

Industry Agenda

Oilfield Services & Equipment Industry

Industry Partnership Strategy Meeting, New York, USA 2 October 2013



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Industry Partnership Strategy Meeting

Oilfield Services & Equipment Industry

Energy Update: Navigating the Energy Sector Transformation

This session was off the record and conducted under the Chatham House Rule.

While energy demand continues to grow globally, companies from across the oil & gas, utility and renewables sectors are increasingly struggling to keep up profitability and attract finance for the large, long-term capital investments needed. This has become a core challenge for energy companies regardless of whether due to changing risk profiles for energy projects, fossil fuel abundance, increased competition in the industry, new energy transition policies, or investors' view of the industry. Lack of investments will over time hit not only company balance sheets, but also the ability to deliver an effective energy transition. Through the lenses of finance and energy transition policies, this session enabled participants to exchange views on the fundamental shifts happening today and how companies can adapt and respond.

1. What are the root causes of decreasing profitability and the challenge of attracting finance in the oil & gas and electricity sectors? What does it say about the evolution of industry fundamentals?
2. How will energy transition policies in major economies affect the energy sectors?

Key Points

- *Significant change is a fact in the energy industry.* The industry has shifted from one of inorganic growth during the era of supermajors and mergers, to one of more organic growth, driven mainly by unconventional, new market entrants.
- *The supermajors still have strong influence on the industry.* Although many players have entered and exited the market, particularly in response to unconventional and renewable sources, the mega corporations still remain as the main players in the industry. Their future will depend on how they manage capital and increasingly difficult projects.
- *Renewables need less policy, more market efficiency.* The renewables industry is viable and a necessary outgrowth of the industry, but must not fall victim to politically driven policy that thwarts natural market growth and development. The sector is getting healthier, with consolidation strengthening companies' balance sheets and growth in new markets; however, more stable policies on the national and local levels are needed to unlock longer-term financing.
- *Subsidies are at the fore of industry transformation.* Subsidies in research and development (R&D), rather than in deployment policies, accelerate innovation and adoption of new technologies, bringing higher returns and less market distortions.

Synopsis

The majority of participants expressed a belief that the energy industry is going through a significant transformation or has reached an inflection point. The dynamics, in particular for oil & gas players, have shifted from one of inorganic growth during the era of supermajors and mergers, to one of more organic growth, driven mainly by unconventional players. About a decade ago, there was a rush among supermajors to leave North America to pursue megaprojects in emerging markets, many of which are now behind schedule and over budget. Some participants characterized this as "sloppiness" driven by high oil prices. This created a vacuum for smaller independent players to build up and steer the US shale gas revolution, as evidenced by the fact that total growth from non-OPEC production has come 100% from unconventional sources in recent years. However, many supermajors have now returned to the US to reclaim the market, and since 2007, supermajors have doubled capital budgets worldwide to US\$ 140 billion.

Oil & gas

Despite the myriad firms that have contributed to the expanding and dynamic renewables industry, as well as the many smaller companies that jumpstarted the shale gas boom in the United States, participants generally agreed that the largest energy players remain fixtures and drivers of the industry. In terms of policy, regulatory issues have prompted some breakups of majors to split off their business divisions, but there was no consensus that the industry is heading wholesale in this direction. Wall Street appears to like integrated business units in the energy industry, as large portfolios create natural hedges. Integrated companies have the advantage of, for example, funnelling downstream cash to struggling, but promising, upstream operations. However, unconventional energy production is a sore spot on the financing front for supermajors, as effectiveness depends largely on how well these companies manage capital flows for large, unwieldy unconventional projects.

According to one source, supermajors have doubled their capital budgets worldwide in recent years, and most of the increase is due to unconventional energy. Supermajors must now "get back to the basics". Their challenge is threefold: 1) channel resources to monetizing capital that is "unfructified"; 2) better manage large projects where inflation is an obstacle; and 3) execute better by bringing not-in-service capital into service. Another challenge for the majors will be to efficiently mobilize capital to manage unconventional energy projects, such as deep-water wells, which are in danger of becoming black holes of valuable resources through inefficiencies and double-digit supply inflation.

Another key question regarding the energy sector transformation, especially in oil & gas, concerns mergers versus demergers, and where the trend is going. In the past, "scale was beautiful" and companies often focused on merger synergies that streamlined costs. However,

participants questioned whether this allowed for companies to be flexible enough to adapt to changing markets dynamics, and warned of the “curse of megaprojects” that put companies over budget and behind schedule. The next 7-10 years will show whether the “supermajor model” – founded on cost and scale advantage – is successful. This is largely in the hands of the industry itself.

Renewables

Unlike the oil & gas industry, the future of the utilities and renewables sectors is more dependent on policies. Policies that create good market designs, predictable emissions trading and sound renewable integration were highlighted as three core issues for utilities, particularly in Europe. In a largely policy-driven environment, many find that current policies fail to balance the security of supply with economic and environmental considerations, and therefore undermine the current business model and value of base-load power generation.

The renewable energy sector also has had to change its narrative on subsidies and in particular work to remove politics and promote policy. This sector is viable and getting healthier, with consolidation strengthening the balance sheets of companies (in China there were 400 companies and now there are 150), and growth in new segments (emerging markets and distributed generation). However, national and local policy has been an obstacle, with one participant describing solar policy as being a “football” tossed around by different political parties and governments, and in turn has led to significant market distortion. More stable policies are needed to unlock longer-term financing, which is critical for renewables, given that capital investment is the vast majority of the total cost.

Key to the changing energy sector across the value chain is also the question of subsidies, which in many cases have become a question of politics, not policy. This has especially affected the utilities sector, particularly in Europe. Subsidies have been too skewed towards supply and deployment, and instead should be more focused on the R&D side to accelerate innovation and the adoption of new technologies. The unit impact would be greater. Industry should leverage more private financing in lieu of public financing.

Energy sector transformation in regional contexts

Germany: Installed capacity from renewable sources in the European Union is 246 GW (2010, IEA), with the lion’s share in Germany. Yet, Germany’s energy transition policy, Energiewende, distorts the German energy market with skewed renewable subsidies. Industry in Europe needs to advance from the “old world” way of doing business and embrace and promote renewables; but this must be done with sound market design and a viable emissions trading scheme for renewables.

There is nothing wrong with renewable start-up subsidies, but Germany is an example (with 30-40 GW capacity of solar capacity) where subsidies were not stopped in time, so that production is unnaturally beyond capacity.

Mexico: The current Mexican administration had to submit a 15-year energy strategy to its Congress, which must create the conditions and framework for a market to happen. In oil & gas, these regulations must make stakeholders responsible for projects, and in electricity, they must level the playing field by promoting a carbon tax to halt distortions.

The United States: The current US administration is pushing for industry-led technology innovation, liberal markets that foster entrepreneurship, and sound policy to address market failures – coal to gas, a phasing out of carbon subsidies, doubled wind, promotion of energy efficiencies, and a natural-gas bridge.



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01: Matthew Harwood, Group Head, Strategy, Petrofac Ltd., United Kingdom
02: Participants on a break out discussion

Panellists

Special Guests

John Adams, Senior Advisor, Office of Electricity Delivery and Energy Reliability, US Department of Energy

Leonardo Beltran Rodriguez, Under-Secretary, Planning and Energy Transition, Secretariat of Energy of Mexico

Jean-Christophe Fueg, Head, International Energy Affairs, Federal Department of Environment, Transport, Energy and Communications of Switzerland

Julia Nesheiwat, US Deputy-Assistant Secretary of State for Implementation

Grant Sprague, Deputy-Minister of Energy, Government of Alberta, Canada

Experts

Rikiya Abe, Professor, Presidential Endowed Chair of Digital Grid, University of Tokyo, Japan

Leandro Feliciano Alves, Head, Energy Division, Inter-American Development Bank, USA

Edward Comer, Vice-President and General Counsel, Edison Electric Institute (EEI), USA

John Kingston, Director, News, Platts, USA

Frank Verrastro, Senior Vice-President and Schlesinger Chair, Energy and National Security, Center for Strategic and International Studies (CSIS), USA

David G. Victor, Professor, University of California, San Diego (UCSD), USA; Global Agenda Council on Energy Security

Moderated by

Jean-Baptiste Renard, Independent Energy Expert, France



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04

01: Dev Sanyal, Executive Vice-President and Member, Group Executive Committee, BP, United Kingdom, making his introductory remarks

02: Thomas Birr, Head, Corporate Development & Strategy Group, RWE AG, Germany

03: Leandro Feliciano Alves, Head, Energy Division, Inter-American Development Bank, USA

04: Participants

Oil & Gas Roundtable

This session was off the record and conducted under the Chatham House Rule.

The Oil & Gas Roundtable brought together key executives from the industry, policy-makers and experts to discuss the critical issues and transformations that the oil & gas industry should foresee and address. Furthermore, participants prioritized the identified issues and set the right action plan for 2014. The outcome of the Roundtable will provide valuable input for the CEO session to be held at the World Economic Forum Annual Meeting 2014 in Davos-Klosters, Switzerland.

From the key issues identified in the New Frameworks for the Oilfield Services Industry session held at the Annual Meeting 2013, participants addressed the implications of the rising complexity, size and cost of projects, and how these risks can be shared more effectively among stakeholders. Moreover, the participants took on the key challenges that the industry is facing, including a human capital deficit, inadequate recognition by the public, and the need for a sustainable business model in the transition to a lower-carbon economy.

Based on the discussions, the selected topics will be refined and presented to guide chief executives in taking necessary action during the Annual Meeting 2014. The main outcomes will be developed into a Forum cross-industry initiative in 2014.

Key Points

- *Project management is a key issue in the industry.* Geology is good for the future, but proper project management is lacking for maximum extraction.
- *Peak demand is a premature concept.* Although demand will most likely taper off in Europe and North America, Asia will continue to be a driver for years to come.
- *Supply depends on reserve maintenance as well as project management.* The industry must not ignore the market power and stability of maintaining healthy reserves while it learns to better extract unconventional energy.
- *Capability, complexity and risk depend on technology and talent.* Technologies have enabled unconventional extraction and must advance to make the cost-benefit viable, but human resource talent is essential for enabling technology, managing projects and developing better financing techniques.
- *Building public trust is far from an industry strength.* The industry must tell its story in a less defensive way and take the “necessary evil” moniker out of the narrative.

01: Matthew Harwood, Group Head, Strategy, Petrofac, United Kingdom
02: Froylán Gracia Galicia, Executive Chief of Staff, Pemex, Mexico
03: Dario Speranza, Vice-President, Government Affairs Department, Eni, Italy

Synopsis

Project management – this was one of the most recurring, persistent themes of the Oil & Gas Roundtable. According to one participant, major projects are currently approximately 50% over budget and 70% behind schedule, with 60-80% efficiencies. Most agreed that the industry does not want to go into a sharp decline, and that the current project management metrics are not sustainable. In short, the industry has been relying far too long on high oil prices to provide sustainable reinvestment margins in lieu of improving performance and efficiencies. Difficult-to-extract hydrocarbons are becoming the operational norm for the industry. Since supply chain inflation is in the double digits and unstable prices are now the norm – due to volatile geopolitics and macroeconomics as well as low US gas prices – financial survival of the industry depends on how cost-effectively and efficiently companies can run their large, unconventional projects.



The moderator of the Roundtable set out five topics for discussion based on the previous deliberations held at the Forum: demand, supply, complexity/risk, capability and trust. Project management figures into all these topics, since oil & gas demand will be impacted by how projects are managed environmentally and production-wise as hydrocarbons compete with renewables. Supply looks good as far as geology is concerned, but project management that depends on technology innovation, available capital and capable on-location human resources is lacking for more efficient extraction. The complexity and risk of unwieldy unconventional extraction are at historical highs for the industry's project management. Capability will depend on stepping up the deployment of human and financial elements that prioritize local, or in-house, talent rather than sending "experts" to troubleshoot, as well as on developing sophisticated capital vehicles. Similarly, capability for these projects will depend on developing local talent more effectively. Lastly, the room for error is small with these projects, which are often set in remote, environmentally sensitive and uncharted environments (e.g. deep water), in that incidents cause disproportionate environmental damage that will compromise the already shaky trust of the public.

But the five topics also have broader parameters in their own rights. The participants agreed that talk about peak demand is premature, just as talk a decade ago about peak supply turned out to be premature (and was even irrelevant as technology altered the entire extraction landscape). Of course, gas in the US does look as if it is heading for peak demand, as the model of exorbitant supply and cheap transportation can only last so long. Likewise, new oil finds that are satisfying demand in the West will level out. However, participants agreed that demand will continue to be driven by Asia, where infrastructure is improving rapidly, macroeconomic and socio-economic development continues, and a requisite middle class is multiplying. But, demand will depend on how the industry contributes directly to local needs by itself investing in public infrastructure, energy education and alternative energy sources, however

01: Gordon Lambert, Executive Adviser, Sustainability and Innovation, Suncor Energy, Canada; and Jean-Baptiste Renard, Independent Energy Expert
02: Steven Michael Fludder, Senior Executive Vice-President, Samsung

Engineering, Republic of Korea; Leonardo Beltran Rodriguez, Undersecretary of Planning and Energy Transition, Secretariat of Energy of Mexico; and Froylán Gracia Galicia, Executive Chief of Staff, Pemex

03: Frank Verrastro, Senior Vice-President and Schlesinger Chair, Energy and National Security, Center for Strategic and International Studies (CSIS), USA

contradictory the latter may sound, which was addressed more fully in the last point of discussion: trust.

Thus, controlling costs on projects is integral to the industry. But participants agreed that supply through the continued maintenance and building of reserves cannot be deprioritized since reserves are essential for flattening the volatility of prices and better controlling demand.

In terms of complexity, risk and capability, the industry must cultivate talent to be able to effectively embrace all three factors, and cease tailoring operational and business strategy strictly to oil prices. For two decades, talented youth consciously avoided the industry, heading instead for less "dirty" industries, such as financial services and management consulting. But the good news is that the graduation rate of geologists and engineers is at an all-time peak. Yet, the industry must manage the talent pool better, according to participants – currently, the industry has handled its growing talent pool by being "too quick to hire, and too quick to fire".

Capability in the industry will be optimized if companies learn to collaborate where they do not directly compete, such as how multiple companies shared 800 million Canadian dollars in intellectual property to make extraction in the Canadian oil sands work on both a functional project-sharing level and a policy level. Related to collaborative research, technology innovation is necessary for tackling the increasingly complex tasks of extracting hard-to-reach hydrocarbons and for minimizing the inherently higher risks of doing so.

The industry is held to the highest public perception



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01: Aysar Tayeb, Senior Corporate Adviser, Saudi Aramco, Saudi Arabia
02: Participants

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standards among industries; although there are not many disasters, and most are averted, the few that happen are often at a scale that brings disproportionate attention from the public. Hence, the industry must do a better job at managing this perception, and taking the “necessary evil versus unnecessary evil” debate out of the narrative. Embracing social media is a must – although sustainability reports have a place, the public does not consume this type of news anymore. By 2014, there will be 2 billion social media users. The oil & gas industry is far from being social-media prepared. As one participant noted, “Although it is frustrating to communicate in 140 characters or less, it can be done and must be learned by the industry.” Another participant pointed out that a company using Facebook is using the tool incorrectly if it devotes posts to “declaring how much it gave to the local boys’ club.”

The industry must tell more stories about what hydrocarbons do for society, and even talk about what may seem to be contradictory to their business models, such as diversification of energy, keeping costs to the consumer low and energy efficiency. On this note, it is mutually beneficial for the oil & gas industry and society to promote the idea of providing energy access to all, and for companies to enable this concept by being active local operators. Companies

should not only tap local human resources to develop competencies, but also contribute directly to local needs (e.g. build power plants in Africa) to better link the industry to sustainability issues. In short, the industry must foster more and willing stakeholders.

Panellists

Special Guests

Leonardo Beltran Rodriguez, Under-Secretary, Planning and Energy Transition, Secretariat of Energy of Mexico
 Grant Sprague, Deputy-Minister of Energy, Government of Alberta, Canada

Experts

John Kingston, Director, News, Platts, USA
 Jean-Baptiste Renard, Independent Energy Expert, France
 Frank Verrastro, Senior Vice-President and Schlesinger Chair, Energy and National Security, Center for Strategic and International Studies (CSIS), USA

Moderated by

Dev Sanyal, Executive Vice-President and Member, Group Executive Committee, BP, United Kingdom

US Leadership in Climate Change: What Next?

This session was off the record and conducted under the Chatham House Rule.

Boosted by its switch from coal to gas, the United States has succeeded in reducing its CO₂ emissions to the levels of the mid-1990s. In terms of climate regulation, however, the US has to date not demonstrated commensurate global leadership. This could change through recent initiatives taken by the Obama administration both domestically and internationally with countries such as China. The coming two years will be crucial for the shape of climate regulations globally. As the world seeks new momentum in climate negotiations, the potential impact of US leadership on climate issues could be very significant. However, questions remain on how ambition will translate into policies and how proactive the industry will be in tackling the decarbonization issue.

This lunch session offered participants an opportunity to debate:

1. What real climate-related policy shifts can be expected in the US and when?
2. What will their implications be generally, and more specifically on different energy sectors?
3. What can major energy companies do to step up their leadership on tackling the carbon challenge as climate issues return to the centre of global attention?

Key Points

- Various recent trends and events have put climate change back on top of the US and global agendas.
- Political gridlock and economic competitiveness concerns are the key obstacles to President Obama's climate change plan.
- China is adopting a gradual approach on climate change, with significant progress on various fronts.



01: Stuart Brooks, Special Adviser, Chevron Corporation, United Kingdom; and Dev Sanyal, Executive Vice-President and Member, Group Executive Committee, BP, United Kingdom

Synopsis

Climate change is back on top of the global agenda, and many recent events point in this direction. The Intergovernmental Panel on Climate Change has issued its fifth assessment report on climate change, underscoring that the climate is undergoing exceptional changes that are extremely likely due to human influence. On 25 June this year, President Obama announced a new national climate action plan. As many as 650 corporations, including GM, Microsoft, Unilever and Nike, have joined the Climate Declaration, calling on policy-makers to seize the economic opportunity of addressing climate change. Momentum is picking up yet again on climate change, and 2014 and 2015 will be crucial years for the international community to agree on a new, binding agreement. In addition, the two largest emitters – the US and China – are entering into specific bilateral collaboration on climate and energy.

Globally, the energy sector accounts for roughly two-thirds of greenhouse gas emissions. Boosted by its switch from coal to gas, the United States has succeeded in reducing its CO₂ emissions to the levels of the mid-1990s. The shale gas revolution will facilitate the transition to a lower carbon economy. The recovery rate in the shale gas basins is currently at 3.5% and will most likely increase in the future. It is, however, in the interest of the natural gas industry that it takes a leadership stance in developing environmentally responsible standards to ensure the societal license to operate and long-term economic viability. Minimizing methane leaks will be one of the key challenges faced by the industry.

The Obama administration recently unveiled its plan on climate change. Energy efficiency will be a central part of the plan, even if remarkable progress has already been made in the past decades (for example, in standards on refrigeration). The plan also foresees a further increase of gas production and a coal switch. The shale gas revolution has not been fortuitous; there was regulatory support behind its surge (tax credits, R&D support). The most controversial element of the plan is the restriction of CO₂ emissions for coal-fired power plants. Even though it is likely that the regulation will end up in the courts, if no stable legislation is enacted to achieve the emission targets (17% CO₂ reduction by 2020), the EPA legislation of carbon emissions for coal power generation will probably take place.

One of the main arguments against the plan is its economic viability and impact on US competitiveness. Yet, California has been able to decrease power demand and emissions while its economy has grown. Furthermore, some participants argued that if emissions are not restricted, climate change consequences will severely hamper economic growth. On the other hand, the environmental community has a great interest in minimizing costs while reducing emissions. California's cap-and-trade system will be an example of a state where the costs of reducing emissions are minimized. The Obama plan has to balance the trade-offs between energy security, economic growth and environmental sustainability. However, the fact that energy demand is flat deters the trade-offs between the economics and environmental sustainability.



01

Panelists

Special Guests

John Adams, Senior Advisor, Office of Electricity Delivery and Energy Reliability, US Department of Energy
 Jean-Christophe Fueg, Head, International Energy Affairs, Federal Department of Environment, Transport, Energy and Communications of Switzerland
 Julia Nesheiwat, US Deputy-Assistant Secretary of State for Implementation
 Grant Sprague, Deputy-Minister of Energy, Government of Alberta, Canada

Experts

Rikiya Abe, Professor, Presidential Endowed Chair of Digital Grid, University of Tokyo, Japan
 Leandro Feliciano Alves, Head, Energy Division, Inter-American Development Bank, USA
 Edward Comer, Vice-President and General Counsel, Edison Electric Institute (EEI), USA
 John Kingston, Director, News, Platts, USA
 Fred Krupp, President, Environmental Defense Fund, USA
 Jean-Baptiste Renard, Independent Energy Expert, France
 Frank Verrastro, Senior Vice-President and Schlesinger Chair, Energy and National Security, Center for Strategic and International Studies (CSIS), USA

01: Participants

02: Julia Nesheiwat, US Deputy-Assistant Secretary of State for Implementation, USA; and Mark Mendenhall, President, Trina Solar US, USA

03: Panelists of the session: Fred Krupp, President, Environmental Defense Fund, USA; David G. Victor, Professor, University of California, San Diego, USA; and Frank Verrastro, Senior Vice-President and Schlesinger Chair, Energy and National Security, Center for Strategic and International Studies (CSIS), USA

04: Fred Krupp, President, Environmental Defense Fund, USA



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The Gas Demand: Evolution or Revolution?

This session was off the record and conducted under the Chatham House Rule.

The abundance of cheap gas in the US has been reshaping demand, particularly from the power sector, with the appetite for gas expanding in traditional energy- and gas-intensive industries and beyond. Moreover, the price competitiveness of US gas production is expected to lead to significant liquefied natural gas (LNG) exports.

Outside the US, some countries have reduced their demand by shifting to coal for electricity production, while others experience a growing demand for gas, driven by GDP growth and efforts to diversify into cleaner fuel sources. It remains to be seen what will happen if and when the development potential of conventional and unconventional gas becomes possible outside North America. Key questions include:

- 1) What is the extent of reindustrialization in the United States in industries where gas serves as a feedstock or important fuel, and how sustainable is it beyond a boom spike?
- 2) How will environmental policy affect gas demand in relation to other sources of energy, notably coal and renewable energy?
- 3) What ability do US producers have to add more production to keep up with growing demand and at the same time maintain production costs at relatively low levels?

Key Points

- Bountiful gas extraction in the US, especially from shale, has had far-reaching impact on the economy, from producing cheap energy for consumers to creating jobs and reindustrializing the US manufacturing/refining landscape.
- *Data is light, but examples tell the story of reindustrialization.* Although hard data on gas supply and demand is not yet robust, anecdotal evidence tells a convincing story of parts of the US manufacturing/refining industry making a comeback as a result of the shale gas evolution.
- *Gas is not yet an international story.* At one point, LNG was thought to be the international energy game changer, but it has not quite panned out. Similarly, the shale gas phenomenon in the US has not translated into cheap energy, and certainly not into other economic impacts, outside of the US so far.
- *Mineral rights make the shale gas story unique to the US.* Europe has the infrastructure and technology, Asia has the political will, and Latin America has the capacity, but mineral rights are what bring small-scale energy extraction to a supply and demand boom.

Synopsis

There was no disagreement among participants that the gas boom in North America has caused an economic revolution in the United States and that shale extraction and regulations on coal are the key enabling factors. There was not as much certitude among participants regarding whether, or how quickly, the gas phenomenon would spread around the world, nor where gas prices are headed in the United States and worldwide.

Experts admit that there is a scarcity of hard data on the gas phenomenon in the US. However, there are factual numbers to provide the positive aspects of the phenomenon. For example, more than 1 million jobs have been created since 2009 as a direct result of shale gas extraction, as well as at least over 1 million additional secondary jobs.

Otherwise, proof is largely anecdotal that the US gas phenomenon is reindustrializing the country. For example, as recently as 2006, shale extractors struggled to hold leases to drill wells, whereas currently they drill at will and are even seamlessly moving from dry to wet gas extraction. In another example, natural gas has become a feedstock for direct reduced iron, and on a micro level, new plants are cropping up all over the country. For example, there is a new steel plant in Youngstown, Pennsylvania, and an Egyptian company is opening a fertilizer plant in Iowa.

01: Robert Grant,
Manager, Washington
Office, Mitsubishi
Corporation, USA

02: Andreas Regnell,
Head, Strategy and
Environment, Vattenfall,
Sweden





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Ironically, the oil refining industry is benefiting as refineries switch to powering plants with cheap natural gas instead of oil. In fact, US refiners are now exporters as a result, and, relatedly, the US has become enough of a producer of petrochemicals to bring US chemical company plants back to the US from abroad, even luring non-US chemical companies into opening plants in the US. As a result, the US has returned to being a chemical exporter.

Of course, the industry is not devoid of risks, but they are not negatively impacting production, supply or demand. There are the fracking issues of groundwater contamination and chemical fallout, and the impact that they have on the populated areas where a sizeable part of shale gas extraction is happening. Yet, no participant thought that these threats are leading to regulations that would negatively impact the industry in the near future.

As for how the shale gas revolution in the US is affecting the rest of the world, there was agreement that it had not shaken any global cost structures. The price of gas is still not cheap outside of the US – not due to a lack of supply, as natural gas is produced in abundance in various parts of the world. This is not to say that countries are not taking notice, however, especially of the shale gas phenomenon in particular and how it has affected the energy portfolio and, in turn, the US economy.

Some of the European participants stressed that EU countries are particularly interested in how shale gas has helped the US wean itself from reliance on coal. But opinions varied on whether Europe was willing, or even capable,

of emulating the US model. Even optimists admitted that Europe is a long way from shale gas production, given the environmental and energy regulations and the public perception against operations onshore. However, many participants noted that discussion of the gas phenomenon in Europe has remained disconnected from discussions regarding the EU's 2030 climate policy goals.

In Asia and Latin America, the story is quite different. The former is ripe for a gas movement as it will see the most demand for energy in the medium to long term. Its governments are amenable to finding whatever means necessary to get to their natural resources. However, infrastructure in Asia is not currently up to the standards needed to replicate what has happened in the US, especially in terms of transportation for supply routes. In Brazil, the learning curve for extracting gas in any form is flattening considerably, but access to land remains expensive. On the issue of land access, all participants agreed that a major factor for what makes North America's shale gas boom unique is mineral rights.

It was agreed that the shale gas phenomenon in the US has caused an economic revolution that has reached far beyond just benefiting domestic energy consumers, but not far enough to significantly impact international energy consumers. As far as the impact that shale gas has had politically, there were no strong opinions other than agreement that lower energy prices are surely a factor in US presidential elections, and that in Germany there seemed to be less talk about renewables in the recent elections.

Panellists

Special Guests

Leonardo Beltran Rodriguez, Under-Secretary, Planning and Energy Transition, Secretariat of Energy of Mexico

Julia Nesheiwat, US Deputy-Assistant Secretary of State for Implementation

Grant Sprague, Deputy-Minister of Energy, Government of Alberta, Canada

Experts

John Kingston, Director, News, Platts, USA

Jean-Baptiste Renard, Independent Energy Expert, France

Frank Verrastro, Senior Vice-President and Schlesinger Chair, Energy and National Security, Center for Strategic and International Studies (CSIS), USA



02

01: Dario Sperenza, Vice-President, Government Affairs Department, Eni, Italy
02: Participants

Energy for Society: Rebuilding the “Circle of Trust”

This session was off the record and conducted under the Chatham House Rule.

In the past decade, the relationship between energy companies and the communities they serve has changed dramatically. Growing public distrust and scrutiny regarding environmental and political trade-offs have called into question industry’s “license to operate”, while emerging technologies in communications is poised to transform the relationship between the industry and its stakeholders. There is a pressing need for the energy industry to engage key stakeholders, including customers, communities, NGOs, government officials, regulators and the media in a meaningful and sustained two-way dialogue.

1. What key steps will ensure trust-based relations between energy companies and their stakeholders?
2. How can the energy industry work collectively to bridge the gap in trust-based relations with society?

Key Points

- Energy companies increasingly suffer from a lack of trust among stakeholders in society, which poses a significant business risk in today’s information age, where big corporations are increasingly coming under societal scrutiny.
- The energy industry’s perceived issues with customer relations, transparency and sustainability were seen as factors undercutting public trust; the situation is further aggravated by often conflicting information and insufficient levels of “energy literacy” among stakeholders.
- Advancing the issue will require individual company action combined with collaborative action among industry, government and civil society stakeholders, with a focus on concrete issues and geographies in non-competitive areas (such as environment, health and safety); efforts must be backed by trustworthy metrics and more transparency.

01: Laurent Yana, Head, Strategy Division Department, GDF SUEZ, France

02: Participants

Synopsis

Participants debated whether energy companies suffer from a lack of public trust, and if so, what the underlying causes and risks are. The answer to this was not fully conclusive, as factors differ depending on geographies and sub-industries. Nevertheless, panellists agreed that there is a trust problem that poses a strategic risk since industry needs the trust of society to operate. This is especially the case in today’s information age, where misinformation/non-information is blended with correct information, and a high level of “energy literacy” is needed to navigate the layers of information.

Lack of deep customer understanding, transparency and sustainability were seen by some as factors underlying the poor public trust of energy companies. For example, when companies respond to events such as a natural disaster or an accident, messages are often competitive, not coordinated and defensive or narrow. In some sense, energy companies are facing similar trust challenges as the financial services industry, which some argue has handled this rather well, given the public backlash following the financial crisis.

Some participants maintained that the energy industry could benefit from more openness, transparency regarding assets and highlighting the critical role the energy industry plays in society. One way to progress collectively, pool knowledge and gain more trust is for industry to consider opportunities for working together in non-competitive areas such as



environment, health and safety. Possible pathways include public commitments on sustainability, backed by action and measurable indices, e.g. qualifying to be listed on the Dow Jones Sustainability Index, or partnering with unbiased organizations to measure an emissions portfolio. Taking an integrated value chain/product life cycle approach to this would further increase credibility. The gas industry in North America has created some models for the rest of the energy industry to follow.

Industry leaders recognized the loss of trust that naturally follows the fall of an economic boom. They tackled issues such as ground water contamination, wells in populated areas and methane leakage head-on by publishing studies that use sound science and partnering with NGOs and the public sector.



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Panelists

Special Guests

John Adams, Senior Advisor, Office of Electricity Delivery and Energy Reliability, US Department of Energy
 Jean-Christophe Fueg, Head, International Energy Affairs, Federal Department of Environment, Transport, Energy and Communications of Switzerland
 Grant Sprague, Deputy-Minister of Energy, Government of Alberta, Canada

Experts

Rikiya Abe, Professor, Presidential Endowed Chair of Digital Grid, University of Tokyo, Japan
 Leandro Feliciano, Head, Energy Division, Inter-American Development Bank, USA
 Edward Comer, Vice-President and General Counsel, Edison Electric Institute (EEI), USA
 Nathaniel Keohane, Vice-President, International Climate, Environmental Defense Fund, USA
 John Kingston, Director, News, Platts, USA
 Jean-Baptiste Renard, Independent Energy Expert, France
 Frank Verrastro, Senior Vice-President and Schlesinger Chair, Energy and National Security, Center for Strategic and International Studies (CSIS), USA
 David G. Victor, Professor, University of California, San Diego (UCSD), USA; Global Agenda Council on Energy Security

Moderated by

Elaine K. Dezenski, Senior Director and Head, Partnering Against Corruption Initiative, World Economic Forum

01: Annegrethe Sylvest Jakobsen, Manager, Senior Public Affairs, Novozymes, Denmark
02: Froylán Gracia Galicia, Executive Chief of Staff, Pemex, Mexico ; and Leonardo Beltran Rodriguez, Undersecretary of Planning and Energy Transition of Mexico

Energy Community Dinner

This session was off the record and conducted under the Chatham House Rule.

In this dinner session for the Energy Industries, participants explored the economic outlook for the coming year with the expert perspective of Kenneth Rogoff and cross-industry guests.

1. What is the trend of global imbalances (fiscal and trade), and what is their likely evolution in 2014?
2. In cases like the US or Japan, how effective have monetary policies been in reactivating the economy?
3. What is the global impact of a potential slowdown of the Chinese economy?

Key Points

- The global economy has not yet recovered but has stabilized and is likely to strengthen slowly.
- The US is on a growth path, but the government shutdown is casting a veil of uncertainty for consumers and financial actors, and a technical default cannot be ruled out.
- China is transitioning from a manufacturing and export-driven economy towards a domestic demand- and service-driven economy. While the near-term outlook is benign, the longer term is uncertain, with key questions around housing and credit markets.

Synopsis

Participants discussed the global economic outlook, focusing primarily on the US and China.

The global economy's growth is still not robust, but it has stabilized and is likely to strengthen gradually. As one participant said, "Now we are in a normal economic crisis." Europe is seen to "have bottomed out" and has significantly reduced the risk of a Eurozone breakdown. Slow economic growth is expected in the future. In Japan, there are signs of the country returning to more stable growth. Emerging markets such as Brazil, Mexico and India have displayed signs of slowing economic growth.

The US is on a growth path, but the government shutdown is casting a veil of uncertainty for consumers and financial actors with consumer confidence being a big issue. Some see the bipartisan gridlock in Congress as a constitutional move to "diminish" the presidency power of Obama. So far, it has not backfired politically, but it creates huge uncertainty. Treasury and government debts have been increasing, and given the political gridlock, it cannot be ruled out that the US could go in to technical default. If this happens, consequences are highly uncertain given the complex financial system and lack of procedures to handle such a circumstance.

Participants agreed that there are likely to be continued uncertainties for the US economy while the overall longer-term US economic outlook is positive, with a central forecast of around 2% growth. Interest rates are likely to stay low in the coming years, although the 10-year forecast is much more uncertain. Has quantitative easing in the US been successful? One participant argued that it has not: if there is no market "hick-up", quantitative easing is not posing any problem. However, if interest rates go up, the Federal Reserve needs to decide what to do. Also, it is not clear how to get out of quantitative easing, as it could create a "deleveraging hangover".

Growing disparities in income and wealth are key challenges for the US to avoid populism and a "voter's backlash" in years to come. Wealth has in recent decades trickled down to the middle class through the housing markets, which made the problem more acute when housing prices plummeted and unemployment rose. The housing market in the US has now turned and sales are up 21% past 18 months.

The conversation then turned to China. As labour, capital and land costs rise, the country is trying to transition from a manufacturing-driven economy to a services-based economy. However, the unreliability of Chinese statistics hampers any GDP and other economic estimations. For instance, the national GDP number is 16% lower than the GDP addition of all provinces.



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01: Leandro Feliciano Alves, Head, Energy Division, Inter-American Development Bank, USA

02: Atul Arya, Senior Vice-President, Research and Analysis, IHS, USA; and Dario Speranza, Vice-President, Government Affairs Department, Eni, Italy



01

The public and private debt to GDP ratio has risen significantly. A major share of these investments is in infrastructure, as China has invested significantly in infrastructure and human capital. However, the economic viability of some of these investments jeopardizes the capacity of banks to recover their investment. The unwillingness of Chinese banks to recognize underperforming loans has created a large low-credit quality loans portfolio. This, in turn, is creating uncertainty in banks and feeding a housing bubble that will ultimately burst. As a result, there is no mechanism to remove capital from sectors with overcapacity.

Discussing a soft landing of China, one participant mentioned: "What worries me most is that there appears to be no landing gear in China." For an economy that has displayed strong growth for the past 30 years, this could prove to become a problem with impacts in China and globally. He added, "The near-term outlook for China is benign, the longer-term more risky."

Panelists

Special Guests

John Adams, Senior Advisor, Office of Electricity Delivery and Energy Reliability, US Department of Energy, USA
 Jean-Christophe Fueg, Head, International Energy Affairs, Federal Department of Environment, Transport, Energy and Communications of Switzerland
 Grant Sprague, Deputy-Minister of Energy, Government of Alberta, Canada

Experts

Rikiya Abe, Professor, Presidential Endowed Chair of Digital Grid, University of Tokyo, Japan
 Leandro Feliciano Alves, Head, Energy Division, Inter-American Development Bank, USA
 Edward Comer, Vice-President and General Counsel, Edison Electric Institute (EEI), USA
 John Kingston, Director, News, Platts, USA
 Jean-Baptiste Renard, Independent Energy Expert, France
 Kenneth Rogoff, Thomas D. Cabot Professor, Public Policy and Professor of Economics, Harvard University, USA
 Frank Verrastro, Senior Vice-President and Schlesinger Chair, Energy and National Security, Center for Strategic and International Studies (CSIS), USA
 David G. Victor, Professor, University of California, San Diego (UCSD), USA; Global Agenda Council on Energy Security



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01: Jean du Rusquec, Senior Adviser, Total, France; and Jean-Christophe Fueg, Head, International Energy Affairs, Federal Department of Environment, Transport, Energy and Communications of Switzerland
02: Participants

03: Kenneth Rogoff, Thomas D. Cabot Professor, Public Policy and Professor of Economics, Harvard University, USA
04: Ron Temple, Managing Director, Portfolio Management/Analyst, Lazard Group, USA

05: Nicholas Gee, Senior Vice-President, Strategy and Business Development, Weatherford International, Switzerland

List of Participants

As of 30 September 2013

Industry Strategists

| | | | |
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| Allen Burchett | Region Function Manager, Strategic Initiatives | ABB Inc. | USA |
| Frederic Lesage | Chief Strategy Officer | Abu Dhabi National Energy Company (TAQA) | United Arab Emirates |
| Ilya T. Hartmann | President & Chief Executive Officer | Acciona Energy North America | USA |
| Dev Sanyal | Executive Vice-President and Member of the Group Executive Committee | BP Plc | United Kingdom |
| Stuart Brooks | Special Adviser | Chevron Corporation | United Kingdom |
| Badr Jafar | President | Crescent Petroleum | United Arab Emirates |
| Jakob Askou Boss | Vice President, Group Executive Support | DONG Energy | Denmark |
| Rye Barcott | Adviser to the Chairman and Chief Executive Officer | Duke Energy Corporation | USA |
| Dario Speranza | Vice-President, Government Affairs Department | Eni SpA | Italy |
| David R. Dunning | Group Executive, Business Development & Strategy | Fluor Corporation | USA |
| Laurent Yana | Head, Strategy Division Department | GDF SUEZ | France |
| Elissa Levin | Director, Federal Government Affairs | Iberdrola | Spain |
| Atul Arya | Senior Vice-President, Energy Insight | IHS | USA |
| Sergey Vakulenko | Head of the Strategic Planning Department | JSC Gazprom Neft | Russian Federation |
| Giovanni Sale | Commercial and Business Development Vice-President | Maire Tecnimont | Italy |
| Robert Grant | Manager of Washington Office | Mitsubishi Corporation | Japan |
| Wishart Robson | Energy and Climate Adviser to the President and Chief Executive Officer | Nexen Inc. | Canada |
| Froylán Gracia Galicia | Executive Chief of Staff | Pemex - Petroleos Mexicanos | Mexico |
| Matthew Harwood | Group Head of Strategy | Petrofac Ltd | United Kingdom |
| Antonio Eduardo Castro | Executive Manager, Corporate Strategy | Petroleo Brasileiro SA - PETROBRAS | Brazil |
| Harry Verhaar | Head, Global Public and Government Affairs, Philips Lighting | Royal Philips | Netherlands |
| Thomas Birr | Head of Corporate Development & Strategy Group | RWE AG | Germany |
| Steven Michael Fludder | Senior Executive Vice-President | Samsung Engineering Co. Ltd | Republic of Korea |
| James Luke Trustram Eve | Planning Consultant | Saudi Aramco | Saudi Arabia |
| Ragnvald Naero | Senior Vice-President and Director Business Development | Statkraft AS | Norway |

| | | | |
|-----------------|--|-----------------------------------|-------------|
| Jean du Rusquec | Senior Adviser | Total | France |
| Mark Mendenhall | President | Trina Solar US Inc. | USA |
| Andreas Regnell | Head, Strategy and Environment | Vattenfall AB | Sweden |
| Morten Albæk | Group Senior Vice-President, Global MarCom and Corporate Relations | Vestas Wind Systems A/S | Denmark |
| Nicholas Gee | Senior Vice-President, Strategy and Development | Weatherford International Limited | Switzerland |

Industry Guests

| | | | |
|-------------------|--|----------------------------|-----------|
| Russ Vanos | Senior Vice-President, Strategy and Business Development | Itron Inc. | USA |
| Clay Nesler | Vice-President, Global Energy and Sustainability | Johnson Controls Inc. | USA |
| Calvin Lam | Planning Manager, Business Development | Pan American Energy LLC | Argentina |
| Patrick J. Forkin | Vice-President, Strategic Planning | Peabody Energy | USA |
| Mark Ellis | Chief of Corporate Strategy | Sempra Energy | USA |
| Gordon Lambert | Executive Adviser Sustainability and Innovation | Suncor Energy Inc. | Canada |
| Marek Szymczak | Management Board Advisor on European Regulatory Affairs | TAURON Polska Energia S.A. | Poland |
| Katherine Richard | Founder and Chief Executive Officer | Warwick Energy Group | USA |

Cross Industry Partners

| | | | |
|-----------------------------|---|--|--------------------|
| Sonia Chapman | Sustainable Development | Braskem SA | Brazil |
| Rajesh Srivastava | Chief Executive Officer, Fine Chemicals | Jubilant Bhartia Group | India |
| Kiyoshi Matsuda | Chief Innovation Officer, Corporate Strategy Office | Mitsubishi Chemical Holdings Corporation | Japan |
| Annegrethe Sylvest Jakobsen | Manager, Senior Public Affairs | Novozymes | Denmark |
| Dmitry Kolobov | Director, Corporate Strategy | Sibur LLC | Russian Federation |

Policy Governors

| | | | |
|----------------------------|---|---|-------------|
| Sergej Mahnovski | Director of the Office of Long Term Planning and Sustainability | City of New York | USA |
| Jean-Christophe Fueg | Head International Energy Affairs | Federal Department of Environment, Transport, Energy and Communications | Switzerland |
| Grant Sprague | Deputy Minister of Energy | Government of Alberta | Canada |
| Leonardo Beltran Rodriguez | Under-Secretary, Planning and Energy Transition | Secretariat of Energy of Mexico | Mexico |
| Julia Nesheiwat | Deputy Assistant Secretary of State for Implementation | US Department of State | USA |

Experts

| | | | |
|-------------------------|--|---|--------|
| Jean-Baptiste Renard | Independent Energy Expert | | France |
| Frank Verrastro | Senior Vice President and Schlesinger Chair, Energy & National Security | Center for Strategic and International Studies (CSIS) | USA |
| David Sandalow | Senior Research Scholar, Center on Global Energy Policy, School of International and Public Affairs (SIPA) | Columbia University | USA |
| Edward Comer | Vice President and General Counsel | Edison Electric Institute (EEI) | USA |
| Nathaniel Keohane | Vice-President, International Climate | Environmental Defense Fund | USA |
| Fred Krupp | President | Environmental Defense Fund | USA |
| Kenneth Rogoff | Thomas D. Cabot Professor of Public Policy and Professor of Economics | Harvard University | USA |
| Jeffrey Carbeck | Chief Technology Officer | MC10 Inc. | USA |
| John Kingston | Director of News | Platts | USA |
| Leandro Feliciano Alves | Head of the Energy Division | The Inter-American Development Bank | USA |
| Rikiya Abe | Professor, Presidential Endowed Chair of Digital Grid | The University of Tokyo | Japan |
| David G. Victor | Professor | University of California, San Diego (UCSD) | USA |
| Eugenie Ladner Birch | Nussdorf Professor and Co-Director, Penn Institute for Urban Research | University of Pennsylvania | USA |

From the World Economic Forum

| | | | |
|---------------------|---|----------------------|-------------|
| Roberto Bocca | Senior Director, Head of Energy Industries | World Economic Forum | Switzerland |
| Pedro Gomez Pensado | Senior Manager, Head of Oil & Gas Industry | World Economic Forum | Switzerland |
| Hanseul Kim | Associate Director, Head of Engineering & Construction Industry | World Economic Forum | Switzerland |

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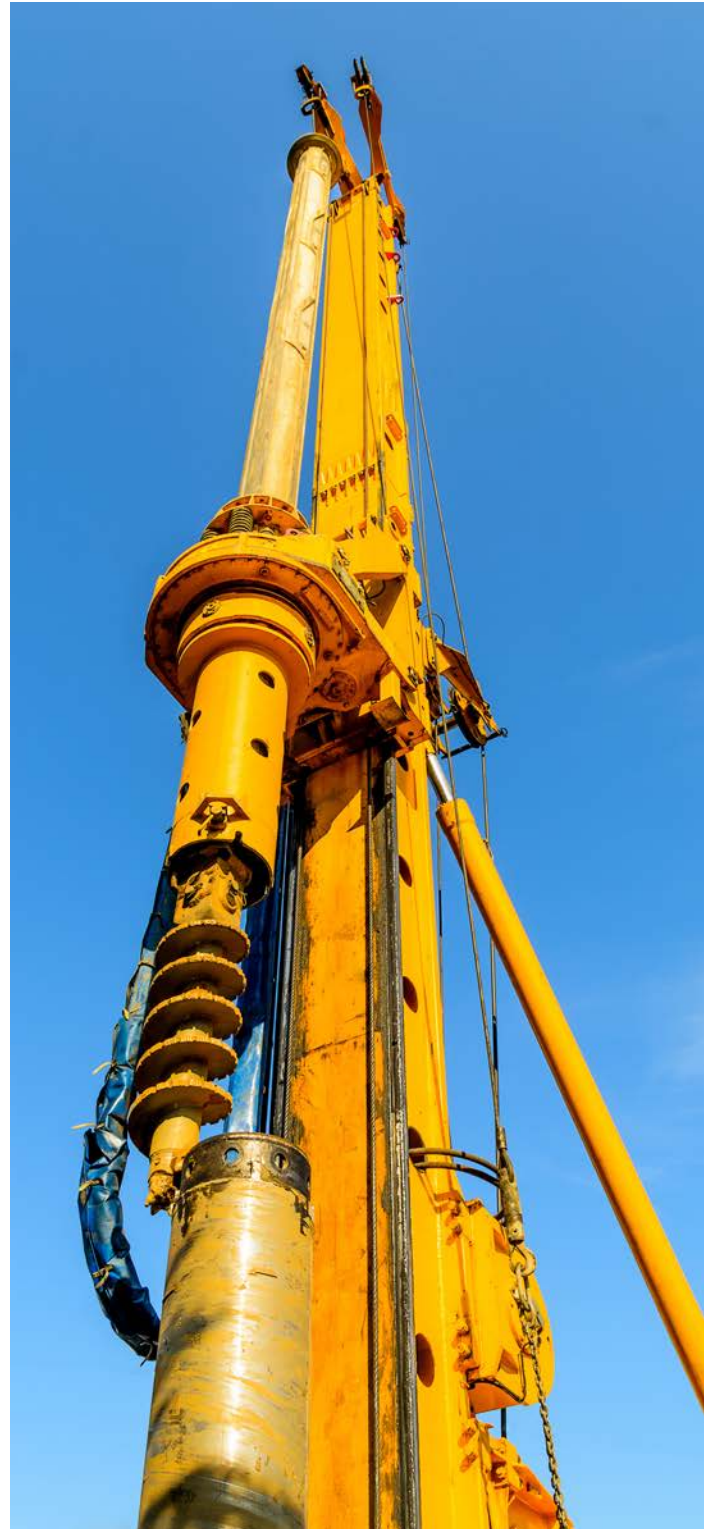
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Appendix: Previous Meetings on the Oilfield Services Industry

- New Frameworks for the Oilfield Services Industry, World Economic Forum Annual Meeting 2013, Davos-Klosters, Switzerland 23-26 January
- Roundtable on the Changing Energy Landscape, Calgary, Canada 15-16 November 2012



New Frameworks for the Oilfield Services Industry

World Economic Forum Annual Meeting 2013

Davos-Klosters, Switzerland

Hotel Waldhuus, Sertig
Saturday 26 January, 08.00 – 10.00

This session was off the record and conducted under the Chatham House Rule.

Participants in this session discussed new frameworks for the fast-changing oilfield services and equipment industry and the issues the industry is facing:

- A severe talent shortage, leading to increasing labour costs
- The emergence of new commercial, risk-sharing relationships between resource owners and the oilfield service sector
- Inadequate recognition by the public and governmental institutions, leading to bad public perception, for example on environmental issues
- The need for investment in community development through job creation and local content

Recognizing these challenges and working closely with key partners and constituents, the World Economic Forum is building a tailored value proposition for the oilfield services community. This inaugural session aimed to further the discussion based on the issues that were previously identified at the Calgary Roundtable and shape an action plan to foster Community collaboration for Forum activities in 2013-14.

Key Points

- The oilfield services industry must effectively address industry-specific issues, including a severe talent shortage, new emerging business and risk models, inadequate public recognition and perception, environmental concerns, safety and security issues, as well as the need to contribute to local development.
- To attract young, talented people into the industry, the Community needs to cooperate on student scholarship programmes, joint training programmes and industry branding initiatives.
- Oilfield services industry internal collaboration is essential to address



- these issues and work towards a cost-efficient, environmentally-sound and publicly-accepted sector.
- The industry should work on clearly communicating its important role in job creation and delivering affordable energy for society.
- The Community should develop joint standards and approaches to safety, security and sustainability issues, which should then be reflected in national and international oil companies' tender criteria.

- Session participants committed to developing an action plan for these critical topics and building the Community in various Forum meetings and activities throughout 2013.

01: Ayman Asfari, Group Chief Executive, Petrofac Services, United Kingdom
02: Samir Brikho, Chief Executive Officer, AMEC, United Kingdom
03: Emilio Ricardo Lozoya Austin, Chief Executive Officer, Pemex - Petroleos Mexicanos, Mexico

04: Robert G. Card, President and Chief Executive Officer, SNC-Lavalin Group, Canada
05: Naheed Nenshi, Mayor of Calgary, Canada
06: Khalid A. Al Falih, President and Chief Executive Officer, Saudi Aramco, Saudi Arabia

Synopsis

The oilfield services industry has achieved fast growth and higher importance in the upstream oil and gas sector in the past decade but is now facing more significant and complex challenges. These changes necessitate closer collaboration within the industry.

The restricted talent pool is likely the industry's biggest challenge, as capabilities are the key constraint to enhancing production and bringing down costs. For this issue, it is important to communicate the industry's needs to governments so they put appropriate policies in place. For example, Canada focuses immigration on skilled workers and offers foreign students fast access to work visas. As a result, it takes only approximately two months on average to mobilize staff to Canada, while it takes as much as one-and-a-half years for Australia. The industry should also establish training relationships between service companies and national and international oil companies (NOC/IOCs), and cooperate closer with higher education institutions. Another joint objective is to make the industry attractive and interesting to young people. For example in Saudi Arabia, high school graduates are sponsored and supported in college and with summer internships. Such initiatives allow tailoring education to industry needs and increasing industry affiliation. Another common challenge is capitalizing on the talented female workforce more effectively.

The oil and gas industry is planning to deploy significant capital expenditure over the coming years, and assuring a seamless operation between oilfield services companies and NOC/IOCs is urgently needed, particularly as social and technical complexity is increasing. To address these challenges, new risk-sharing models are being deployed (for example risk-sharing and production enhancement contracts) and huge advances in technology are being made (for instance for deep water and oil sands).

Both the oil and gas and oilfield services industries are not well regarded by the public. In the United States the public image of the oil and gas industry can be compared to that of the tobacco industry. Moreover, the public does not recognize the job creation potential and positive economic impact of the hydrocarbon industry relative to the green power industry. Citizens seem



to have taken affordable and reliable energy for granted, and they do not appreciate the difficulty to deliver. The industry Community needs to raise its voice, demonstrating its existing positive impacts and responsibility. Communication could be anchored around the engineering and technology as they enjoy a positive reputation in civil society. Overall, the industry needs to be branded as an industry of the future, not as an industry of the past.

In an increasing number of countries, stakeholders do not accept pure monetization projects and have broader expectations with regard to fostering local development. The industry is also increasingly held responsible for reducing water and energy consumption and delivering energy safely. Another concern is the security situation in many

locations where evacuation plans need to be developed proactively, potentially in industry partnerships. The industry should establish joint standards and approaches for safety, security and sustainability, which should then be reflected in NOC/IOCs' tender criteria. As many of these challenges also apply to the mining industry, great potential exists to derive lessons from cross-industry collaboration.

- 01:** Balkrishan Goenka, Chairman, Welspun Corp., India
- 02:** Nicholas Gee, Senior Vice-President, Formation Evaluation and Well Construction, Weatherford International, Switzerland
- 03:** Saddek Omar El Kaber, Governor of the Central Bank of Libya
- 04:** Kim Jae-Youl,

- President, Samsung Engineering Co., Republic of Korea
- 05:** Michael McKelvy, President, Government, Environmental and Infrastructure Division, CH2M HILL Companies, USA, and Olof Faxander, President and Chief Executive Officer, Sandvik, Sweden

Through the discussion, three issues were identified as the top issues to be addressed with the Forum: a severe talent shortage (and the need for local content development), new emerging business and risk models, and inadequate recognition and perception by the public. The Community committed to keep up the momentum and develop an action plan for these critical topics in various meetings and events, including an update call in March/April and sessions at one of the Forum's Regional Meetings in 2013 and at the World Economic Forum Annual Meeting 2014. Participants also expressed the need to support additional oilfield services companies joining the Community so that a more complete value chain is represented (e.g., drillers). Petrofac has offered to act as the Forum secretariat to actively support this effort.

Co-Chaired by

Ayman Asfari, Group Chief Executive, Petrofac Services, United Kingdom
 Samir Brikho, Chief Executive Officer, AMEC, United Kingdom



01: Shahril Shamsuddin, Group President and Chief Executive Officer, Sapura Group of Companies, Malaysia, and Idris Jala, Minister, Office of the Prime Minister, Malaysia



02: Hor Wuen Fung, Director, Strategic Marketing and Corporate Communications, Weatherford International, USA, and Steve Fludder, Senior Executive Vice-President and Chief Marketing Officer, Samsung Engineering, USA

03: Fabrizio Di Amato, Chairman and Chief Executive Officer, Maire Tecnimont, Italy

04: Anders Nyren, Chairman, Sandvik, Sweden

05: Participants in the session



Roundtable on the Changing Energy Landscape Calgary, Canada

Thursday 15 November

Issue Identification Dinner

- Major challenges for the industry are related to market access, obtaining a “license to operate”, limited skilled labour availability and high costs, as well as better engagement and communications with stakeholders.
- Sustainability of operations is key to the successful development of the industry; best possible use or the least possible impact on water, land and air must be the underlying assumption.
- Climate change is an important component of the sustainability discussion; carbon pricing should play a central role following the logic to turn carbon pricing from a liability to an asset for the industry.

Friday 16 November

Global Economic Outlook

- The pace of change and level of uncertainty in the global economy is increasing while at the same time there is a limited access to information for all.
- Global issues like the Eurozone crisis or the climate change challenge and ongoing socioeconomic shifts impact all countries and regions. Understanding and addressing those issues require multistakeholder discussion at the global level.



01: Naheed Nenshi, Mayor, The City of Calgary, Canada

02: Alison Redford, Premier of Alberta, Canada, and Bob Oliver, Chief Executive Officer, Pollution Probe, Canada

03: Ronald N. Mannix, Chairman, Coril Holdings, Canada

- Canada is getting more attention globally thanks to its stability, credibility, good governance and strong financial sector.
- Canada is short of a skilled labour force to increase its competitiveness and to close the productivity gap in comparison with the US and other alternative destinations for capital. At the same time, there is a significant pool of unemployed youth whose skills and educational background does not fit to needs of the economy.
- The energy sector globally and in Canada has a very positive long-term perspective; however, at the same time the energy industry faces challenges in the short run. It seems that the two perspectives are often disconnected in planning.

Conversation with the Mayor

- A high level of uncertainty and the increasing pace of change do not allow the industry to prepare for future scenarios; building resilient industries is key.
- In current circumstances, the likelihood of construction of the Northern Gateway pipelines seems to be very limited while it seems likely for the Keystone XL; the industry should work on alternative projects, possibly in eastern or even northern directions.
- A rarely known fact is that the oil & gas sector is responsible for one-fifth of investments in renewable energy in Canada; building on oil & gas revenue, the energy industry in Calgary should further expand in the alternative energy sector.
- Canada’s national energy programme is crucial for successful development of the industry, Calgary and the country.

Global Risk 2012: Managing Volatility

- The energy sector has faced discontinuous technological disruptions on the supply side. High volatility may be an innate characteristic of the sector; it is a matter of working with this volatility, rather than trying to reduce it.



- Energy price volatility in fact has not been so high except for the recent time period (2008-2011); the real risk is the public perception of the volatility, which is not always justified.
- In regards to public perception, the sector is generally slow to respond to new information whereas the public is reacting to the information in real time (e.g. social media). Information has instant global coverage, but the sector is still very regional and infrastructure is slow to adapt to new information. To overcome this limitation, the sector needs to:
 - Accelerate the implementation of technology
 - Develop better ways to pre-plan infrastructure to respond faster
- The public is much less concerned about the volatility of supply these days, which is one of the positive impacts that the sector provides; however, such achievements are not well recognized and shadowed by the negative perception.

New Frameworks

Fast-changing energy industry dynamics require new frameworks for the oil & gas sector. Participants shared some of the main concerns and challenges facing the industry:

- The sector is inadequately recognized by the public and institutions. For example, in the UN Secretary-General's five-year action agenda, the oil & gas aspect was not mentioned in the sustainable development framework discussion whereas climate change and renewable energy were highlighted numerous times.
- There is a talent shortage.
- Environment issues and public perception have become much more acute; the public is much more sophisticated and their expectations from the sector are changing.
- Economic challenges are more than just a risk-return issue; investment in community and local development through job training and local content requirements hold much higher importance.

Facing sectorial changes and the need of new frameworks, the discussion focused on the competitiveness of the energy sector in Canada:

- The cost of business in Calgary has been identified as one of the most critical challenges. Rough estimates for the capital expenditure for an oil sands plant was given as an



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example: the same US\$ 1 billion plant in Calgary can be built for US\$ 300-400 million in the US Gulf Coast, 10-20% lower than the US Gulf Coast in the Middle East or South-East Asia.

- High labour cost was mentioned as another challenge of doing business in Calgary where wages are 4-5 times higher than in India and about 40% higher than the US Gulf Coast.
- Canada's brand value is recognized as a competitive advantage. Its non-financial aspects, such as stability and transparency, should be promoted more as they are a distinctive strength of the country.
- However, such brand power can easily be at risk as it is seen as a "protectionist" market. Canada should focus on the clarity of the rule, rather than protectionism, to be successful in the longer term.



03

01: Nicholas Gee, Senior Vice-President, Weatherford International, Switzerland, and Greg Stringham, Vice-President, Markets and Transportation, Canadian Association of Petroleum Producers, Canada

02: Ronald N. Mannix, Chairman, Coril Holdings, Canada, Lee Stein, Chairman and Founder, Prize Capital, USA and Peter Madden, President, Oil Sands, AMEC, Canada

03: Tony Meggs, Executive Vice-President, Talisman Energy, Canada



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New Markets

- Getting access to new markets for Canadian oil & gas will be an important factor of Canadian economic success. However, serious challenges occur – the industry is missing a social “license to operate”, which is mainly related to environmental concerns. Moreover, society does not see the link between its well-being and the oil & gas industry.
- It seems that there is a plenty of misleading oil & gas-related information in the public domain. Thus, it is important to increase the level of people’s energy literacy. Moreover, a common language should be created to communicate among all stakeholder groups. Fundamentally, multistakeholder engagement is a prerequisite to gain a “license to operate”.
- Environmental concerns in the past have ultimately had a positive outcome of the industry operations, making it more sustainable and environmentally friendly. Today, an important part of the solution to address those concerns is the application of world class, state-of-the-art extraction technologies. Canada should become an example in this respect. This would facilitate obtaining “license to operate” domestically and abroad.
- Access to new export markets would obviously be beneficial for Canada. In parallel, extending the value chain in the domestic market could bring added value as well.
- Placing midstream facilities, such as having refineries in places other than in the Province of Alberta, would spread economic benefits among other non-producing provinces. However, refined products are more targeted for specific markets which would restrict Canada to a limited numbers of customers, whereas crude oil is a global commodity and can be easily redirected to other markets.
- It is a favourable time to develop LNG export facilities. While the US does not seem to be willing to export its production, British Columbia and Alberta could become a natural gas export window for North American gas. As there are several projects under development, it would be useful to

coordinate in this respect to spread it over time and spread risk.

- Realizing export ambitions would require engagement of Canadian leading companies in global, multistakeholder dialogue in addition to national or provincial dialogue with communities.



01: Harrie Vredenburg, Director, Global Energy Executive MBA, Haskayne School of Business, University of Calgary, Canada, and John Kingston, Global Director of News, Platts, USA
02: Susannah Pierce, Vice-President Shell Canada Value Chain Integration, Royal Dutch Shell, Netherlands
03: Greg Stringham, Vice-President, Markets and Transportation, Canadian Association of Petroleum Producers, Canada
04: John Tilton, Professor, Colorado School of Mines, USA, and Ronald Denom, President, SNC-Lavalin International, Canada
05: Jean-Francois Poupeau, Executive Vice-President, Schlumberger, USA, and Paul Smyke, Senior Director, World Economic Forum USA



Premier's Closing Remarks

- The attitude of policy-makers towards the oil & gas industry and especially pipelines evolved over time. Today, there is more understanding that government is an important stakeholder and has its role to successfully realize the potential.
- There is need to honestly acknowledge mistakes from the past and to clear them in order to move forward. Whenever possible, realized projects should be used to show what successful and sustainable development looks like.
- Multistakeholder engagement of the industry, policy-makers and civil society on the environmental and First Nations side is a prerequisite.

Session Description

Canada and the United States are at the frontier of technological development in the oil & gas sector, especially in relation to unconventional resources such as shale, tight oil & gas and oil sands. The proliferation of unconventional resources is having a huge transformative effect on the energy landscape in North America and the world.

The changing dynamics in the energy sector calls for new ways to think about the markets and business models. Now, with soaring oil & gas supplies emerging from Canada and the United States, but with limited markets within the region, the private sector, government and civil society need to find the right framework that will be of mutual long-term benefit to stakeholders. Also, given discrepancies in supply and demand, the stakeholders are seeking to develop new operational and technological strategies, risk identification and allocation, trading and marketing methods, and infrastructure investment plans.

The "New West Partnership", an unprecedented and historic economic partnership between the provinces of British Columbia, Alberta and Saskatchewan, highlights the opportunities and benefits of cooperation in the region. This transformative partnership represents a combined gross domestic product of more than US\$ 500 billion. The



- 01:** Alison Redford, Premier of Alberta, Canada
02: Matthew Harwood, Group Head of Strategy, Petrofac, United Kingdom, and Tim Marchant, Adjunct Professor, Haskayne School of Business, University of Calgary, Canada
03: Thomas G. Searle, President, CH2M HILL Canada, CH2M HILL Companies, Canada, and Ric Sorbo, Senior Vice-President and General Manager, Hydrocarbons & Chemicals, SNC-Lavalin Group, Canada
04: Alison Redford, Premier of Alberta, Canada, and Robert Greenhill, Managing Director and Chief Business Officer, World Economic Forum, Switzerland



Calgary roundtable discussion brings further expertise and strategic insights, and a neutral platform for dialogue and partnership, into the heart of the region.

The roundtable in Calgary convenes business leaders from oil & gas, oilfield services and engineering & construction industries, along with members of civil society and key policy-makers in a series of private and interactive discussions.

The outcomes from the roundtable will be discussed at the World Economic Forum Annual Meeting in Davos-Klosters in January 2013.

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