the following topics:

- Asia Power Demand and Fuel Markets (China, India, Indonesia, Australia)
- US and Canada
- European Energy Markets: Adjusting to a New Reality
- Middle East
- Under Pressure: Latin America
- Gas and Power Markets
- The Anatomy of the Major Shale Play: The Marcellus
- The Next Generation of IHS Scenarios: Exploring Uncertainty, Risk, and Opportunity in North American Energy Markets



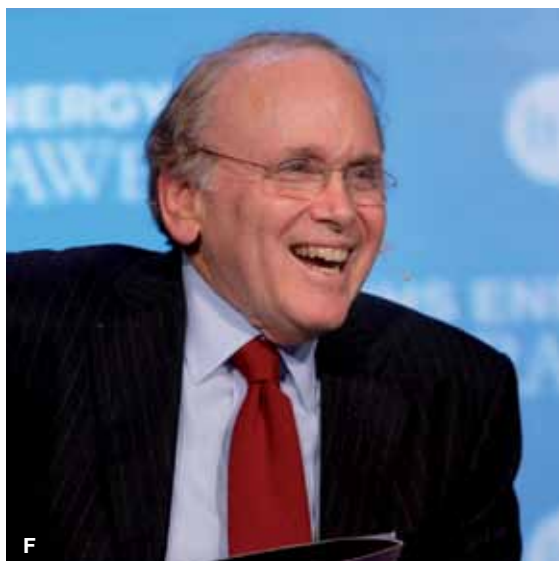


A Glimpse Over the Horizon: Energy Game Changers from the MIT Energy Initiative

Five of the world's leading energy technologists on the frontiers of innovation, from the Massachusetts Institute of Technology (MIT), discussed their current research and the systems and tools that will reshape the energy future. **Daniel Yergin**, Vice Chairman of IHS, chaired the session with panelists **Robert Armstrong**, Director of the MIT Energy Initiative; **Angela Belcher**, the W.M. Keck Professor of Energy; **Vladimir Bulovic**, Fariborz Maseeh Professor of Emerging Technology and the MIT School of Engineering's Associate Dean for Innovation; **Donald Sadoway**, John F. Elliott Professor of Materials Chemistry; and **Alexander Slocum**, the Neil and Jane Pappalardo Professor of Mechanical Engineering and MacVicar Faculty Fellow.

All from the MIT Energy Initiative, the speakers collectively account for an impressive 200 patents and 14 start-ups, with many of their innovations rooted in solving the problems of the energy industry.

eBook with a link to video coverage is available at CERAWeek.com.



(A) Alexander Slocum
(B) Robert Armstrong
(C) Vladimir Bulovic
(D) Angela Belcher
(E) Donald Sadoway
(F) Daniel Yergin

*“We have learned a lot,
but we’ve also learned not
to be complacent.”*

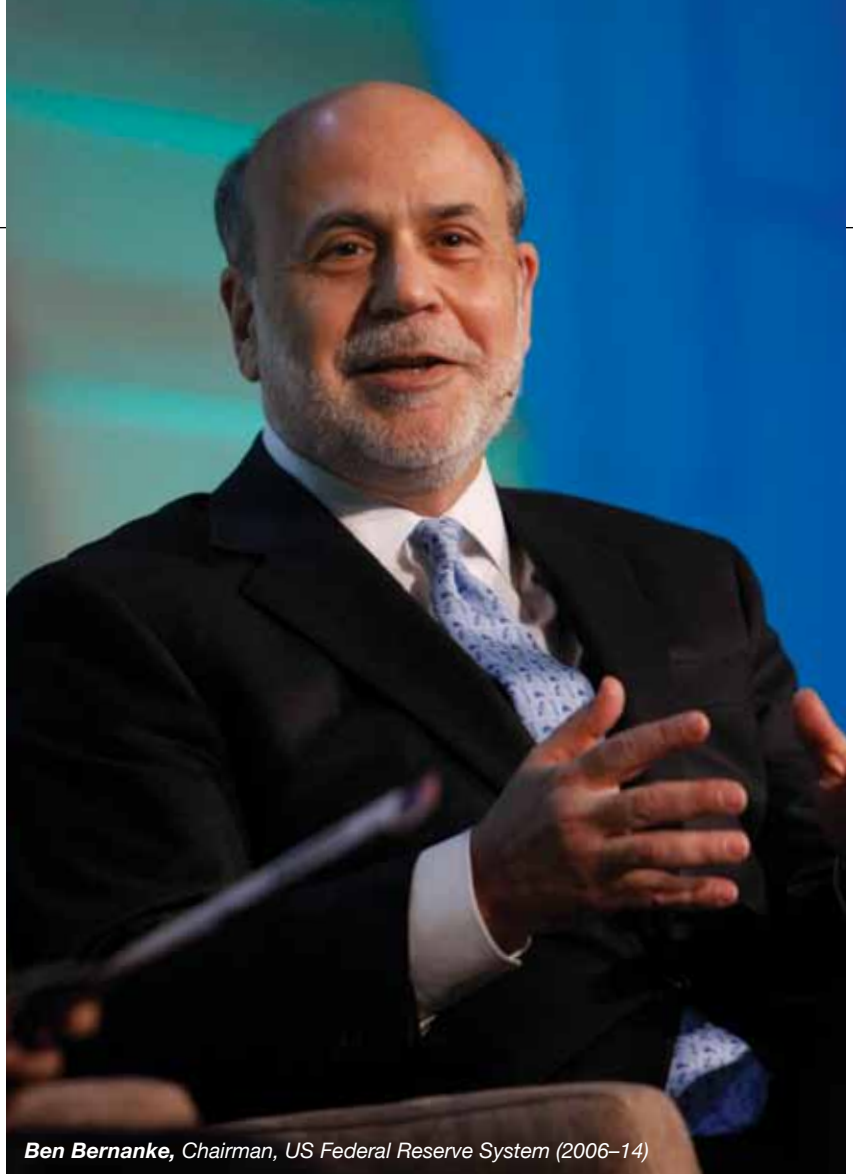
— Ben Bernanke, Chairman,
US Federal Reserve System (2006–14)



Concluding Insights, Dialogue, and Reflections

Ben Bernanke

Ben Bernanke, Chairman, US Federal Reserve System (2006–14), delivered the concluding remarks for IHS Energy CERAWeek 2014. In conversation with **Daniel Yergin**, Dr. Bernanke discussed his experiences at the Federal Reserve during the financial and economic crises of the Great Recession of 2008–09. Lessons learned from the Great Depression — including a monetary policy that was too tight and the widespread collapse of banks which interrupted the flow of credit — were avoided in the Great Recession, although the Fed still had to use appropriate monetary policy and stabilize the banking system. Today the financial system is in much better shape, and banks are healthier. Dr. Bernanke stated his optimism and views about the global economy today.



Ben Bernanke, Chairman, US Federal Reserve System (2006–14)



Concluding Insights, Dialogue, and Reflections



Reflections and Insights from IHS Energy CERAWEEK 2014: What's Ahead for Energy?

Atul Arya, Senior Vice President, IHS Energy, chaired the Opening Insight Dialogue on the final day of IHS Energy CERAWEEK 2014. Joining Dr. Arya were IHS experts in oil markets, the upstream industry,

natural gas, power, the environment, and economics: **James Burkhard**, Vice President, Head of Global Oil Market Research and Energy Scenarios; **Jerry Kepes**, Managing Director, Oil Markets; **Michael Stoppard**, Chief Strategist, Global Gas; **Lawrence Makovich**, Chief Power Strategist; **Samantha Gross**, Director, Integrated Research; and **John Larson**, Vice President and Global Leader for Big Data Analytics.

Panelists offered their perspectives on

this year's conference, including the biggest surprises, and the road ahead for energy. The experts discussed geopolitical challenges, increasing interfuel rivalry in power and transportation, rising costs, the opening of Mexico's energy sector, the effects of the "shale gale," coordination between gas supply and power demand, pragmatic dialogue on the environment and the need for technical and policy innovation, and the role of cheap energy in GDP growth.

(A) **Atul Arya** (Chair), **James Burkhard**, **Jerry Kepes**, **Michael Stoppard**, **Lawrence Makovich**, **Samantha Gross**, **John Larson**
(B) **Atul Arya**



The Future of Geopolitics: Turmoil and Transition

Daniel Yergin, IHS Vice Chairman and IHS Energy CERAWeek Conference Chairman, led a panel discussion on geopolitics. Joining him were **Angela Stent**, Professor, Georgetown University; **Nicholas Eberstadt**, Henry Wendt Chair in Political Economy, American Enterprise Institute; **Raad Alkadiri**, Managing Director, Energy Insight, IHS; and **James Clad**, Senior Advisor for Asian Affairs, Center for Naval Analysis and former Deputy Assistant Secretary of Defense for Asia Pacific Affairs. The discussion focused on ongoing, recent, and future areas of geopolitical turmoil in the Middle East, Ukraine, and East Asia.

The Next Stage of the North American Energy Renaissance

Atul Arya, Senior Vice President, IHS Energy, chaired the session. Joining him were **Barry Smitherman**, Chairman, Texas Railroad Commission; **Diane McQueen**, Minister of Energy, Alberta, Canada; and



Raoul LeBlanc, IHS Managing Director.

The panel discussed unconventional oil and gas development in North America and possible impediments to that growth. Key challenges center on the availability of capital for new play development, water resources, the supply of skilled labor, and government policies.

*(A) Raad Alkadiri, Angela Stent, Nicholas Eberstadt, James Clad, Daniel Yergin
(B) Raoul LeBlanc, Diane McQueen, Barry Smitherman, Atul Arya*



Nick Akins

Chairman, President & CEO
American Electric Power

Nizar Al-Adsani

Chairman & Managing Director
Kuwait Petroleum Corporation

Abdallah Al-Saadon

Vice President, Corporate
Planning
Saudi Aramco

Diezani Alison-Madueke

Min. of Petroleum Resources,
Nigeria; Alt. President, OPEC

Robert Armstrong

Director
MIT Energy Initiative

Ben Bernanke

Chairman, US Federal Reserve
System (2006-2014)

Leonhard Birnbaum

Member of the Board of
Management – Markets,
Services
E.ON

Steve Bolze

President & CEO
GE Power & Water

Sharon Burke

Assist. Secretary, Operational
Energy Planning and Programs
US Dept. of Defense

Orlando Cabrales

Vice Minister of Energy
Ministry of Mines and Energy of
Colombia

Peter Coleman

CEO & Managing Director
Woodside Energy

Gregory Ebel

President & CEO
Spectra Energy

Steven Edwards

Chairman, President, & CEO
Black and Veatch

Dawn Farrell

President & CEO
TransAlta Corporation

Chris Finlayson

Chief Executive Officer
BG Group

Rob Franklin

President
ExxonMobil Gas & Power
Marketing

Russ Girling

President & CEO
TransCanada Corporation

Andrés R. Gluski

President & CEO
AES

Lynn Good

President & CEO
Duke Energy

Javier Gutiérrez

President
Ecopetrol

Richard Haass

President
Council on Foreign Relations

John Hickenlooper

Governor
State of Colorado

Jim Hughes

Chief Executive Officer
First Solar

Joe Kaeser

President & CEO
Siemens AG

Badar Khan

President & CEO
Direct Energy

Bill Klesse

Chairman of the Board and CEO
Valero Energy Corporation

Cheryl LaFleur

Acting Chairman
Federal Energy Regulatory
Commission

Sam Laidlaw

Chief Executive
Centrica PLC

Doug Lawler

President & CEO
Chesapeake Energy

Andrew Liveris

Chairman & CEO
Dow

Emilio Lozoya

Chief Executive Officer
Pemex

Andrew Mackenzie

Chief Executive Officer
BHP Billiton

Christophe de Margerie

Chairman & CEO
TOTAL S. A.

Gina McCarthy

Administrator
US Environmental Protection
Agency

Lamar McKay

Chief Executive, Upstream
BP Plc

Philip Moeller

Commissioner
Federal Energy Regulatory
Commission

Ernest Moniz

Secretary of Energy
United States

Irene Muloni

Minister of Energy & Minerals
Development
Uganda

Lisa Murkowski

US Senator
United States Senator

Marvin Odum

Upstream Americas Director
Shell

Joe Oliver

Minister of Natural Resources
Canada

Colin Parfitt

President Supply and Trading
Chevron Corporation

Carlos Pascual

Special Envoy & Coordinator,
International Energy Affairs
US Department of State

Daniel Poneman

US Deputy Secretary of Energy

Paolo Scaroni

Chief Executive Officer
ENI

Adam Sieminski

Administrator
EIA

Barry Smitherman

Chairman
Texas Railroad Commission

Takayuki Sumita

Commissioner
Ministry of Economy, Trade &
Industry of Japan (METI)

Jean-Pascal

Tricoire
Chairman & CEO
Schneider Electric

John Watson

Chairman & CEO
Chevron Corporation

By the Numbers

History

IHS Energy CERAWEK is the energy industry's preeminent gathering of industry leaders and government officials, offering new ideas, insight, and discussions on major strategic issues facing the global energy industry. IHS Energy CERAWEK 2014 marked the 33rd anniversary for the annual executive conference.

Delegates

Over 2,800 senior energy executives, government officials, and thought leaders from the energy, policy, technology, and financial communities

Speakers

Over 220 industry leaders, government officials, and thought leaders

Energy Innovation Pioneers

The Energy Innovation Pioneers program recognizes companies whose technologies and business plans exemplify the following criteria: invention and creativity, feasibility and timeliness, scalability and quality of management team. IHS Energy CERAWEK 2014 recognized 24 pioneers. Past Energy Innovation pioneers have achieved remarkable success including six who have gone on to an IPO.

Program

IHS Energy CERAWEK featured keynote addresses, plenaries, ministerial dialogues, strategy sessions, energy insight breakfasts, and IHS expert briefings on a range of topics:

- World Economic Outlook
- Technology Innovation
- Geopolitics
- Prospects for a Global Unconventional Revolution
- New Global Competition
- License to Operate
- Energy Development in Africa
- Energy Policy and Regulation
- Climate Change and Energy Transition



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**Colombia
Holds Bid
Round at
IHS Energy
CERAWEEK**

*(A) Orlando Cabrales, Vice
Minister of Energy, Ministry
of Mines and Energy of
Colombia*



Industry Partners

ALSTOM

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EgonZehnder



MITEi
MIT Energy Initiative

أرامكو السعودية
Saudi Aramco



SBN
OFFSHORE



Spectra
Energy



TUDOR PICKERING
HOLT & CO | ENERGY INVESTMENT &
MERCHANT BANKING

THE WALL STREET JOURNAL.



Media Coverage

Over 240 members of the media attended IHS Energy CERAWEK 2014 (a record number) including: The Wall Street Journal, CNBC Television, The New York Times, Financial Times, Bloomberg Television, Houston Chronicle, Business Week, Forbes, Dow Jones, Reuters, Associated Press, NHK Television, Xinhua Television and Xinhua News Agency. CERAWEK 2014 generated over 3,000 total media stories.

“The speakers list represents the world oil industry’s who’s who.”

— *NBC News*

“The conference, described as ‘the Davos of energy,’ has always attracted a high-powered line-up of executives and policy makers to Houston.”

— *Financial Times*

“The world’s preeminent energy conference.”

— *CNBC*

“Industry leaders gather in Houston for IHS CERAWEK energy conference.”

— *Houston Chronicle*

“The year’s preeminent energy gathering.”

— *Wall Street Journal*

“The oil and gas industry’s Super Bowl.”

— *Politico*

“One of the most important energy conferences in the world, IHS CERAWEK.”

— *Bloomberg Television*

“The biggest executives in energy are gathering for ... IHS CERAWEK.”

— *CNBC Television*



Recent IHS Energy CERAWEK Speakers



Igor Sechin,
President and Chairman of
Management Board, Rosneft



Vagit Alekperov,
President of OAO LUKOIL



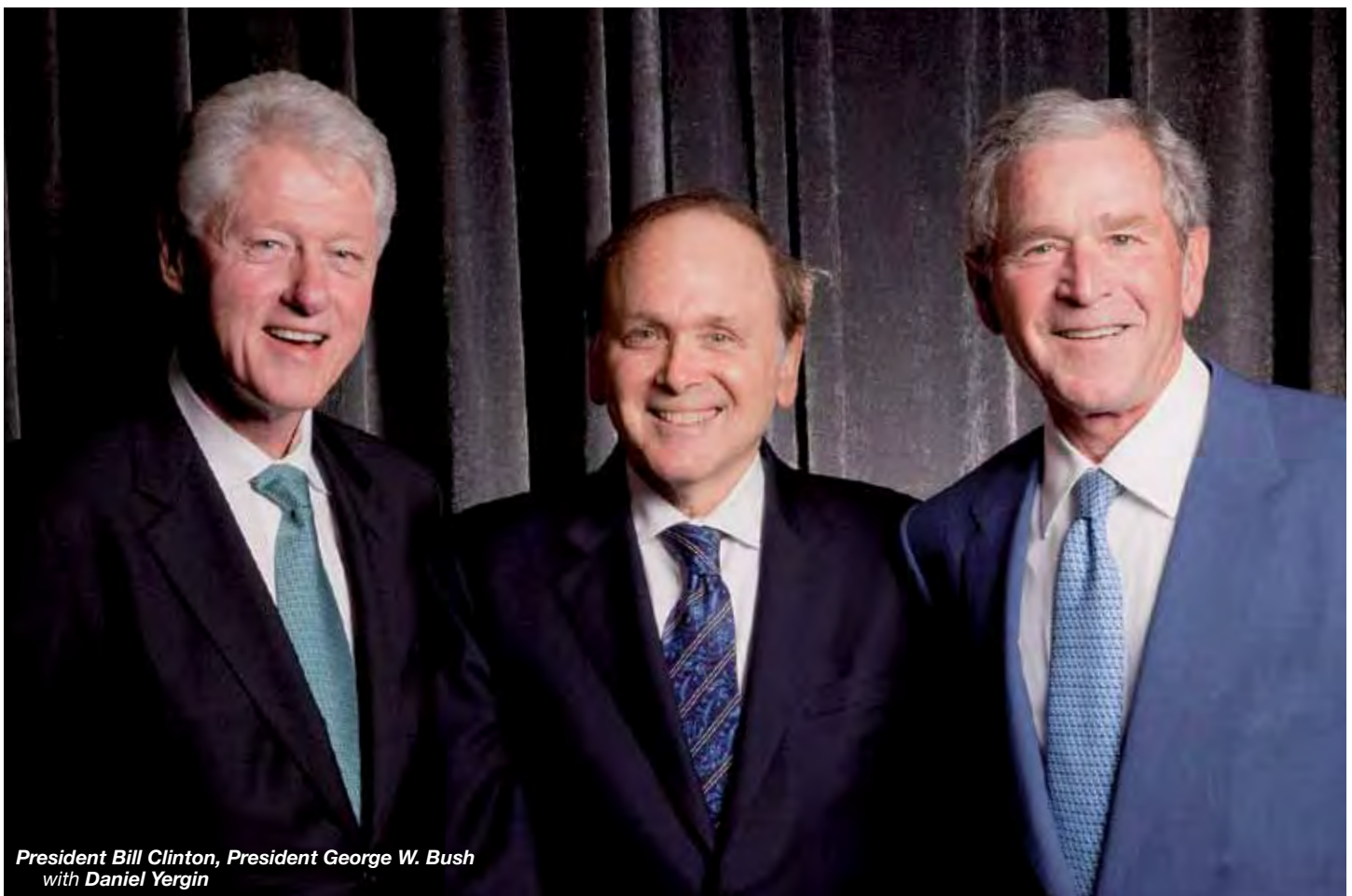
Fanrong Li,
CEO & President, CNOOC Ltd.



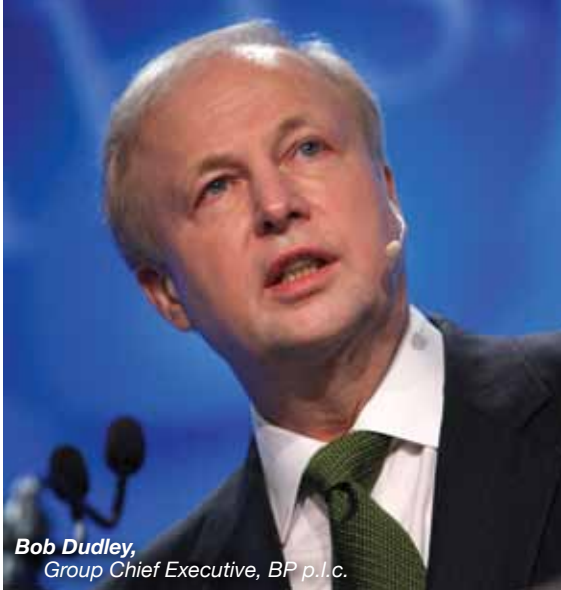
Helge Lund,
President & CEO, Statoil



Jeffrey Immelt,
Chairman & CEO, GE



**President Bill Clinton, President George W. Bush
with Daniel Yergin**



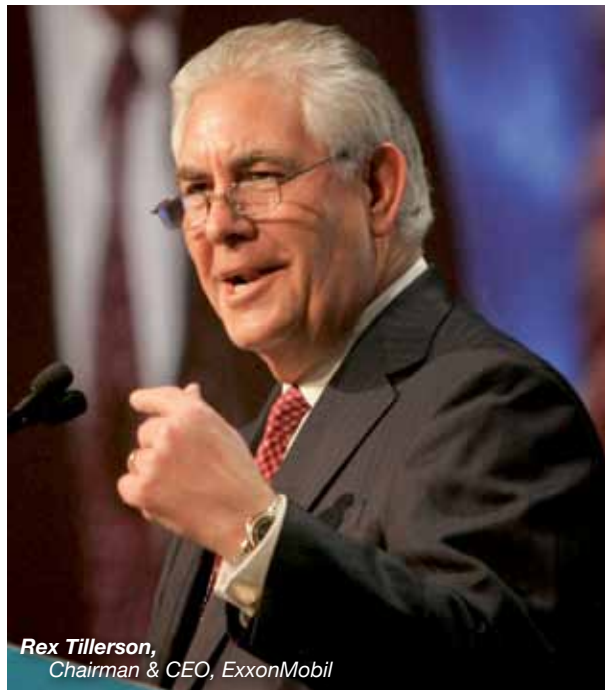
Bob Dudley,
Group Chief Executive, BP p.l.c.



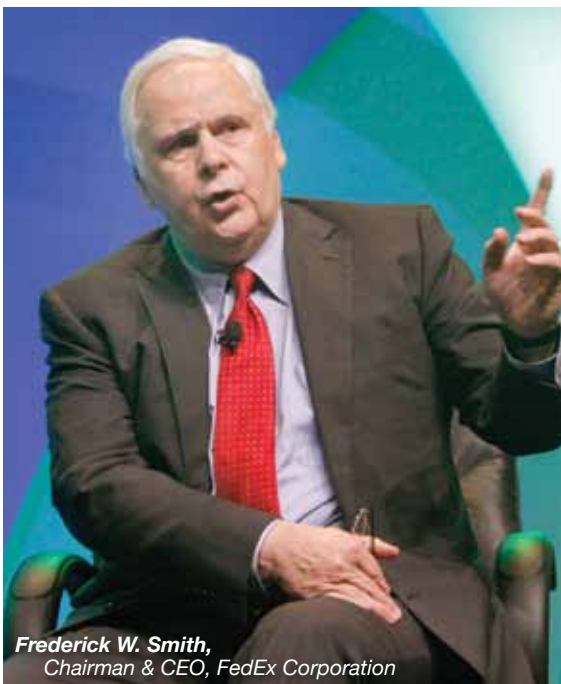
Bill Gates,
Chairman, Microsoft Corporation



Khalid Al-Falih,
President & CEO, Saudi Aramco



Rex Tillerson,
Chairman & CEO, ExxonMobil



Frederick W. Smith,
Chairman & CEO, FedEx Corporation



Walter Isaacson,
President Aspen Institute;
author of *Steve Jobs* and *Einstein*

IHS ENERGY CERAWEEK®



2015

Save the Date

*IHS Energy CERAWEEK 2015
moves to late April.*

Date:

April 20–24, 2015

Place:

Hilton Americas
Houston, Texas



For the latest information on
Program and Speakers go to:
www.ceraweek.com

For information about
participation in IHS Energy
CERAWEEK, contact:
Christina Butkiewicz
email: **christina.butkiewicz@
ihs.com**
phone: **617-914-0203**

For information on IHS Energy
CERAWEEK Partnership,
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Todd Szczebak
email: **todd.szczebak@ihs.com**
phone: **303-858-6053**



*(A) Jin-Yong Cai, Executive
Vice President & CEO,
International Finance
Corporation (IFC) and Scott
Key, IHS President & CEO*





IHS (NYSE: IHS) Every decision matters. That's why our customers around the world rely on IHS to help them make the best choices. As the premier provider of global market, industry and technical information and expertise, we can scale our thinking to virtually any operation and enterprise, from ground-level tactics to high-level strategy. IHS has been in business since 1959 and became a publicly traded company on the New York Stock Exchange in 2005. Committed to sustainable, profitable growth and employing over 8000 people in 31 countries, IHS is headquartered in Englewood, Colorado, USA.

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