



cutting through complexity

What next for the Oil & Gas industry?

Key findings from the
report by Chatham House

Spring 2013

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“THE INDUSTRY IS NOW UNDER PRESSURES THAT WILL TRANSFORM IT AS PROFOUNDLY AS THE CHANGES OF THE 1970’s”

John Mitchell

Over the past year, KPMG has contributed to an ongoing debate around **“What Next for the Oil & Gas Industry.”** Within this area, Chatham House have produced a truly insightful piece of thought leadership, which has been authored by John Mitchell, Valérie Marcel and Beth Mitchell. It has been a pleasure to work with John, Valérie and Beth and the findings of their report have provoked debate. For me personally one of the key themes is the fact that the research suggests we are now at a **“tipping point”** with the oil deficits of the Asian markets exceeding the oil surpluses from the Middle East, and that this gap will continue to widen. This combined with the reduced dependence of the US on imports from the Middle East has far reaching implications not least to energy security in these regions. We have set out on the following pages key extracts from the full report. I hope you enjoy it.



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Just over 10% of the value of the world's stock markets is invested in the oil and gas sector

10%

Oil and gas exports are more than 15% of the value of global exports

15%

Oil and gas supply provide more than 25% of GDP in Russia, Central Asia and members of the Organization of the Petroleum Exporting Countries (OPEC).

25%

Oil and gas supply 57% of the commercial energy the world consumes, and their combustion accounted for roughly the same proportion of global CO² emissions.

57%

About the Authors:



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graduated from Magdalen College, Oxford in PPE and started work in the City in September 1987; an early introduction to market volatility. She has worked in asset management since 1989 as both specialist analyst for a wide variety of sectors and portfolio manager in UK, European and global equities, working for a variety of institutions including Deutsche Bank (Morgan Grenfell), Axa, Dresdner Bank and Mitsubishi UFJ. Having invested through two full economic cycles and a wide variety of fashions in investment and corporate management, she is particularly interested in corporate/industry life-cycles, the limitations of linear modelling and the relationship between perceived risk and asset allocation both by company managements and by investors.

The contents and graphs used in this publication are taken from the "What's next for the Oil and Gas Industry" report published by Chatham House and written by John Mitchell with Valérie Marcel and Beth Mitchell. The full report can be found on the Chatham House website: www.chathamhouse.org

The future for the oil and gas industry has changed.

For over 100 years the story was one of growth in production to supply a largely Western-driven market, and of competition between private companies for access to reserves. Since 2005, oil prices have moved to a permanently high level.

Other industries are capturing some of the demand for transport by producing more efficient engines, vehicles, ships and aircraft, and by supplying alternative fuels. New technologies are providing diverse but uncertain opportunities for producing 'unconventional' oil and gas in many parts of the world. There are also still opportunities for private-sector companies in the traditional oil-exporting countries where the industry is under state monopoly, but generally these will involve cooperation with the state-controlled oil or gas company. Finally, there is a question of who will carry responsibility for the physical security of Middle East oil exports now that these mostly go to Asian markets rather than the US or Europe.

The industry cannot develop its strategies independently of governments. The report shows increasing and changing intervention by governments, driven by climate change policies and economic and physical security. Government policies are generated by political processes that cannot necessarily be expected to produce coherent or rational results. The report does not offer new quantitative predictions. The future cannot be predicted with any confidence, especially while the present economic difficulties persist. The report's key findings are:

1

The oil industry can no longer rely on its monopoly of the transport market.

Use of oil in transport – half the world oil market and most of its expected growth – is being reduced by competition from other industries. The vehicle industry is replacing oil with more efficient vehicles, and biofuels are replacing oil products as liquid fuels. This is driven both by the increase in oil prices since 2005, and by government policies limiting carbon emissions. Since 2011 all major importing countries have adopted strong policies on carbon emissions and vehicle efficiency. These secure markets for efficient automobiles, rather than for oil. As current policies are unlikely to achieve their aims, it is probable that stronger policies will be introduced. Businesses outside the oil sector are anticipating more severe policies against carbon fuels and are innovating accordingly. The result will be to flatten and reverse growth in the use of petroleum in transport in developed countries, and slow its growth in developing countries.

The major private-sector oil companies have a legacy of refineries and distribution networks in the 'no-growth' markets. Companies will not invest in modernizing these for a short and uncertain future. Refineries will close, brands will disappear, and more products will be imported. Governments will be less able to rely on major international companies to secure supplies.

2

The role of OPEC will change.

The international oil market will continue to be dominated by economics, but the role of OPEC will change. Future weaknesses in short-term demand will be balanced not only by OPEC's regulation of its members' production when prices are weak, but by the response of producers of non-conventional oil, whose high variable costs will drive them to slow drilling and delay new projects. Competition in the medium term will be between investments (made now) in new sources of oil and substitute fuels, and investments that reduce the use of oil by greater efficiency. Competition from outside the oil industry is a real and present threat to demand for oil. Long-term trends cannot be predicted on the basis of business as-usual extrapolation. Investors look to the industry to show how it will respond.



“The problem is not finite resources but the rate at which these very large resources can be converted into reserves for potential production.”

3

There will be more gas, but uncertainty over where and when.

New perceptions about the potential supply of conventional and ‘unconventional’ gas (such as shale gas) at relatively low cost are creating the possibility of unexpected expansion of gas markets in most parts of the world. For this to happen each major region needs prices which are low enough to increase demand but high enough to increase supply. Prices at present differ widely between markets. Relying on imports to build new gas demand, will seem risky to some countries. In the power sector (which now consumes about 40% of world gas production) the market for gas depends on government policies for coal, nuclear and renewables rather than on factors intrinsic to the gas industry. As many oil and gas companies switch their emphasis from the oil to the gas business, the policies and dynamics influencing the utilities sector – and potentially transport – will be of growing strategic concern. Because a ‘golden age for gas’ may not prevail soon or everywhere, investors will be concerned about the cost-competitiveness of new projects.

4

Technology and collaboration are the keys to upstream reserves growth.

‘Peak oil’ is proving a misleading idea. The foreseeable problem is not finite resources but the rate at which these very large resources can be converted into reserves for potential production. Reserves of oil and gas have each more than doubled since 1980 – faster than the increase in production. Technologies are developing which are creating new reserves of ‘unconventional’ oil, as they already have for gas. These technologies have more places to go, many of them outside the existing oil-exporting countries. These new areas are opening a field of growth for private-sector companies which was not foreseen a few years ago.

The companies also still have opportunities for collaboration with state companies, in half of the world’s oil reserves, provided they meet each country’s terms and conditions and bring technology to complement the state company’s own resources. In some countries whose economies depend on oil exports, expansion of production is problematic, because their governments may choose to keep oil in the ground for future production, while gaining time to diversify their economies. Technology is the master key to both sets of opportunities.

With demand vulnerable to other industries, and supply growing from ‘unconventional’ sources and new areas, there is no long-term escalator for oil prices. There is no clear trend; all depends on investment by competitors for the transport market and on the creation of new reserves.



5

Financing future investment is not a question of quantity but of quality.

Matching the opportunities and risks with sources of funds. Finance for the private sector in oil and gas depends on investors' beliefs about growth, risk and the prospects for positive change. Inertia is not an option if the industry is to maintain and improve the terms on which it gets finance. Downstream, prospects differ for developed and the developing markets, and upstream for technologies and access to resources in either state-controlled or open-access areas. The private-sector companies need to demonstrate to investors their strategies for managing the declining value of their downstream assets in 'no-growth' markets and accessing the diversity of opportunities upstream. This may lead to radical restructuring of companies and the industry.

Finance for the state companies depends on their place in the national economy, their access to government, loan or bond finance and governments' willingness to involve the private sector. For investors who look for growth in value or volume, many private-sector oil companies seem configured for the last era and not the next; their public strategies look recycled, not renewed. Few companies seem to question the arguments for vertical integration and there is a legacy of implied obligations to 'meet demand', rather than to engage with the changing forces shaping that demand. Choices are emerging within the industry in which some companies will become energy conglomerates with interests throughout the value chain, while some become focused upstream or downstream companies.

6

The oil security problem has moved to Asia.

The geopolitics of oil are changing fundamentally as interregional oil trade divides between the eastern and western hemispheres, with Asian markets absorbing more oil than the Middle East can supply. This changes the security of supply problem. For Western countries, the risk is price, not supply, since disruptions to Asian supplies will affect the world oil price.

Political and physical security measures have not yet caught up with these new realities. Although they are building their own oil stocks, China and other key Asian countries are not part of the OECD/IEA emergency response system.

There is also a political question: how far will the US go to defend sea lanes that mainly benefit Asian countries which import oil from the Middle East? And will Asian countries eventually seek to provide their own protection, individually or collectively? These questions cannot be separated from the wider issues of US military arrangements in Asia and conflicts there, which may prevent the development of cooperative Asian response mechanisms either for physical protection or in order to share supplies. We look at this in more detail in our next chapter.



Geopolitics: Moving East



“Asian imports will account for roughly **60%** of interregional oil trade.”

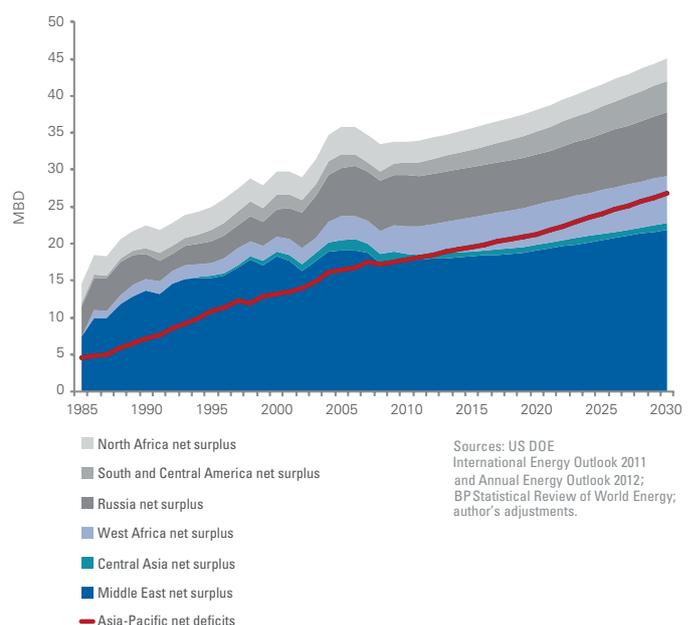
This section explores in detail the oil security implications in the Asian market as referenced in the key findings.

Production in the Asia-Pacific region will not match the increase in consumption, so imports will increase, and by 2020 Asian imports will account for roughly 60% of interregional oil trade. This is not a new phenomenon, but it has reached a kind of ‘tipping point’. From 2010–11, the oil deficits of the Asian markets exceed the oil surpluses available from the Middle East, and this gap will continue to widen.

Figure 21 illustrates this crossover of trends by comparing the export surpluses of different regions with the oil deficits of the Asia-Pacific region. The North Africa/Mediterranean region includes available exports from Syria and northern Iraq, and from Azerbaijan through the Baku–Çeyhan pipeline. Sudan exports are grouped with the Middle East surplus. The central Asian surplus is what remains uncommitted after exports to the Mediterranean through the Baku–Çeyhan pipeline and to China through the pipeline from Kazakhstan; Russian exports are reduced by the availability shift to Asia through the ESPO pipeline. The Asia-Pacific deficit is net of the Central Asian and Russian pipeline supplies.

The actual level of trade is probably about 10% higher than the sum of these surpluses: Low sulphur crude is exported from west Africa to Asian markets, and some Saudi Arabian oil is supplied to the refineries in the United States which are owned by Saudi Aramco.

Figure 21: **Regional surpluses and Asian deficit**





“Chinese competition has an edge over American and European companies since Chinese state controlled financial institutions can make parallel investments, on favourable terms, in the producing country’s infrastructure.”

Competition for resources (investment opportunities)

The inevitable increase of Asian purchases of oil from suppliers in the Atlantic market is accompanied by increased investment from Asian companies, most of them state-controlled, in the resources in the western hemisphere.

According to an IEA 2011 survey, Chinese state-controlled companies had equity production of 1.4 mbd in 20 countries: Kazakhstan, Angola, Sudan and Venezuela are major established sources where Chinese companies produce a significant fraction (more than 10%) of production in these countries¹. The Chinese companies have also invested more recently in Iraq, East Africa and western Canada.

Chinese competition has an edge over American and European companies since Chinese state controlled financial institutions can make parallel investments, on favourable terms, in the producing country’s infrastructure. This is important as developing oil exporters seek to diversify their economy. The Western oil companies generally do not have the capacity to deliver the same level of support for development outside the oil sector as Chinese and some other Asian companies.

In some cases Chinese or other Asian companies invest in expanding production in countries where European and American companies hesitate to invest because of physical conditions, or the risk of US and UN sanctions, or because companies are committed to codes of behaviour they would have difficulty in implementing in certain countries. The net result may be to increase the global supply of oil but to limit the opportunities for private-sector companies based in the US and Europe.

¹ Julie Jang and Jonathan Sinton, *Overseas investments by Chinese National Oil Companies*, International Energy Agency, 2011.

Figure 22: **The new balance of the international oil trade**



Competition for supply

Access to trade is different from access to investment opportunities. In the western hemisphere the trade in oil is largely free from government intervention: there are open and competitive markets, with many private-sector buyers and sellers.

Short-term prices are established in commodity exchanges in London and New York, and by price disclosure commercial reports. These prices have global influence. As long as the free market in oil in the western hemisphere continues, this competition from Asian buyers may be regarded as a normal phenomenon, driven by the economic needs of Asian consumers. Asian purchases in the western hemisphere will form a relatively small proportion of the trade (about a quarter by 2030).

In the eastern hemisphere the situation is somewhat different. By 2030 something like 60% of the world's oil trade will take place within the Asia region and between Asia and the Middle East. These are regions where, aside from OECD members (Japan, Korea, Australia and New Zealand) state-controlled companies dominate as buyers and sellers. Short-term prices are revealed through the Platt reporting system for Dubai crude, the Dubai mercantile exchange contract for Oman crude, and (through the links by contracts for differences and swaps) between these prices and the much more widely traded Brent price revealed in London. There are two problems: the volumes of Dubai and Oman

crude are small relative to the Asian market, and there is not much diversity of supply². The major exporters to Asia are state companies which impose restrictions on the resale of their crude – in other words, they only sell to refineries, bypassing traders who would make a profit on the trade. In the future the volume and diversity of freely tradable crude may increase with supplies of private-sector equity crude from Iraq, Russia and East Africa. Meanwhile, the restraints on resale and trade in the Asian market may partly explain why prices are higher than they would be if there was more competition. From 1988 to 2012 the price of Saudi light crude to Asian buyers loading at Ras Tanura averaged 3% above the price paid by US or European buyers³.

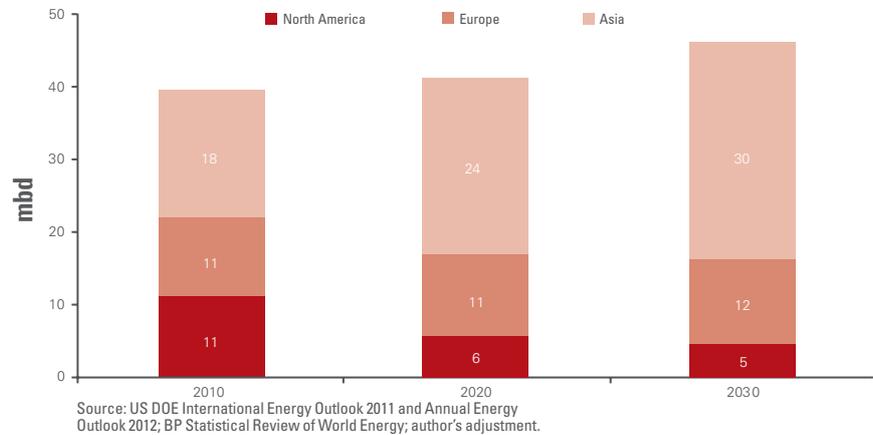
The shift in the centre of gravity of oil investment and supply on the global oil map focuses around a 'hinge' consisting of countries which, for economic and logistical reasons, could equally supply to the East or the West: their stability, policies and rate of investment in oil production are of interest globally. The demands and opportunities of these countries need the attention of Asian as well as Atlantic importers.

² Basam Fattouh, 'The Dubai Benchmark and its role in the International Oil Pricing System', Oxford Institute for Energy Studies, 2012.

³ Petroleum Intelligence Weekly data source: crude values at port of loading.



Figure 23: Regional deficits requiring supply from global oil markets



Energy security

The rebalancing of the oil trade also affects energy security. On current policies, it is the Asia-Pacific region that is due to become much more dependent on all imports.

For Europe, thanks to flattening and declining oil demand, dependence on international markets is not expected to increase even though production will fall. For the United States, dependence on the global oil trade is expected to decrease as a result of the growing supplies of oil from North America itself. This rebalancing is shown in Figure 23 above.

The supposed risks of Middle East supplies

Until now the risks of disruption of supplies from the Middle East, for whatever reason, applied to both the Atlantic and the Pacific markets.

Now it is the Asia-Pacific markets that face the greatest risk. Over half the oil consumed in the Asia-Pacific region is imported from the Middle East⁴, compared with 10% for the Atlantic. Atlantic imports from the Middle East are almost balanced by the Atlantic exports of light crudes to Asia.

The Atlantic importers have an economic interest in avoiding or mitigating the effects of disruptions of supply to Asian markets because international oil prices will respond to Asian market shortages. Importers in the western hemisphere would have to pay international prices to maintain their share of the available supplies.

However, there is a contrast between the arrangements for dealing with supply interruptions in the two hemispheres. In the west, OECD members account for 80% of consumption and 90% of oil imports. The International Energy Agency (IEA) is a subsidiary of the OECD⁵. IEA countries maintain oil stocks equivalent to 90 days of imports. The IEA's emergency response mechanism (ERM) provides for a coordinated release of stocks in the event of disruptions of physical supply. EU member countries hold 90 days of consumption and have a potential for responding to disruptions if the ERM mechanism does not operate. Asian OECD members (Japan, Korea, Australia and New Zealand) are also part of this mechanism.

⁴ These include about 2 mbd to the United States for refineries owned by Middle East exporters and about the same quantity to Europe, balanced by Atlantic exports of light sweet crude to the east.

⁵ It is not, as sometimes described in the press 'the consumer countries' watchdog', it is only the OECD countries' watchdog.

“Over half the oil consumed in the Asia-Pacific region is imported from the Middle East, compared with 10% for the Atlantic.”

Table 9: Oil trades, 2010

	mbd	% of importers consumption	% of total oil imports
Atlantic imports from Middle East	4.6	10	16
Atlantic exports to Asia	3.8	14	24
Asian imports from Middle East	14.3	52	57

Source:BP Statistical Review 2012.

China, India and other Asian importers are not part of the IEA system because they are not members of the OECD (although technically bilateral agreements between the IEA and each of these countries would be possible). There is currently no regional political organization under which an emergency sharing mechanism could be built.

China began building strategic stocks in 2001, but there is no mechanism to bring this oil into any regional or global sharing system. The IEA estimated from public sources that by end-2010 crude stocks in strategic storage were 103m bbl (about 95 days of consumption), and increases in capacity to 207m bbls by 2013 and 500m bbls by 2020 were planned⁶. A disruption of Middle East oil supplies would therefore lead to free-for-all competition for the available oil in the Asian hemisphere. The severity of Asian disruption would lead to very high prices which would not only attract supplies from the Atlantic, but also be translated directly into the international oil prices that Atlantic countries would have to pay.

Is equity oil secure?

Chinese and other Asian companies' equity oil in foreign producing countries is not necessarily useful for oil supply security.

In the event of a disruption to Middle Eastern supplies, Chinese production in the affected country would also suffer. In the event of a political dispute leading to either UN or US sanctions on exports from a particular country (as in Libya, Sudan, Burma and Iran) the availability of Chinese equity crude from these countries would depend on the attitude of China in the dispute concerned, and the response of those countries to that attitude. In the last resort, it is the host countries that will decide on any interference with the normal commercial flow of their oil. Nevertheless, in times of crisis companies will be better off with some oil somewhere than with no oil anywhere. Oil 'somewhere' gives the company a bargaining position for swaps and trade in the international market and also gives it a source of valuable market intelligence.

“There is currently no regional political organization under which an emergency sharing mechanism could be built.”

⁶ *Oil and Gas Security: Emerging response of IEA Countries: People's Republic of China*, IEA, 2012



Table 10: **How much do gas imports matter?**

2010	Importers as % of consumption					
	Total imports	All imports	From region	From Middle East	From Russia	From elsewhere
	BCM	%	%	%	%	%
China	16	15	9	2	0	4
10.2	12	20	0	18	-	2
Japan	93	98	65	22	0	11
Europe	270	55	12	9	26	7
US net	75	11.6	10.2	-	-	1

Source:BP Statistical Review 2011.

Gas security

Security for gas differs in some respects from security for oil.

- Gas is mainly a regional market, and is likely to remain so. Over 80% of the world’s gas consumption is supplied from production in the country in which it is a consumer, or from neighbouring countries, whereas only about 40% of oil is supplied locally or regionally and the balance must come from the global market.
- Demand in each regional market is uncertain because of its link to the future mix of fuel for power – itself subject to policy uncertainty; the supply outlook has been transformed in North America by the development of shale gas, and there are possibilities that this might be replicated elsewhere – notably China.
- Large discoveries of conventional gas off the coast of East Africa add to the potential supply in Asia.
- Gas security involves reliability of continuous supply to consumers, so that at the national level shortage and resilience of networks are important issues.

Only about a third (30% in 2010) of interregional gas trade is carried in ships: the remainder is moved by pipeline. The LNG portion is likely to increase as a result of the increased demand for gas in China and India, most of which will be supplied in this form from Qatar, Australia, Indonesia and East Africa.

Table 10 shows the diversity of supply for Japan. It shows the relatively high dependence of Europe on Russian pipeline supplies and the importance of regional pipeline supplies (from Canada) to the US in 2010. Individual countries in Eastern Europe have a dependence of 40% or more on Russian supplies.

The geopolitical considerations connected to the LNG trade are similar to those affecting the oil trade, but there are important differences.

In Asia, an increasing proportion of LNG will originate from private-sector exporters in Australia, East Africa as well as Indonesia, and will be bought by private-sector power utilities. The market is far from transparent. There is no short-term gas pricing point and prices are linked to oil prices rather than to gas-to-gas competition. This may change, but overall the future gas markets in Asia look unlikely to be dominated by state-controlled exporters.

For gas, the geopolitical risks are therefore focused on pipeline trade: regulatory risks on the pipelines between Canada and the US, and political risks between Russia and Europe. In both cases the pipelines provide a mutual dependence. For the exporters, alternative markets are distant and expensive to reach. For the importers the alternative is LNG.

“The key geopolitical gas issue is the **European dependence on Russian gas supplies.**”



In North America the prospect of self-sufficiency or at least marginal gas exports is now very real. Canadian pipeline exports to the US are an important part of this. If pipeline expansion is frustrated by environmental policy decisions, Canadian exports may move to Asia. There are already several projects to provide pipelines to the Pacific coast and export LNG terminals.

In Europe the political focus is on the dependence of Russian–European gas trade on pipelines which transit through Ukraine. There has been a history of disputes between Russia and Ukraine over gas pricing. In 2009, Russia cut off supplies to Ukraine for a short period and the shock of this shutdown had a knock-on effect on EU perceptions of gas insecurity. This dependence has become an iconic issue and the events of 2009 and subsequent short interruptions of supply have led to two responses:

- The Russian state monopoly Gazprom has invested with German import partners in a pipeline under the Baltic (Nordstream) to bypass transit countries, and has a project (South Stream) for a pipeline under the Black Sea to supply its customers in the Balkans. These two pipelines would reduce the dependence on transit through Ukraine to a very low level.
- A series of projects have been proposed for gas pipelines to bring Central Asian gas to southeast Europe. The most ambitious, ‘Nabucco’ project for importing gas from

Azerbaijan and Kazakhstan seems unlikely to secure supplies or investors, despite political support from the European Commission. Less costly alternatives are being considered for importing gas from Azerbaijan. Imports of Kazakhstani gas across the Caspian Sea to support any of these schemes is less certain: the economics of a pipeline under the Caspian are severe, the politics are controversial because of long-standing disputes over maritime rights, and finally the opening towards more profitable Asian markets via pipelines to China is more attractive to Central Asian exporters.

The key geopolitical gas issue is therefore the European dependence on Russian gas supplies. This has to be placed in the broader context of political, economic and security relations between Europe and Russia.

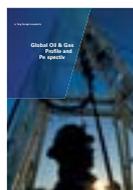
For Asian gas importers, the LNG supply is potentially more diverse, is less dependent on specific bilateral links, and mostly avoids the Persian Gulf.

Other KPMG thought leadership



The Future of the European Refining Industry

The profitability of the European refining industry has long been cyclical. However, this time many of the challenges the industry faces today may prove to be permanent.



Global Oil and Gas Profile & Perspectives

This publication provides a wealth of information on KPMG's Global Oil & Gas Practice.



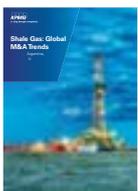
Central and Eastern Europe - Shale gas development "inevitable"

Many Central and Eastern European countries, especially Poland, Romania and Ukraine, will potentially be important markets for shale gas production in the next decade.



The NOC investment challenge

Turmoil in the financial markets and volatility in the oil price has meant international oil companies (IOCs) and national oil companies (NOCs) have had to try to balance the immediate cash flow needs of their investors/governments, with the need to invest in the future development of reserves.



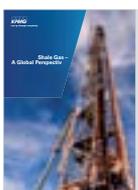
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In a world of rising energy prices, pressure to reduce harmful emissions, and geopolitical instability, some countries have taken a huge stake in developing their shale gas production and distribution capabilities—changing the game for decades to come.



Shale Gas Outlook - A U.S. Perspective

The paper provides an outlook of the shale gas industry, analyzes the implication of shale gas production on the global energy sector, and discusses the drivers and inhibitors of M&A transactions in this particular energy segment.



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Examining the current state of shale gas development in various regions as well offering our views on its prospects as part of the world's energy mix.



The Gulf of Mexico Oil Spill - Recent developments in the oil and gas industry

Reviews the industry reaction to the Gulf of Mexico oil spill and provides insights about the possible future impact.



Key issues for rising national oil companies

The demand for energy is expected to grow by more than 50 percent by 2030 according to the International Energy Agency. How National Oil Companies (NOCs) respond to this challenge will be likely to have a significant impact on the stability of oil and gas markets in the future.

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Launched in 2007, the GEI is a worldwide knowledge-sharing forum on current and emerging industry issues. This vehicle for accessing thought leadership, events, webcasts, and podcasts about key industry topics and trends provides a way for you to share your perspectives on the challenges and opportunities facing the energy industry – arming you with new tools to better navigate the changes in this dynamic arena. To register for your complimentary membership in the KPMG Global Energy Institute, please visit: www.kpmglobalenergyinstitute.com

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RR Donnelley | RRD-279679 | February 2013