

NATIONAL OIL COMPANIES CONFERENCE 2014: A SUMMARY

KEY NEWS AND INSIGHTS FROM MARSH'S NOC
CONFERENCE IN DUBAI

Energy Trends Driving Internationalization of NOCs



Stable oil prices and the scarcity of hydrocarbon resources are just some of the factors driving the internationalization of NOCs. Two presenters addressed this topic at this year's conference; Francois Austin of Oliver Wyman and Mark Saunders of TAQA.

Oil prices have remained high over the last five to six years, resting above the US\$60-\$70-price per barrel typically required for the majority of oil companies to remain economically viable. Forecasts of future price stability and economic growth have "been driving a certain set of behaviors among NOCs," said Mr. Austin, "not least increasing expansion and confidence".

This confidence, as well as issues surrounding local resource depletion and the requirement for security of supply, has driven the geographical expansion of NOCs, explained Mr. Austin, which he said is being witnessed across Asia, the Middle East, and South America.

Given the complexities of adhering to varying and new local governances Mr. Saunders highlighted the need to carry out due diligence in order to grow business in a meaningful and sustainable way.

Upstream capital expenditure by NOCs increased 31% between 2008 and 2009 to \$220 billion — a figure 107% larger than that for IOCs. However, Mr. Austin added that NOCs will also continue to enjoy the lion's share of refined products, following significant investment in downstream activities — which collectively stood at \$21.8 billion in 2012, more than 560% of the figure for IOCs.

"Historically, NOCs may have focused far more on upstream," said Mr. Austin. "However, in order to manage their portfolios and hedge themselves internally, we're seeing more investment from NOCs in downstream assets as well, and this is actually changing the risk profile of the business and changing the nature of the world they're operating in."

As a result of this investment, NOCs' share of global oil production is expected to rise to 84% in 2020 — up from 76% a decade earlier.

Looking forward, Mr. Austin said this trend for internationalization showed no sign of slowing down. Pointing to predictions that 72% of future liquid hydrocarbon reserves will come from more unconventional resources, he said this will inevitably result in further internationalization, because many NOCs will require "a different level of investment and level of partnership to bridge the technology gap required".

The size and scale of future projects will be another driver towards internationalization. Pointing to Oliver Wyman data showing more than 40% of projects planned for 2014 are in excess of \$5 billion, Mr. Austin told delegates that "the sheer size and scale of projects going on in the industry means there's going to have to be an increasing level of partnership between players in a way that there's never been before."

Data and Analytics Key to Future of Oil and Gas Industry

The ability of data and analytics to dramatically increase the knowledge surrounding outcomes, and around the frequency of those outcomes occurring, is set to drive future competition in the oil and gas industry.

Bill Pieroni, Marsh's chief operating officer, told delegates in Dubai that data and analytics can "dramatically enhance the position of each of your respective organizations and how you differentiate yourselves in the marketplace."

"I think it will simultaneously improve efficiency, as well as effectiveness, and help to navigate risk and uncertainty — dampening the uncertainty by increasing the knowledge around risk and outcomes, therefore making it far easier to execute and develop strategies," he said.

Mr. Pieroni spoke of the potential for huge productivity gains in the C21st — particularly in the energy sector — and said there was little doubt that "data and analytics will be at the core".

"Data and analytics is going to be extremely disruptive to this industry," said Mr. Pieroni. "I think it will occur just slowly enough that if you want to ignore it you'll be able to, but organizations which are able to use data, develop insight, and drive resource allocation will be truly dangerous competitors moving forward."



Panel Sessions Delve to the Heart of Matters

In addition to the Hot Risk Topic Workshops held prior to the start of the Conference and the Master Classes which took place the day after, Marsh also hosted three panel discussions during the Conference which attracted a great deal of interest.

The Contractors Panel focused on the Middle East and Asia, and featured representatives from Swiber, Sapura Kencana, Larsen & Toubro, and McDermott. The group agreed that the factors that influence the risk transfer strategies for contractors have changed. Talking from an insurance buyer's perspective, Mr. Pradeep Sinha of Larsen & Toubro raised concerns over the limited scope of insurance policies and commented: "The gap which is there, with regard to the apportionment of responsibility, by virtue of the indemnity clause and what the insurance

policy provides, is fundamentally required to be borne by the contractor."

Captives have long been an important risk mitigation tool used by IOCs, they are increasingly being utilized by NOCs. The Conference's second panel focused on captives and comprised speakers from TOTAL, Repsol, Statoil, and Saipem. The panel discussed the benefits that a captive can offer an NOC; overcoming a lack of capacity and competitive pricing, reducing the export of capital, and increasing control of the risk, which is particularly helpful when expanding into new territories.

Representatives from Scor, AIG, Trust Re, Liberty, and ADNOC made up the final panel — the Insurer Panel — which reviewed the current state of the energy insurance market. They concluded that 2013 saw an overall reduction of rates due to the increased

capacity for mid-sized risks; however, the panel agreed that while there's overcapacity for the majority of energy risks, there's not necessarily capacity for the largest ones.

"At the moment ... we are in a situation where the pool of premium is certainly not — at least for the lead markets — increasing at a speed that matches the increase in the demand of capacity for peak risks," Victor Peignet, SCOR's P&C CEO, told delegates.

The panel attributed inflation in construction costs, the increasing scale of projects, and more advanced technological specifications to an increase in values that were increasingly difficult for insurers to match. The energy market's premium pot is not growing fast enough to meet the demand for peak risk capacity on mega-energy projects, the Panel concluded.

Focus is on Growth and Globalization at This Year's Conference



The fifth Marsh National Oil Companies Conference's focus is on the expansion of NOCs to INOCs and the risk issues that need to be considered, according to Andrew Herring, Marsh's EMEA Energy Practice leader.

Speaking at the opening of this year's three-day event, Andrew Herring welcomed the period of rapid growth experienced by NOCs, saying he looked forward to learning more about the new risk issues involved and working together with clients to develop suitable solutions.

"NOCs are experiencing a period of rapid growth and international expansion," explained Mr. Herring. "Some face technological challenges in the next frontier of oil and gas exploration and production, for example, while others face regulatory challenges associated with establishing operations in new territories. Couple this with new risks faced by oil operators, such as terrorism and cyber, and it is clear we have many experiences and ideas to share in Dubai."

The event attracted more than 500 delegates this year, and Mr. Herring said this is a testament to the importance of such an event for the industry: "We've had a tremendous turnout from our client and prospect base, with representatives from all corners of the globe," he said.

"The way this event has grown over the years shows just how valuable it is for delegates looking to improve their understanding of the risks facing NOCs and the energy sector as a whole. In some ways, more importantly, it allows networking with like-minded firms and individuals to build the relationships which help them do business," Mr. Herring concluded.

"NOCs are experiencing a period of rapid growth and international expansion."

PetroSA Helping to Drive South Africa's Gas Transformation

Thulani Mbolekwa, PetroSA's group insurance manager, has told delegates in Dubai that his company has no time to delay in securing gas supplies for South Africa.

The country continues to face energy deficiency; blackouts and power surges are frequent due to a lack of investment in power stations. Of the primary energy it uses, a massive 65.9% is made up of coal, 21.5% from crude oil, and just 2.8% from gas. According to Mr. Mbolekwa, the country's poor standing in greenhouse gas emission tables — it is ranked 12th globally, and 1st in Africa — means this has to change.

"Currently in South Africa, we have a National Development Plan, which emphasizes the need for gas," explained Mr. Mbolekwa. "We need to diversify the current energy needs and reduce the carbon footprint..., and match power supply to the requirement of the power supply conventions for cheaper, cleaner, and more efficient energy."

The South African government envisages that 14% of the country's electricity will be generated from gas by 2030, and Mr. Mbolekwa claimed PetroSA is playing an important role in making this a reality, saying: "As an NOC we are making concerted efforts to secure gas supplies for South Africa.... We are participating in the exploration of South

Africa's offshore gas fields... and invest[ing] and participat[ing] in gas plays abroad, for example, in modern-day Tanzania."

However, Mr. Mbolekwa concluded by saying he believed the exploitation of the country's vast shale gas reserves will ultimately play the greatest part in its energy transformation: "[In South Africa] we are currently sitting on 485 trillion cubic feet of shale gas," he said. "Environmentalists are protesting against [exploiting] this, but the government is starting to fast-track shale gas activity, because for us there is a need for cleaner energy in order to reduce greenhouse gas emissions. Shale gas in South Africa will happen."

Targeted Cyber Attacks a Threat to Energy Facilities' CPNs



A rise in the frequency and sophistication of cyber attacks, coupled with an industry-move towards interconnectivity between control process networks (CPNs) and enterprise networks, is placing energy facilities at risk.

Shah Sheikh, co-founder and senior security consultant at DTS Solution, told delegates that while traditional viruses, worms, and denial of service (DoS) attacks continue to impact core lines of service, “in the last three to four years we have seen cyber security attacks that are very targeted — in the sense that they target a particular enterprise in an attempt to bring it down”.

The energy industry is a particular target for attack, said Mr. Sheikh, pointing to data from the US Industrial Control Systems Security — Computer Emergency Response Team, which revealed that 151 (59%) of the 256 reported security incidents in 2013 were directed at energy companies.

Echoing concerns raised in the recent Marsh Risk Management Research paper, *Advanced*

Cyber Attacks on Global Energy Facilities, Mr. Sheikh said the risk to energy facilities is being exacerbated by “a revolution in the oil and gas industry, where connectivity into the core control networks is happening more and more across IT networks as opposed to the more traditional circuit switch networks, and of course that in itself brings security-related concerns.

“The process control network that is pumping the oil, refining it, etc., which has connectivity to the corporate network, should always be separate to it,” he explained. “However, the business logic in enterprise IT requires it to read business data from the process networks themselves. What we find is that the majority of attacks are typically targeted at enterprise-level, which then trickle down into the process control network.”

Mr. Sheikh expressed particular concern over legacy systems. “There are typically systems that have been running for 25 years, for example,” he said. “Some of these

systems are legacy devices, and are insecure by design. They are not designed to run on modern internet technology.

“Communication protocols [in these systems] do not have identification or encryption built in. And so we have to build security controls around that to compensate for the risks that are inherent in the legacy equipment,” he added.

Mr. Sheikh went on to explain that the risk is the same for new systems which are being connected to the internet, but acknowledged that better and more up-to-date security may be in place.

Traditionally, there have always been air-gaps between CPNs and enterprise networks to offer protection to core networks, said Mr. Sheikh, before expressing concern that this is no longer the case: “It’s just not happening anymore, and this is because people using the corporate network need information from the CPN, so therefore the connection is always established.”

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Societal Unrest Driving Political and Terrorism Risk

Social disquiet about how revenues from business investment are redistributed within the economy is the new driver of political risk, with potentially significant consequences for the oil and gas industry, according to Alyson Warhurst.

Speaking in Dubai, the Maplecroft founder and CEO said that while progress has been made in the legal environments of the majority developing economies, there is now a growing risk of societal unrest driving regime instability and political risk.

“It’s not the legal environment and the rule of law we should be worried about now — that’s on the right track,” Ms. Warhurst said. “Instead, it is societal disquiet about how revenues from business investment are redistributed within the economy and the extent to which society protests when it believes it’s not being done fairly.”

Delegates were presented with Maplecroft data which suggests the landscape for political risk is getting particularly more challenging in countries with high levels of national resources — including oil and gas — which are critical for the development of local industry and for those countries themselves.

Ms. Warhurst said the terrorist threat to “trophy” oil and gas targets in some of these countries showed no sign of abating. “We’re seeing an increase in political violence, particularly in East Africa and in the MENA



region, and that will continue to undermine security and pose a threat to human security and oil and gas assets,” she said.

“The attack on the Amenas facility demonstrated the heightened security risk to energy assets across Algeria, Mauritania, Libya, Niger, and further into the Sahel and West Africa. So, in a practical sense, it’s important to be prepared and insured in those countries.”

However, the risk of heightened societal unrest leading to resource nationalism will be even more acute in 2014, Ms. Warhurst went on to add, particularly in developing nations. “Over the course of the past 12 months, the risk of resource nationalism increased in 15% of countries, with Latin American and Sub-Saharan countries dominating the high

risk category. East Africa’s position as a risk hot spot is further solidified by, for example, Kenya substantially increasing mining royalties in 2013.”

Ms. Warhurst urged delegates to watch out for those countries whose governments are not reinvesting business revenues back into social projects and development, but are actually engaging in expropriation, increases in taxes, increases in requirement for local content, increases in royalties, and other types of constraints as a means of pacifying societal protest against regime issues.

“Indonesia, Brazil, India, and South Africa are key countries to watch in 2014 as national elections take place, due to the likelihood of resource nationalism being a criterion used to win popular support,” she concluded.

Securing Long-Term Financing a Challenge for the Energy Sector

The legacy of the global economic crisis and subsequent rise in financial regulation has resulted in a gap emerging between the supply and demand of long-term financing, one which is posing challenges to future investment in the energy sector.

“New capital and liquidity requirements for banks in most jurisdictions are encouraging them to invest in the short term rather than the long term,” John Drzik told delegates in Dubai.

Marsh’s president of Global Risk and Specialties said this meant “long-term financing has to come from new sources,

because some institutions which are considered natural suppliers, such as insurance companies, are also now being discouraged through new regulation to the financial sector from investing long-term as well.”

Mr. Drzik added that investors were also being put off participating in the sector due to uncertainty surrounding the energy policy of the majority of governments around the world as they seek to balance energy security, affordability, and sustainability — a problem he termed the “energy trilemma”.

To resolve this, Mr. Drzik said that there needs to be “more dialogue between public and private stakeholders around energy policy and that policymakers ultimately need to formulate more coherent and internally-consistent policies that are more predictable over time in order to attract new investment to the sector”.

“It’s important that all of us within the energy sector work with governments to try to find policy formulations that are more stable and do attract investment, but also there may need to be new and different financing structures to attract real investors by moving risks to different participants,” he concluded.

Now More Important Than Ever to Discuss Emerging Risks for NOCs



Marsh's Global Energy Chairman, Andrew George, explains why the rapid portfolio expansion of NOCs has created a new set of risks that warrant discussion.

The fifth National Oil Companies Conference could not have come at a better time, according to Andrew George, who said the increasing expansion of NOCs to IOCs is opening up a new set of risks that a conference like this is perfectly positioned to address and present solutions for.

"This year's Conference was all about NOCs going international, and taking a look at the risks they face," explains Mr. George. "Our event brought together NOCs from more than 50 nations to discuss these risks, how to solve them, and how to help companies prosper as they search for more energy across the globe."

Indeed, buoyed with the confidence afforded by energy price stability and an improving economic outlook, NOCs have rapidly increased investment in national and international upstream and downstream activities since the height of the global financial crisis, thereby increasing their risk profile as they develop even greater importance to the industry.

Mr. George explains: "What's interesting is that if you look back to when there have been oil and gas commodity price reductions in the past, there has been a corresponding reduction in investments which has created a lag after prices restabilized. I think people have learnt lessons from that. Overall we are seeing activity picking up, and we believe the current strong investment going into the oil and gas sector will continue for the foreseeable future."

It may be seven years since Marsh's inaugural conference, but Mr. George was keen to stress that the purpose remains the same today as it did then: how can we help companies go into new areas and understand the new risks they're facing.

"This year's theme 'Beyond the Horizon — Managing the Next Frontier of Risk' echoes the tenet of our first event. Some of the topics are more advanced, a lot has happened since 2007, and so some of the risks have changed, but the overall theme is the same — and that's looking forward to ask: What's coming?"

Asked about this year's topics, Mr. George said they fall into four specific areas: risk and governance, technology, human capital, and risk velocity.

"One of the challenges comes from the fact that many NOCs are used to operating within their own borders; they're used to their own regulatory regime. When you go into a different country, particularly a developing country with an evolving legal framework, you have to understand the risks you're getting into, and most of the NOCs we're dealing with say to us: "When we work with you, you help us stay out of trouble."

Asked about human risk to oil companies struggling to manage an ageing workforce, Mr. George says this is a risk that often doesn't get the attention it deserves: "If you look at how the industry has grown up, it's a high-hazard industry. So you can have the best equipment, but you've got to also have the best people and processes as well," he explains. "A significant proportion of refinery managers and well operators are in their early- to late-50s and will be retiring in the next five to ten years and so understanding those human capital risks and having a strategy in place to mitigate them is incredibly important."

Speaking about technology risk, Mr. George says there are a number of different aspects to consider, many of which can still be classed as 'emerging' risks as NOCs struggle to make the most of increasing technological sophistication within the industry and the liabilities that arise with this.

"One of the real emerging risks discussed at this year's Conference is cyber-attacks," he explains. "We've seen various near-misses. So far, there have been some examples where computers have been hit in the energy industry. There hasn't, as yet, been a loss to process equipment. But when you've got process equipment worth billions of dollars, and there's much more reliance on technology controlling them, if someone were able to hack into that and, say, open valves on process equipment, the loss could be catastrophic."

"We released a Marsh Risk Management Research publication entitled Advanced Cyber Risk to Global Energy Facilities at this year's Conference which looks at this risk in great detail, and there was also

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a presentation on the subject which we hope will give delegates the opportunity to put forward any questions they have on the issue,” says Mr. George. “Meanwhile, Marsh is in the process of developing a new product, which will be a real innovation within the market.”

However, it is the velocity of risk which is giving a number of NOCs the greatest cause for concern, according to Mr. George, particularly about the way they implement their enterprise risk management.

“Because the world is so well connected today, it’s very difficult to keep things to yourself,” he explains. “A market event, for example, even if it takes place on the other side of the world, is much more likely to impact your organization today than it would have five years ago, and businesses need to have business resiliency plans in place to deal with these. Also, with technology and

the internet today, when things happen, everybody knows about them very quickly, and so it is therefore really important that NOCs have plans in place to manage this.”

As well as discussing the macro-issues affecting the energy industry as a whole, this year’s Conference will also look at some very specific risks and opportunities facing particular markets and geographies, something Mr. George says he is particularly looking forward to.

Marsh also increased the opportunity for discussion and debate at this year’s Conference, and at the beginning and end of the event put on more workshops and master classes than ever before. “We wanted it to be very engaging for attendees and hope it offered insight into the most pertinent topics impacting the industry, whether they be on going international, or more specific issues around power turbines, for example,”

says Mr. George. “For some people this will be purely educational, but for others it will actually help shape where the market goes.”

The NOC Conference is now firmly embedded in the Marsh calendar, says Mr. George, due to the extent to which it helps inform the company about client’s changing risk profiles and the products they demand.

“An event like this is about sharing knowledge: it informs delegates as well, but it also informs us of the big issues. Therefore, as a commercial firm it’s invaluable for us to be able to ensure we tailor our offerings, services, and products to meet the needs of risk managers working in the energy sector” he concludes.

Marsh Would Like To Thank the Conference Sponsors.

Marsh would like to thank ADNIC, AIG, Liberty, SCOR, Swiss Re, And Trust Re, for their kind sponsorship of the NOC Conference. Without their support the Conference would not have been possible.



Global Energy Scenarios Dependent on Role of Government



The role of government is the key critical driver of future energy scenarios as uncertainty in the sector increases due to a rise in the complexity and speed of risks it faces, according to Christoph Frei, Secretary General and CEO of the World Energy Council (WEC).

“We see unprecedented uncertainty in the energy sector,” Mr. Frei told delegates. “20 years ago, if you were an investor in energy there was exactly one signal that mattered and that was the oil price. Today, if you’re an investor in energy, you have oil prices, diverging gas prices, uncertainty in CO₂ prices, collapsing in solar prices, and increasing nuclear costs post-Fukushima.”

Mr. Frei told delegates the current period of “fast energy” is one full of complexity and uncertainty, and drew on information from the WEC’s World Energy Issues Monitor, which revealed energy price volatility, global recession, climate frameworks, and access

to capital markets to be the biggest issues currently facing the oil and gas industry.

Despite these challenges, Mr. Frei insisted the long-term outlook remains positive for oil and gas, and dismissed suggestions that demand for energy and fossil fuels is decreasing or flattening out as “simply not true”.

“We are going to double [energy] demand roughly by 2050,” said Mr. Frei, “Our reliance on fossil fuels is going to remain very high. Today 80% [of energy is produced by fossil fuels]: by 2050 between 60% and 75%. In absolute terms, it’s at least the same if not more.”

Mr. Frei told delegates that the greatest fundamental differentiator in the energy sector is the way in which governments approach energy, something which had enabled the WEC to formulate the following energy scenarios for 2050: Jazz, a market- and trade-based scenario with minimal

government interference, and Symphony, a Government-led, voter-driven one.

Mr. Frei stressed that, ultimately, whichever scenario comes to pass will depend on the ability of the energy sector to work with governments to develop energy strategies which afford equal consideration to economic development, cost, and environmental issues; something he said was not happening.

“There is currently a very bad alignment of understanding of risks among governments, finance, and the energy sector,” he concluded. “The understanding of what critical risks are going forward is not shared and therefore we have big issues.”

You can watch this and other presentations at www.MarshNOC.com.

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WEC SCENARIOS – STORYLINE AND QUANTIFICATION ASSUMPTIONS

	Jazz – Market- and trade-based with minimal government interference.	Symphony – Government-led
GDP growth	Higher (3.54% pa CAGR, PPP)	Lower (3.06% pa CAGR, PPP)
Population	Lower (2050 = 8.7 billion)	Higher (2050 = 9.3 billion)
Efficiency/intensity	Increasing (2.29% pa (primary, PPP))	Increasing more strongly (-2.44% pa (primary, PPP))
Climate policy	Limited prices (2050): US\$23-US\$45/tCO ₂	Stronger prices (2050): US\$75-US\$80/tCO ₂
Resources	Better access to unconventional	More expensive unconventional
Technology support	Limited; energy choice based on free markets	Support for nuclear, large hydro, CCS, and renewables
Technology innovation	Further development of CCGT decentralized power (SPV)	Focused R&D programs (esp. CC(U)S, solar PV)

Source: *World Energy Scenarios: Composing energy futures to 2050*, 2013, World Energy Council.

Global Economic Trends Positive for Future Oil Prices

The rise of Asian middle-earners and increasing global urbanization are just a few of the long-term economic trends that are positive for future oil prices, according to Kurt Karl, Swiss Re’s chief economist.

The emerging markets’ share of total world GDP has already increased by 18% over the past decade, and Mr. Karl predicts that they will “at some point between 2030 and 2050,

most likely account for around half the global economy”.

The rapid estimated expansion of middle-income groups in Asia — from 29% in 2009 to 66% in 2030 — is particularly bullish for oil producers due to the future demand for infrastructure, cars, and other commercial goods.

Delegates heard that the overall urbanization rate in emerging markets was 46.5% in 2011, a figure that is predicted to rise to 56% by 2030. Mr. Karl said this “rapid urbanization and industrialization” taking place in emerging economies, particularly in Asia and Latin America, will be a “key growth driver of emerging markets, and will increase energy demand significantly”.

Pemex Boosted by Energy Reform in Mexico



Mexico's national oil company, Pemex, will soon reap the benefits from Enrique Peña Nieto's 2013 landmark energy reform, according to Mario Beauregard.

The company's chief financial officer told delegates that recent reform in the country will ultimately improve Pemex's business efficiency and ability to access vast, as yet largely untapped, unconventional energy reserves.

"For Pemex, [energy reform] is very good news," said Mr. Beauregard. "Pemex is very productive and profitable in E&P activities, but being a monopoly from the state means you have to invest in all activities along the value chain, and we have to admit we're not very profitable in all activities.

"In both refining and petrochemicals, there is a very good opportunity, now that companies will be able to participate in the Mexican oil and gas industry, for Pemex to associate with other participants in order to be more efficient." In terms of improvements

to operational performance alone, Mr. Beauregard told delegates that energy reform in Mexico could provide Pemex with \$1.9 billion-worth of savings.

Before the reform was approved in December last year, Pemex had had a monopoly on the country's crude oil production for 76 years, during which time the company developed into the world's seventh-largest oil producer — at the end of 2013, the NOC produced 2,513 Mbd of oil and 6,406 MMcf^d* of natural gas.

Successive governments have attempted to enact energy reform over the years to attract much-required foreign investment into the country's struggling oil, gas, and electricity sectors, but last year it was President Enrique Peña Nieto who finally secured the two-thirds of votes from the Congress required to modify the Mexican Constitution.

The government is clear that in no case will it be privatizing reserves themselves; however, changes will allow for different types of upstream contracts, including profit-sharing contracts, production-sharing contracts, and licenses for all other upstream activities. The government will also permit grants for downstream activities, including refining, petrochemicals, gas processing, transportation, storage, and all other types of activities along the industry value chain.

Mr. Beauregard told delegates that the new changes will also help Pemex access its wealth of unconventional reserves as they will help provide the investment, expertise, and technology required.

Pemex has acquired significant information from deep- and ultra-deep water oil fields,

and of the 31 wells the company has drilled, 16 have been viable, suggesting significant potential. "There is great potential to explore and exploit hydrocarbon resources in the Gulf of Mexico... but as you know, activities in these areas are more risky and you need more financial resources and different kinds of technology," said Mr. Beauregard.

"The International Energy Agency has estimated that Mexico also has the world's 6th-largest shale reserves, and as yet these are totally unexploited. So there is great opportunity."

Mr. Beauregard admitted that Pemex will have to adapt to change, but insisted it would rise to the challenge: "We have been a monopoly for the last 76 years; now we will have to compete. We will also have to associate with other companies, and learn to work in a new environment. This will take years, but we need to do our work."

Pemex will be helped by legislative changes that will provide it with "new tools to work in this new environment," said Mr. Beauregard. These tools include a new budgetary process and compensation regime, which will improve its ability to associate with other companies while helping to retain human talent.

Mr. Beauregard concluded his presentation by saying that energy reform will finally allow Pemex to invest its capital in those areas where it is more profitable for the company: "Just like any other company, we want to maximize the return on our capital. This is now going to be possible; it wasn't in the past."

"We will also have to associate with other companies, and learn to work in a new environment. This will take years, but we need to do our work."

*Cubic Feet per Day

Publications

At this year's National Oil Companies Conference, Marsh released the following risk and insurance papers which explore and provide insight into current and emerging risks to the energy sector:

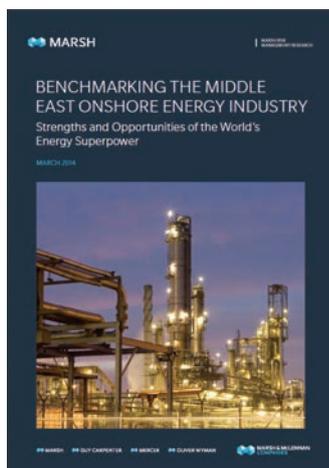


1. ADVANCED CYBER ATTACKS ON GLOBAL ENERGY FACILITIES

The global energy sector is increasingly vulnerable to cyber-attacks and hacking, due to the widespread adoption of internet-based, or 'open', industrial control systems (ICS) to reduce costs, improve efficiency, and streamline operations in next-generation infrastructure developments.

While new projects generally incorporate more sophisticated risk management practices and apply rigorous standards to minimize risk, Marsh's research states that cyber risk is accentuated at the beginning and end of the project lifecycle, during the design, and decommissioning stages. Marsh refers to this at the 'ICS security risk reliability bath-tub curve'.

Advanced Cyber Attacks on Global Energy Facilities looks at the cyber risk posed by sophisticated hacker networks motivated by commercial and political gain, and explores the potential damage a successful attack could inflict.

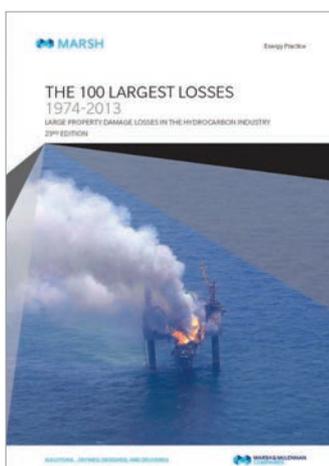


2. BENCHMARKING THE MIDDLE EAST ONSHORE ENERGY INDUSTRY

Energy firms in the Middle East energy market are highly adept at responding to the ever-evolving risk landscape they face and have an above-average approach to risk management, relative to their global peer group, according to the Marsh benchmarking data included in this report.

Benchmarking the Middle East Onshore Energy Industry gauges the comparative risk quality of Middle Eastern oil, gas, and petrochemical facilities to more than 500 similar facilities worldwide. Its findings reveal that hardware is a key strength in the Middle East, due to land availability, substantial capital investment and the development of modern facilities.

The research also identifies key areas for improvement, including software and emergency control systems, which determine the overall risk quality of the region. In particular, it reveals that significant improvement can be achieved in the management of change — the industrial practice of changing processes and systems without introducing new hazards or exacerbating existing ones.



3. THE 100 LARGEST LOSSES, 23RD EDITION

The failure of multiple process and safety systems is the most common cause of the largest property damage losses in the global energy industry over the past four decades, according to the latest edition of *The 100 Largest Losses*.

The report details the most significant property damage losses in the global hydrocarbon extraction, transport, and processing industry since 1974. It estimates that the global energy sector has sustained property damage losses in excess of \$34 billion since 1974, based on current estimated values; with the majority attributable to offshore and refining incidents.

The above publications are all available on the recommended reading page of the NOC Conference website, www.MarshNOC.com, where you will also find copies of all of the presentations delivered at the Conference.