



مركز الإمارات للدراسات والبحوث الاستراتيجية  
The Emirates Center for Strategic Studies and Research

## Unconventional Fuels: Geopolitical Consequences for the Arabian Gulf

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Over the past twenty years we have gone through a series of fundamental “game-changing” developments and “powershift” in almost every domain of our lives, be in economy, geopolitics, security, technology, and values.

Yet another one is now breeding and has the potential to “revolutionise” the world energy scene. Uncertainties and global recession are rocking the foundation of what many believed two decades ago to be a steady roadmap into our energy future.

The story of the world oil and gas industry has significantly 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.

As globalization lifts millions out of poverty, the demand for energy worldwide will continue to grow, and the world risks ending up with a volatile, “beggar thy neighbour” style of competition between countries to control sources of supply, especially in the developing world, giving rise to more conflict and

confrontation than co-operation and collaboration.

The world of tomorrow will be radically different from our world today. Two key *megatrends* will shape our world out to 2030: demographic patterns, especially rapid aging; and growing resource demands which, in the cases of food, energy and water, might lead to scarcities. These trends, which are virtually certain, exist today, but during the next 15-20 years they will gain much greater momentum.

Price competitiveness, supply security and environmental quality have become major energy industry challenges around the world. However, these goals are not always consistent. The world needs to cut greenhouse gas emissions in half by mid-century, if we hope to avoid the worst effects of climate change. So, the world will need twice as much energy, but with half the emissions.

Let's make no mistake: This is not the first time that the energy sector has faced uncertainty – recall the oil shocks of the 1970s and 1980s. Such changes do not of course occur without serious risks, particularly above-the-ground risks, threatening the energy sector seriously in today's inter-connected world. Uncertainties are particularly dangerous in a sector where investments are long-lived and take a long lead-time to pay off.

Both positive and problematic changes are to generate profound implications for, and need for prompt responses from, the Gulf in terms of new trade flows following shift of demand, cross-investment with consumer nations, continued price volatility, changing balance of interest with IOCs, inter-regional competition, environment, cross-border pipelines, infrastructure security, and geopolitical powershift.

***Global energy needs are growing and shifting to emerging and developing economies.*** Overall, global energy demand will grow by 35 to 46 percent between 2010 and 2035, if no action is taken to halt the growth of fossil fuel use. Even with significant efficiency gains, demand will continue to increase as the world's population expands from about 7 bn people today to nearly 9 bn people by 2040, led by growth in Africa and India.

Most of that growth will come from the new engines of the world economy - China, India, and partly the Middle East, where the consuming class is growing rapidly. Although global energy demand is projected to rise by 2.2 percent annually up to 2020, China's forecasted annual growth demand is expected to be 4.7 percent over the same period. This poses a serious issue for the energy-poor nations, which must now contend with China's hunger for fuel.

Energy-saving practices and technologies, such as hybrid vehicles and high-efficiency natural gas power plants, will help OECD countries keep energy use essentially flat even as OECD economic output grows 80 percent. Energy demand in developing nations (Non-OECD) will likely rise 65 percent by 2040

compared to 2010, reflecting growing prosperity and expanding economies.

To put this into perspective, in 2005, Non-OECD countries had about the same demand as OECD countries. By 2040, their demand will be more than double that of OECD countries. And while energy will help fuel advancement in Non OECD countries, significant gaps in living standards will persist. On a per-capita basis, energy use will rise about 25 percent by 2040, though it will still be around 60 percent less than that in the OECD

The Asia-Pacific region is home to over half the world's population and is the fastest growing region in the world. Stretching from the Central Asian Republics through the population-dense countries of South Asia across the dynamic countries of East Asia to the expansive stretch of the Pacific Islands, the region has become a key driver of global politics and economics.

In all these developments that unfold, Asia has emerged as a likely "problem centre" of the world, particularly if it fails to address global environmental and supply security problems deriving from heavy use of energy (about 46 percent of world's energy use by Asia alone in 2035). If successful, on the contrary, Asia could well become a "solution centre" to be emulated by the entire global community.

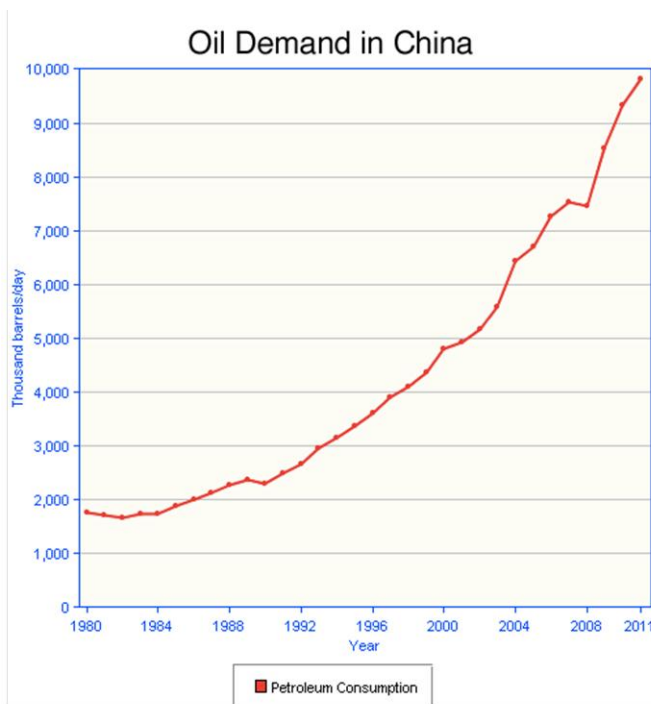
This demand growth in the region is the inevitable consequence of global population increase, economic growth, continued urbanisation, as well as the resulting increased demand on mobility and other energy dependent services. Investments totaling \$38 trillion are needed to meet projected global energy demand through 2035.

Improving infrastructure and energy efficiency and consumption are also fundamental to meet global demand while responding to environmental challenges. We will also need to reduce greenhouse gas emissions by half if we want to keep a global temperature increase below two degrees Celsius.

The rise in Asian demand is unlikely to abate, despite economic slowdown in many major economies. For instance, China's oil consumption is set to rise from 9.6 mbd at the end of 2012 to 16 mbd by 2030, of which 70-80 percent would have to be imported. According to the US Energy Information Administration, 80 percent of China's energy requirements will come from coal and oil sources for the next 20 years. High switching costs and expensive exploitation of shale reserves will require China to continue to use oil as a primary energy source for transport in the short to mid-term.

Currently, China is the world's second-largest oil consumer, trailing only the US, and the second-largest net importer. As the demand for energy continues, it will remain important to strive for efficiencies, including improved production and refining capacities. Pipelines that move imported oil and gas to these markets are expected to be the leading development to help these markets meet demand. Increasing Chinese demand for oil imports will help offset a

reduction in the projected US demand.

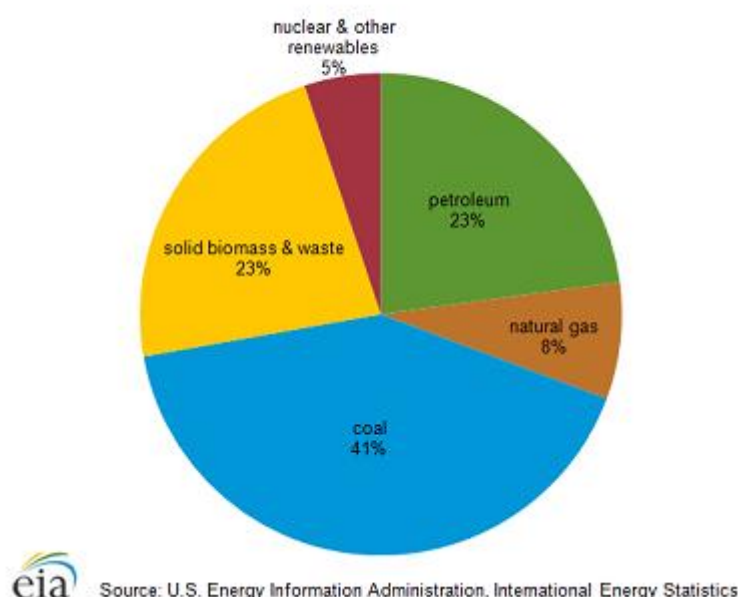


Source: U.S. Energy Information Administration

Demand in other dynamic economies of Asia such as India, Korea and Taiwan will also follow China's lead. India, together with China, will account for half of the projected increase in world energy use over the next 25 years. Both countries combined in 2008 accounted for 21 percent of total world energy consumption.

India is the fourth-largest energy consumer in the world, trailing only the US, China, and Russia. In 2012, India had the tenth-largest economy in the world as measured in 2012 US dollars (converted at official exchange rates), and the third largest economy in the world when GDP is adjusted for inflation and purchasing power. This inflation-adjusted GDP has grown at over 7 percent per year since 2000, although it slowed to just over 5 percent in 2012, according to the Indian Central Statistical Organization.

Total energy consumption in India, 2011



The Gulf region used to be seen only as a supply province for the world energy markets. This is rapidly changing as it has become a demand growth region that needs to be monitored not only the supply but also consumption map of the world.

Gas demand in the UAE and the wider Gulf region is rising because of cheap prices and increased power consumption, particularly in the hot summer months. Apart for Qatar, all other Gulf States will need to tap unconventional reserves to meet this demand, which is more expensive and more difficult to produce.

Around 77 per cent of the Gulf's 1,100 trillion cubic feet of gas reserves is non-associated gas (raw natural gas that does not contain any hydrocarbon liquids), and nearly 90 per cent of that is in Qatar, according to Wood Mackenzie. About 18 per cent is associated gas (raw natural gas that comes from crude oil wells), which cannot be pumped at will because it is linked to oil production.

Future gas production in Qatar is also bound by a self-imposed moratorium at its North Field, the country's biggest. The remaining 5 per cent of gas reserves is sour gas that has a high percentage of hydrogen sulphide, is expensive and hard to produce.

Then, the alternative is to import gas. The UAE and Oman import Qatari gas through the Dolphin project pipeline, while Dubai buys LNG. Abu Dhabi is setting up an LNG import terminal in Fujairah that will have an annual import capacity of 9 mn tonnes. Adnoc this year completed an \$11bn integrated gas development, a set of facilities and infrastructure that collects and processes associated gas from offshore oil production that supplies 800 mn scuf of gas.

Part of an explanation for the Gulf States' relentlessly growing demand for energy today comes from their industrial structures. The availability of low-cost hydrocarbon resources, primarily oil but more recently natural gas, has precipitated a series of national policies aimed at diversifying the Gulf's economies towards energy-intensive industries, such as steel, aluminium, and petrochemicals.

While successful in boosting value-added output in their national energy sectors, these industries are large energy consumers in proportion to the Gulf States' predominantly small populations – which also explains, to a certain extent, the region's generally high per capita consumption rates for both primary and secondary energy. Meanwhile, the Gulf States' population has more than doubled since the 1980s – due to substantial labour migration flows that have poured into the region since the 1960s – accompanied by a dramatic rise in living standards across the entire region.

Gulf oil producers feature among the lowest-price suppliers in various energy price comparisons, indicating a substantial gap between prices paid by energy consumers in the Middle East and in most other parts of the world. Low-cost energy – in the form of electricity, petrol, and other fuels – is, today, frequently perceived as a Gulf citizen's birthright, reflecting a largely distorted cost-price relationship behind energy supplies throughout the region.

***Supply patterns are also rapidly changing from region to region.*** Technology is enabling the safe development of once hard-to-produce energy resources, significantly expanding available supplies to meet the world's changing energy needs. Oil will remain the No. 1 global fuel, while natural gas will overtake coal for the No. 2 spot. Use of nuclear power and renewable energy will grow, while demand for coal peaks and then begins a gradual decline.

Keeping pace with the demand growth, the new suppliers appear on the horizon. Of particular importance is the resurgence of US oil and gas production, particularly through the unlocking of new reserves of oil and gas found in shale rock. One should also count on the Arctic region, Brazil, Australia, Central Asia, the East Mediterranean, and East Africa as the additional suppliers.

Geopolitical boundaries, intensifying Asian markets, questions of energy independence and regional economic nuances all contribute to the demand for oil and gas. The future of the industry depends on how producers and distributors can keep pace with global needs.

Oil majors have few clues where to place their upstream bets. Reserves are trickier to extract in hard to reach places. Kashagan is a long-standing case in point in Kazakhstan, with the Russian Arctic and Alaska's Chukchi Sea leaping off the page as similarly difficult marginal calls. The geography is uncertain, few people really know where to go, particularly where large resource prizes

are heavily intermingled with political, regularity and resource risk. Brazil, Argentina, Canada, Venezuela, Russia, Australia, America, Africa, the Caspian. There are no free lunches left in the energy world.

Oil supplies could increase all over the world. The four countries that show the highest potential in terms of effective production capacity growth are – in order – Iraq, the US, Canada, and Brazil. Much of this increased capacity comes from “unconventional sources” such as US shale/tight oils, Canadian tar sands, Venezuela’s extra-heavy oils, and Brazil’s pre-salt oils.

Only four of the current major oil producing countries (more than 1 mbd of production capacity) face a net reduction of their production capacity by 2020: Norway, the UK, Mexico, and Iran. In Iran and Mexico, the loss of production is primarily due to political factors. All other producers are capable of increasing or preserving their production capacity.

There are enormous volumes of un-conventional oil under development in the US. Taking into consideration limitation in transportation infrastructure and refining capacity, and environmental barriers to development, the US could still increase oil production by 3.5 mbd and conceivably produce a total of 11.6 mbd of crude oil and natural gas liquids per year by 2020, making it the second largest oil producer in the world, after Saudi Arabia, which accounted for 13.2 percent of world oil production in 2011.

Saudi Arabia, together with other Gulf producers, will retain the power to balance (or not) the global oil markets by squeezing or preserving its spare capacity. This will be the only cushion to offset strikes in Nigeria, hurricanes in the Gulf of Mexico, disruptions in Libyan production or the oil embargo on Iran, to name but a few.

Iraq is another variable that can become a game changer in the oil market. Projections point to Iraqi oil production rising from 3 mb/d in 2012 to 6 mbd in 2020 and to over 8 mb/d in 2035. This would mean exports of over 4 mbd in 2020 and of over 6 mb/d in 2035, up from more than 2 mb/d in 2012. These are ambitious figures that date back to the unfulfilled promises given after the occupation of Iraq and which depend on the country’s political evolution. Iraqi exports of 8 mb/d by 2035 would equal US conventional and unconventional oil production.

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A significant shift is in full swing due to the unconventional hydrocarbon revolution in North America. But neither Middle Eastern, Russian nor North

African producers are likely to be pushed to the fringe of the international geopolitical scene. The EU is still expected to remain linked to its traditional suppliers of conventional resources, but uncertainties regarding the development of unconventional resources should not put at risk investment on either renewables at home or conventional resources in the European neighbourhood.

We have boundless amounts of energy locked up in the earth, and the key is to exploit them in a safe, reliable, and environmentally considerate way. The scientists focus on new energy technologies that could transform the ways we generate, store and use energy, and that could protect our environment while recharging our national economy.

Innovation, technology, and long-term commitment are the common threads that run through divergent new approaches to serving the world's exploding energy demands. Strategic innovation, high technology are key to exploiting less conventional energy sources. Special attention has been given to several specific technologies: deep water and arctic oil and gas exploration, shale gas, oil shale, and methane hydrate development.

With modern advances in drilling and exploration, international spending in this sector is forecast to reach an all-time high for 2013: \$644 bn, up 7 percent from \$604 bn last year, according to Barclays' Global 2013 E&P Spending Outlook. This point is heavily reinforced by the number of new orders for offshore rigs.

As critics decry the large quantities of water that fracking demands, multiple companies are working toward using much less water or waterless well-fracturing methods. One of the largest, Houston-based Baker Hughes, has developed a technique called VaporFrac that uses drastically less water than traditional well stimulation methods.

Thousands of cities and towns around the world have developed their own plans and policies to advance renewable energy, and momentum accelerated in 2012. To achieve ambitious targets, local governments adopted a range of measures, including FITs or technology-specific capacity targets; fiscal incentives to support renewable energy deployment; and new building codes and standards, including solar heat mandates..

***Risks have multiplied including commercial, financial, political, geopolitical and technical ones.*** The key supply side risk remains the Middle East. The political debris from 2013 will continue into 2014 and beyond, with popular pressures continually growing. That's not just in the Arab Nationalist Republics such as Egypt or indeed Syria, whose internal implosion will have increasingly regional effects, but in Gulf Monarchies as well.

The trigger point to watch is all about political succession. The exact timings are by definition uncertain, but Bahrain, UAE, Qatar, Kuwait and most



importantly Saudi Arabia, are in the same boat. If the old succession model passing power from one aging leader to another is seen to be broken, then prices will rapidly lift when the Arab Street erupts. The fact that Saudi Arabia has a very 'awkward neighbourhood', with deep-seated problems in Bahrain, Yemen and Iraq hardly helps its own Eastern Province either.

Given likely Eurozone failures, a realisation that the US debt position is unsustainable, and daunting domestic challenges in India, Brazil and China to head off hard landings, then demand side fundamentals all point towards two digit oil prices. Having made over \$1.115 trillion in 2012, you could be excused for thinking OPEC would have ample room to buy themselves more political time; not so. \$100/b is no longer deemed expensive across OPEC ranks, but a necessary price for regime survival.

Besides notoriously overstretched patronage states like Algeria, Nigeria, Venezuela or Iran, even Gulf States are starting to feel the pinch. There are no true price moderates left in the oil cartel. The geopolitical cost of survival is what matters, and it's seriously out of sync with the geological cost of production. Bottom line: It's \$100/b or bust for petro-states.

While it's true that most recessions since the 1970s have been preceded by oil price spikes, OPEC has never been very good at heading the lessons of demand destruction, and with emerging markets dominating the headlines, it is unlikely to do better now. Most producer states will be caught seriously short if this happens. Russia will be first out of the money, Central Asian budgets will be squeezed and MENA producers will have to make uncomfortable trade-offs. Latin America is in no better shape, no matter whether you look at Venezuela, Bolivia, Ecuador or indeed Brazil.

In a back to (conventional) basics scenario, the bulk of producer states will go for volume over price, in the hope that the Saudis will do the heavy lifting to set a viable floor. Riyadh might play ball for a while, but it's unlikely to stop producer states reverting to what they know best as a short-term coping mechanism: 'blunt repression'.

Whether that works or not remains to be seen, but if nothing else, we could see a '2013 paradox' of heightened instability across producer states underpinning prices as panic sets in. Pleasant OPEC meetings in Vienna will be irrelevant to the political unrest sweeping producer states. 'Cyclical' will take on a whole new meaning as far price and political instability is concerned – the lower the price, the more likely we will see supply disruptions as more vulnerable producers opt for a Libyan or Syrian course.

Watch out for Iraq on that score; Kurdish plays look good right now, but Baghdad is unlikely to give up the Northern ghost without a fight – Sunni factions could easily get caught in the crossfire.

Amid all this, for all the huffing and puffing in Washington and Tehran, the

nuclear question will remain a stalemate as long as Iran can find Eastern outlets for its crude.

In Russia, in the midst of extreme market uncertainty, the main wars they'll be fighting are internal between Rosneft and Gazprom. It's quite clear after the TNK-BP deal that Rosneft has become the new national champion of choice, producing up to 4.6mb/d (taking overall state control of hydrocarbon output to over 50 percent). How well Rosneft performs remains to be seen, as does the amount of international capital Russia can attract into Arctic plays, but it's Gazprom that seems to lose out.

After pursuing endless political goals such as Nord Stream (and nascent South Stream pipelines), Gazprom failed to respond to the most fundamental 'fundamental' of all; the unconventional gas world developing around them. To remain a 'market maker' rather than price taker, Gazprom had to get out of petty pipeline politics and into serious quantities of LNG.

But the competition isn't just coming from overseas, but directly from Rosneft. Igor Sechin's outfit has already secured a 25-year gas supply agreement with Inter RAO (the state electricity provider), next stop will be going after Gazprom's gas export monopoly. That spells trouble for Gazprom, and indeed private players such as Novatak. Gazprom gets left holding the European baby, playing regional pipeline politics, while Rosneft performs a global energy role.

As the battle unfolds, expect Russian production to suffer in the interim and for Moscow to fall back on its free-rider role wherever possible. Hostilities will be brutal, but Rosneft is likely to be the long-term winner.

Then we have America. It's been the trail-blazer for shale gas gains over the past decade, and's increasingly replicating the 'revolution' for liquids. As everyone knows, US shale gas gains have turned gas into a perennial buyers' market, so much so that Henry Hub prices have become a victim of their own success. The key question in 2013 is not whether America will maintain its number one (650 bcm) gas slot, but how much it intends to export as LNG?

Those expecting the floodgates to open next year could be disappointed; any volumes signed off in Washington will keep a very keen eye on domestic prices. Of the 125 bcm/y of LNG trains awaiting FERC approval, 40-50 bcm would be remarkably good going. But even if America gets cold LNG feet, price convergence will slowly continue to play out across the Atlantic and Pacific Basins.

The mere prospect of US liquidity hitting the market has been seized upon by Asian buyers, with the upshot that Washington's virtual impact on the gas world will be far larger than its physical presence in 2013. That's not particularly great news for global energy companies trying to develop expensive LNG projects in West Africa, East Africa and Australia.

In terms of liquids, America will probably push towards 11.5mb/d production next year. That means very different things to different people. It's 'energy independence nirvana' for some, especially those willing to lump the Americas all under a single Washington production figure. That's chilling news for OPEC of course, not because America can play any kind of swing producer role, but because of the collateral damage it will do to oil prices.

Where things get considerably worse for the cartel, is not only that the Americas will use Washington as a production hedge to send tankers East, (Canada, Brazil, Argentina, Venezuela and Mexico all know that relying on a single source of supply and single source of demand is a no brainer), but that Beijing will continue to go 'long' in the Americas to make sure they remain firmly tied into global energy markets.

Just as China is strategically investing in any cost overruns on LNG plays right now, it's going to do exactly the same for liquids. Why? Because China wins most from a cheap and abundant energy world. 2013 will mark a transitional step towards that outcome; the vexed Nexen deal will be the watershed moment underpinning Chimerica's physical and virtual stake in the game. But a word of caution for Beijing, political risk is just as lethal, if not more so in the US than anywhere else in the world.

The perceived US upside from its energy gains is that it no longer has to do all the heavy lifting for global energy supplies, but the blunt fact to consider is that two-thirds of global oil supplies are still sitting on politically shaky ground, and doing so in an increasingly large external power vacuum in the Middle East. The vacuum will get significantly bigger as US power (and interest) ebbs and Chinese oil flows, albeit without overarching political or security guarantees in place.

The 2013 headlines will relate more to Asia-Pacific rather than the Middle East given that the US has made a clear stand to stake its future geopolitical credibility containing the regional rise of China. US fingers have already been firmly stuck in Vietnamese and Australian dykes, more digits will be applied across the Pacific Rim and Indian Ocean.

Some might say that's a bit like running a marathon during rush hour, particularly as Beijing ultimately holds US purse strings and indeed, the economic aces in its own back yard. But as far as MENA states are concerned, few doubt that post-Libya, post-Iraq and pre-Iran, American commitments to global supplies are not what they once were.

The more the Middle East resembles a 'Chimerican lake', the more China will be expected to take up some of the security slack. China's predicament is that it knows it can't keep getting a free energy lunch off the US military table, but that it can't build up or project its military might without fuelling American paranoia. If anything, 2013 will be marked by variations of this Chimerican dissonance being played out across producer states in Africa, Central Asia, the

Middle East, and Latin America.

But as 'litigants' caught between two very differing claimants, the downside problem is that 'external political protection' will be in very short supply for producers and consumers states globally.

The EU urgently needs to get to grips with diversity of hydrocarbon supplies, but hasn't got the political pull or military muscle to do so. With the US taking a back seat, Russian supplies looming larger than ever - and Caspian output heading predominantly East - it's brutally clear that Europe needs to start working with China at the other end of the Eurasian pipeline to safeguard its consumer interests. Relying on the trans-Atlantic certainties of old will leave them high and dry. For a 'reference point' just ask Delhi; it's far easier working with the Chinese than against them to orchestrate mutual energy gains.

Irrespective of the unfolding geopolitical contours of the energy world, energy economics are in a state of flux from unconventional developments. In the past five years we've added 200bn barrels of potential oil reserves and 28,000tcf of gas. Any kind of downside price corrections could wipe out vast swathes of Canadian tar, Brazilian pre-salt, Arctic ice, Aussie LNG, and even US tight plays.

The upshot is that some will manage to place decent bets in the race to unconventional riches in 2013; others will catch serious colds. That certainly applies to grandiose pipeline plans laid out in the early 2000s. They now look terribly old fashioned in a new age of unconventional bounty.

Pipelines from the Caspian and Levant supposed to feed into European markets could remain on hold. It's only China that will provide the necessary finance and 'policy certainty' to cut through the risk and ensure Turkmenistan, Uzbekistan, Tajikistan and Kazakhstan continue to build pipelines East.

Not to mention Beijing pressing ahead with its own unconventional resources. Piece all that together, and the biggest Eurasian loser from new energy gains is Russia. Moscow's 'grand Asian designs' look more like primitive blue prints with weak foundations. Unless Russia's willing to sell large volumes of energy set at Beijing prices, Moscow's inherent arbitrage potential will go wanting. China plays the unconventional game to perfection.

Nuclear will continue on a slight upward slope, despite Fukushima and the lack of long-term carbon prices, with pretty much the same point applying to CCS technologies. But that hits on the real space to watch for emissions: The interplay between coal and gas. The US has turned the corner from shale gains, but coal is still the 'fuel of the future' in Asia, and indeed, 'back to the future' in Europe, no matter how far we think we've come in the energy world.

***Renewables have already transformed European and other consumer markets.*** If the unconventional boom is a tricky hand for energy majors (and

major resource holders) to get right, it spells absolute disaster for the clean tech sector. From all the energy risks, renewables could be the greatest loser of all.

Obviously that's not to say that green investments are dead. But the problem is that the \$200bn (plus) global investments have always been driven by government tax incentives and subsidies inflating green tech bubbles, rather than 'cost curve' basics. 2013 runs the real risk of seeing government props being knocked out of the renewables market.

Purely through scale and a 'portfolio approach', China will remain the key green growth market, with wind and solar likely to suffer sharp declines across the board, albeit with notable 'bright spots' of solar growth in the Middle East.

The rapid growth of renewables continues to beat expectations. It is a bright spot in an otherwise bleak assessment of global progress towards a cleaner and more diversified energy mix – but how sustainable is this trend.

Renewables are picking up speed across Asia, Latin America, the Middle East, and Africa, with new investment in all technologies. The Middle East and North Africa region and South Africa, in particular, witnessed the launch of ambitious new targets, as well as the emergence of policy frameworks and renewables deployment. Markets, manufacturing, and investment shifted increasingly towards developing countries.

Optimistic projections are set out with regard to renewables – on-the-ground realities confirm such optimism. Global demand for renewable energy continued to rise during 2011 and 2012, supplying an estimated 19 percent of global final energy consumption in 2011, with a little less than half from traditional biomass. Total renewable power capacity worldwide exceeded 1,470 GW in 2012, up about 8.5 percent from 2011. Hydropower rose 3 percent to an estimated 990 GW, while other renewables grew 21.5 percent to exceed 480 GW.

Globally, wind power accounted for about 39 percent of renewable power capacity added in 2012, followed by hydropower and solar PV, each accounting for approximately 26 percent. Industrial, commercial, and residential consumers are increasingly becoming producers of renewable power in a growing number of countries.

Renewables represent a rapidly rising share of energy supply in a growing number of countries and regions:

- In China, wind power generation increased more than generation from coal and passed nuclear power output for the first time.
- In the EU, renewables accounted for almost 70 percent of additions to electric capacity in 2012, mostly from solar PV and wind power. In 2011

(the latest year for which data are available), renewables met 20.6 percent of the region's electricity consumption and 13.4 percent of gross final energy consumption.

- In Germany alone, renewables accounted for 22.9 percent of electricity consumption (up from 20.5 percent in 2011), 10.4 percent of national heat use, and 12.6 percent of total final energy demand.
- Wind and solar power are achieving high levels of penetration in countries like Denmark and Italy, which in 2012 generated 30 percent of electricity with wind and 5.6 percent with solar PV, respectively.
- The US added more capacity from wind power than any other technology, and all renewables made up about half of total electric capacity additions during the year.

Renewables are not only driven by climate policy, but are also seen as a contribution to diversity and security of supply as well as a critical enabler to enhancing access for the 1.3 bn without access to energy. Large hydro is moving into the action space, explained by huge un-used potential in central Africa, Latin America, Russia and Canada. Regional interconnection, which is often the feasibility basis for large energy projects, is also robust in the action space.

Electricity generation from hydropower, wind, solar and other renewable sources is projected to scale up by 40 percent in the next five years. By 2016 global renewable electricity generation will overtake that of gas, and represent twice as much as nuclear. And by 2018 the share of renewable electricity will account for a quarter of the global power mix, up from 20 percent in 2011.

Renewable power deployment is continuing to expand geographically. Investments and renewable deployment are accelerating in emerging markets, mainly driven by fast-rising electricity demand, energy diversification needs, and local pollution concerns, while contributing to climate change mitigation.

China alone accounts for nearly 40 percent of expected global growth. This trend is expected to over-compensate for slower growth and smooth out volatility in other areas, notably Europe and the US. Second, more renewables are becoming cost competitive versus fossil fuels in a wider set of circumstances.

Global new investment in renewable power and fuels was \$ 244 bn in 2012, down 12 percent from the previous year's record. The decline in investment—after several years of growth— resulted from uncertainty about support policies in major developed economies, especially in Europe (down 36 percent) and the US (down 35 percent). To get investment up, risks must be reduced and shared.

The main challenge for investors and business is policy uncertainty. Retroactive

policy changes are the worst offender in this regard. But also stop & go decisions – for example around the extension of the Production Tax Credit in the US, and the reduction of accelerated depreciation incentives for wind in India. Many countries have reduced economic incentives to renewables. Cuts in incentives are absolutely legitimate and desirable when technology costs fall and the savings can be passed to taxpayers. But those decisions must be transparent and predictable, allowing industry to adapt, and in line with long-term policy targets.

***"Energy democracy" has gained ground.*** What seemed unimaginable two decades ago has become reality: energy is again on the top of the political agenda in many countries such as China, the US, Japan, Russia, Turkey and Germany, now becoming a priority for prime ministers and presidents. The public has taken a strong interest in how their energy future will be shaped as they are likely to be affected seriously from the climate change, local pollution, high energy prices, energy poverty, and geopolitical conflicts.

Indeed, the impact of the Fukushima nuclear disaster is vivid, and has multiple dimensions. It has awakened the Japanese general public with energy issues for the first time since the oil shocks of the 1970s. People started to think that energy policy should not be left only in the hands of a small number of people, those in the government and relevant energy sectors. This phenomenon could be called "energy democracy".

Today, even in China, which is the most obvious power on the rise, likely to dethrone the US as the world's economic superpower over the next two decades if things progress as widely predicted, the "energy democracy" works. The Beijing leaders feel the need to take into account the local protests on heavily polluting fuels, nuclear power plants, fuel price hikes, and low carbon/cleaner energy. Beijing is not alone: India and other dynamic Asian economies now boast growth rates that could outstrip those of major Western countries for decades to come and they are increasingly responsive to the "energy democracy" demands.

***Price volatility will stay with us.*** Energy prices are quite volatile, reflecting market participants' adjustments to new information from physical energy markets and/or markets in energy-related financial derivatives. Also political risks play a role in determining the price levels.

Price volatility is an indication of the level of uncertainty, or risk, in the market. It is much more than just the question of low natural gas prices and high differentials between regions that highlight transport bottlenecks, particularly to Asia. The coal to gas substitution in the US electricity mix has resulted in a higher gas than coal share for the first time in US history, with the consequence that US greenhouse gas emissions have decreased.

This development has led to a push of discount-priced coal from the US to Europe where it has changed the competitiveness of the companies who took

advantage of the changing dynamics compared to those who were locked into natural gas at European prices. This development has however pushed up Europe's greenhouse gas emissions further away from previously reducing levels.

Russia's top concern is its vulnerability to fluctuations in the price of energy. With half of the Russian budget coming from energy revenues (of that, 80 percent is from oil and 20 percent comes from natural gas), the government could be crippled should energy prices fall. The Kremlin has already decreased its budget projections for oil prices to \$93 per barrel instead of \$119 -- though even at that price, the government is playing a game of chance.

Historical patterns show that major international crises and fluctuations in global consumption and production patterns repeatedly have had sufficient impact on oil prices and on Moscow's revenues to destabilize the country.

Meanwhile, Australia, on the way to become one of the world's largest LNG exporters, has re-directed its interest from North America to Asia and Canada's infrastructure companies have also started watching out for Asian customers.

Price volatility is also about solar, where module costs have collapsed since 2008 from over 4.5 \$/Wp to as low as 0.6 \$/Wp. This is largely driven by low-cost production in China but has been accentuated by the fact that 2012 demand has not kept up with expectations and absorbed less than half of the global manufacturing capacity of about 100 GWp.

US natural gas prices could face rising volatility over the next several years as demand begins to catch up to the rapid supply growth of the last several years. The huge wave of supply that hit the US market in less than a decade – with production growing by a third from 2006 through 2012 – preceded a commensurate rise in demand by several years. The demand side wasn't really ready for that.

Henry Hub natural gas prices have recovered off of the staggering lows – sub-\$2.00 per mn Btu – of last spring. Prices are now in the \$3.50-\$4.00/MMBtu range, which is high enough to engender some optimism, but still too low to prompt a rush back to gas, especially when compared with returns on liquids and oil.

As demand grows from new sources, such as LNG exports, prices will have to rise high enough to spur a return to more robust production growth, and temporary supply-demand mismatches during the adjustment period could lead to price volatility.

The start-up of LNG exports would add a measure of volatility to US natural gas prices, and as export capacity grew, so would volatility. We expect another three to four projects – in addition to the two US LNG export projects already approved – granted licences this year for deliveries to non-free trade



agreement countries, though we doubt on whether there is market appetite for that much capacity.

***Gulf region will be seriously affected by price volatility.*** Oil and gas represent the most important sources of income and comprise the largest sector of the GCC's GDP (49 per cent of total GDP in 2011). The highest percentage was accrued in Qatar, with 55 per cent of GDP, while the lowest was in Bahrain, with 25 per cent on average for the period of 2000–10. It is important to note that, with the overall oil booms and crises, oil income remains the critical and predominant source of GDP in the GCC.

Therefore, oil price collapses usually have deep, long-term negative consequences for the Gulf economies. For instance, the 1986 collapse transitioned most of the GCC states from creditor states into debtor states. The GCC states' economy faced recession, deflation and a long period of deficit in state budgets, leading many of them to liquidate most of their overseas assets. The Qatari budget, for example, went into deficit from 1985 to 2000, with only one recorded surplus (1990–1).

Saudi Arabia suffered seventeen consecutive years of deficit. In spite of previous oil price collapses, the negative effects on economic stability were quickly forgotten as soon as the oil price began to increase again (2003–7). The worst consequence of this is that, rather than benefiting from the lessons of the past, governments have increased their dependency on oil and decreased their willingness to initiate economic integration.

This strong association between international market demand and national GDP shows the international market's influence on the national GDP. Furthermore, dependence on oil as a main export product renders the GDP of GCC countries vulnerable to fluctuations in the international market.

Behind the oil and gas sector, the services sector is the second largest in terms of GDP for all GCC states. From 2000 to 2009, services averaged 20 per cent of GDP in the GCC states, ranging between 15 per cent in Qatar and 24 per cent in Bahrain (Arab Monetary Fund 2013). The government played a significant role in this sector's activities (e.g. public administration, defence, health, education, welfare) in terms of the services it provided in most of the GCC states.

***Unconventional fuels as a game-changer.*** The real game-changer in this new age is the rising production in the US from shale basins, which are transforming the global market. This is about unconventional oil (shale oil, tight oil, beyond Canadian oil sands or Venezuelan heavy or extra-heavy oil) as much as it is about the still-hot topic of shale gas.

The technology revolution is continuing and while further progress is needed to address the energy-water nexus and the costs associated with mitigating greenhouse gas emissions, production volumes continue to increase. The

widespread adoption of techniques such as hydraulic fracturing and horizontal drilling have made those reserves much more accessible, and, in the case of natural gas, has resulted in a glut that has sent prices plunging.

North American energy supply independence has become a possibility within less than a decade. Such supply independence is however put into perspective as crude markets, and therefore prices are global and US prices will continue to depend on international developments.

This success story has inspired many other countries, including Argentina, China, Poland, South Africa and the UK, to develop their own reserves. Shale development in China, home to the world's largest shale deposits, has been slower than predicted by the government. China may produce 6.5 bn cubic meters of shale gas annually by 2015 and has set a target of 60-100 bn cubic meters of production annually by 2020, according to China's National Development and Reform Commission.

In 2011, after the Fukushima nuclear accident, the IEA heralded the arrival of a "golden age" of gas in the period until 2035 due to enormous economic growth in China combined with significant gas consumption, a low share of nuclear energy in the generation of electricity, an increase in the use of gas in the transportation sector, and a boom in unconventional gas production and subsequently lower prices.

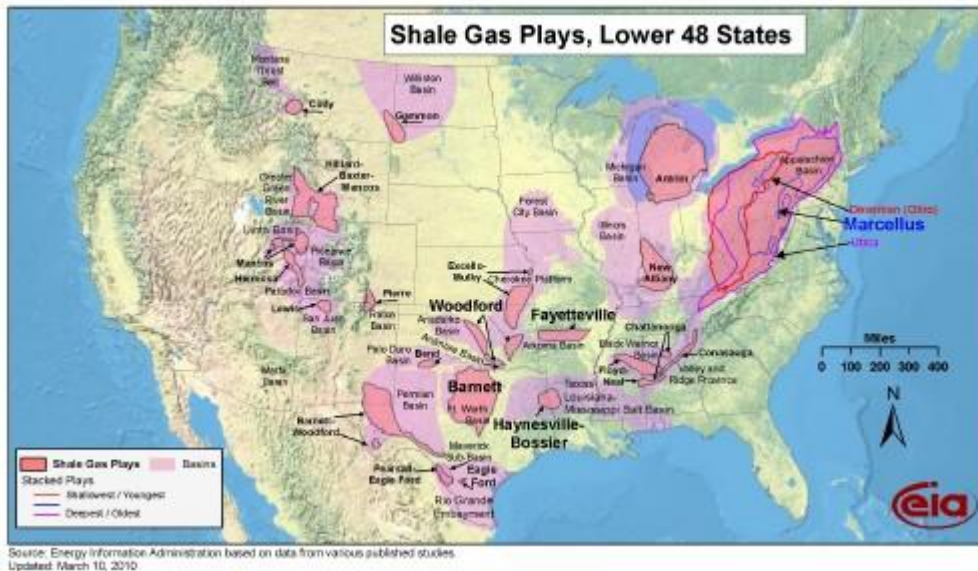
Electricity from renewable resources still requires natural gas as a back-up energy source because there is no uninterrupted supply of renewable energy available, at least until technology enabling the high-efficiency storage of electricity is discovered and commercialized.

However, as yet, no country other than the US has what could be termed a shale gas industry -- gas production from tight oil and shale plays is still negligible outside the US. Most production increases will only come after 2020, as countries need time to develop the commercial unconventional gas sector due to various geological, logistical and regulatory challenges.

In fact, the emergence of shale gas is perhaps the most intriguing development in global energy markets in the last decade and one that flies in the face of peak resource depletion theorists. Beginning with the Barnett shale in northeast Texas, the application of innovative new techniques involving the use of horizontal drilling with hydraulic fracturing has resulted in the rapid growth in production of natural gas from shale.

Knowledge of shale gas resources is not new, as geologists have long known about the existence of shale formations. Accessing those resources was long held in the geology community to be an issue of technology and cost. In the past decade the technology has advanced, bringing about substantial cost reduction.

However, as yet, no other country has what could be termed a shale gas industry—gas production from tight and shale plays is still negligible outside the US. Most of the production increases will only come after 2020, as countries need time to develop a commercial unconventional gas sector due to various geological, technical and regulatory challenges.



As a first consequence of the rapid, cost-competitive US unconventional gas development their electricity supply portfolio switched from a high share of coal towards more gas installations. The US do not pursue significant gas exports in future, but rather keep the intensive and cheap unconventional gas resource domestically and support their re-industrialization process. In the meantime Europe follows a proactive support of renewable energy technologies in order to reduce its CO<sub>2</sub> emissions.

However, renewables are characterized by volatile power output and higher generation costs. Thus, adequate back-up power is required whereas the recent trend goes towards coal power plants. Coal prices decreased significantly since the unconventional gas revolution in the US and their excess coal is redirected towards Europe and other energy markets.

Consequently, due to the market competitiveness of coal power plants significant new capacities are being installed in Europe, emitting high quantities of CO<sub>2</sub> although a remarkable share of its GDP is spend for supporting renewable energies.

The intention of the US is not to export significant shares of their unconventional gas resources, thus empowering traditional gas exporting countries to meet the global demand and therefore setting the price. Especially the Gulf countries have high interests in keeping the gas price on current levels in order to stabilize their monetary revenues and thus keep their domestic welfare system alive.

Driven by technological breakthroughs in unconventional gas production, major

increases in US natural gas reserves and production have led to supply growth significantly outpacing forecasts in recent years. As a result, natural gas producers have sought new and additional sources of demand for the newfound volumes. One proposed end-use is the exportation of US natural gas in the form of liquefied natural gas.

There is a growing debate between policymakers, industry, and energy analysts as to the merits of exporting greater quantities of US natural gas. Some domestic natural gas consumers contend that exporting US gas would result in an increase in domestic natural gas prices and therefore in higher prices for businesses and households. Proponents of natural gas exports argue that they would provide valuable foreign exchange and would be a source of economic growth and job creation.

Hence, the unconventional gas development shows a global dimension with huge implications to other energy carriers and other energy markets due its cost-competitiveness in selected regions.

Shale oil and gas are not without their fierce critics, who think all the predictions of a revitalized US energy superpower flooding the world with its shale oil and shale gas are wrong. They think it is based on a bubble, on hype from the usual Wall Street spin doctors.

In reality, they say, it is becoming increasingly clear that the shale revolution is a short-term flash in the energy pan, a new Ponzi fraud, carefully built with the aid of the same Wall Street banks and their "market analyst" friends, many of whom brought us the 2000 "dot.com" bubble and, more spectacularly, the 2002-2007 US real estate securitization bubble.

One reason we hear little about the declining fortunes of shale gas and oil is, they argue, that the boom is so recent, reaching significant proportions only in 2009-2010. Long-term field extraction data for a significant number of shale gas wells only recently is coming to light. Another reason is that there have grown up huge vested corporate interests from Wall Street to the oil industry who are trying everything possible to keep the shale revolution myth alive. Despite all their efforts however, data coming to light, mostly for the review of industry professionals, is alarming.

Despite warnings that the US shale gas industry could be a Ponzi scheme, major oil companies continue to make major investments. It's certainly true that US natural gas prices have fallen—the product of shale gas's own success—but profits and costs vary widely between plays and are dependent on a number of variables. Key to the debate over future profits is whether decline rates are linear or hyperbolic.

***Russia may be on the losing end as a natural gas superpower.*** While the US is on the way to replacing Russia, the world's gas superpower, as the leading gas producer in 2015 (coming close to Saudi Arabia as a leading oil

producer by 2017), Russia seems to be on the side of those who will suffer most from the game-change in energy.

What happens to Russia in the face of these unfolding developments is critically important for the Gulf given Moscow's predominant role in world energy supply security, be gas, oil, coal and nuclear, as well its geopolitical standing in the broader Eurasia.

Russia holds the world's largest proven reserves of natural gas and continually alternates with Saudi Arabia as the top oil producer. The country supplies a third of Europe's oil and natural gas and is starting to export more to the energy-hungry East Asian markets. The energy sector is far more than a commercial asset for Moscow; it has been one of the pillars of Russia's stabilization and increasing strength for more than a century.

The Kremlin has designated energy security as the primary issue for Russia's national security, especially since recent changes in global and domestic trends have cast doubts on the energy sector's continuing strength.

As things stand, Gazprom's unparalleled prosperity and dominant market position have been seriously upset by the "shale energy revolution" and emergence of new suppliers/competitors. The rapid increase in the extraction of cheap shale gas and the construction of factories where this gas can be liquefied before being shipped to Europe represent a real threat to Gazprom.

While Russia's dependence on high oil prices continues to worry Moscow, Putin has so far managed to respond proactively to the other external shifts in energy consumption and production patterns -- particularly those affecting the European natural gas market. However, the long-term sustainability of the model Russia is moving toward remains doubtful.

Though Moscow's energy strategy became fairly aggressive, it helped bring about a stronger and more stable Russia. Russian energy revenues soared due to high global oil prices and the high natural gas prices it charged in Europe. Russia had excess funds to pump into its political, social, economic and military sectors. Energy politics also helped Russia leverage its influence in its former backyard and forced Europe to step back from countering Russia's resurgence.

The good times for Russia, particularly for Gazprom, once seemed like they would never end. The world's largest natural-gas producer enjoyed sky-high gas prices for years. The gas flowed along pipelines into Europe and Turkey; the profits flowed back. All this is now under threat. Its ageing gas fields are in decline. Thanks to America's shale boom, gas is more plentiful on the world market. Gazprom's European customers are realising that they have other choices. The prices it can charge are falling, and with them the firm's prospects.

The central battleground for Gazprom is Europe, its traditional stronghold and

the source of 40 percent of its revenues. Gazprom is fighting to preserve its old pricing system, whereby big European customers sign long-term contracts linked to the price of oil. But those customers now have the option of buying liquefied natural gas that America no longer needs to import.

Gas on the spot market is often much cheaper than Russian gas delivered under long-term contracts. Norway's Statoil, a nimbler state-controlled energy firm, has cut its prices and grabbed market share. Gazprom has slowly and reluctantly offered price cuts too, which it expects will cost it \$4.7 bn this year. Citi, a bank, calculates that every drop in European gas prices of \$1 per mn British thermal units reduces Gazprom's profit by \$4 bn. Gazprom's managers act as if this is a temporary inconvenience. They insist that the old system of oil indexation is here to stay.

Because so many of its customers are tied to contracts, the full effects of the global gas glut on Gazprom's bottom line will not be felt straight away. But it is already cramping investment. Last August Gazprom and its partners, France's Total and Norway's Statoil, decided to freeze a colossal offshore project in the Barents Sea, which was intended to produce gas destined for export to America.

The final threat to Gazprom's old way of doing business is legal. An antitrust probe launched by the European Commission alleges that Gazprom is using its dominant position in central and eastern Europe to restrict competition and hike prices. If it loses the case, it could face a fine of up to \$14 bn and lose the mighty lever of being able to charge some European countries more than others.

For years, Gazprom's bosses were in denial about threats to its business model. Alexey Miller, the chief executive, called the shale-gas boom a "myth". Of late, however, Mr Putin appears to have woken up. He admitted last year that there has been a "real shale revolution" and said Russia must find "mutually acceptable forms of co-operation" with consumers.

Gazprom's future may involve more robust competition even at home. Two domestic rivals have emerged: Novatek, a gas producer part owned by Gennady Timchenko, an old acquaintance of Mr Putin's, and Rosneft, a state-owned oil firm led by Mr Putin's trusted adviser, Igor Sechin. Put together, non-Gazprom firms now account for a quarter of all Russian gas production.

The Kremlin is likely to react defensively to pressure from hard-bargaining European customers and regulators. It may opt to shelter Gazprom at the expense of Novatek and others. But the overall message is clear: Gazprom cannot count on its gilded position lasting forever. That means it must think about what sort of company it will be in the years to come. If things don't go Gazprom's way, it can still threaten to withhold supplies. It hopes to avoid such a scenario, says Sergei Komlev of Gazprom's export division, but the company

"has the right not to deliver gas if we don't like the price."

Gazprom badly needs to find two things: new sources of gas, and new markets. Neither will be easy. Its gasfields are running down. The International Energy Agency reckons Russia's gas producers must spend \$730 bn by 2035 merely to replace most of their current production of 655 bn cubic metres a year. But much of Gazprom's 35 trillion cubic metres of reserves are in barely accessible places such as the Yamal Peninsula, the Far East and Eastern Siberia. Gazprom will have to pay much more to get this gas out of the ground.

Natural gas export revenues are also currently in question. With alternative natural gas supplies coming online for Russia's largest consumer, Europe, the Kremlin has been forced to lower its prices in recent months. This year, Gazprom expects to give European consumers \$4.7 bn -- approximately 10 percent of Gazprom's net revenues -- in rebates due to price cuts.

Moreover, Europe's dependence on Russian energy is decreasing. The natural gas shortages experienced throughout Europe during the Russian-Ukrainian crises of 2006 and 2009 were a stark reminder of how vulnerable European nations were because of their dependence on Russian natural gas exports. Both unilaterally and through the European Union, European countries began developing strategies that would allow them to mitigate not only Europe's vulnerability to disputes between Moscow and intermediary transit states, but also its general dependence on energy from Russia.

The accelerated development of new and updated liquefied natural gas import facilities is one such effort. The development of a pipeline project that would bring non-Russian Caspian natural gas to the European market is another attempt -- albeit less successful so far -- to decrease European dependence on Russian natural gas.

Additionally, a set of EU-wide policies, including the Third Energy Package, has begun giving EU member nations the political and legal tools to mitigate Gazprom's dominance in their respective natural gas supply chains. This common framework also allows European nations to present a more unified front in challenging certain business practices they believe are monopolistic -- the latest example being the EU Commission probe into Gazprom's pricing strategy in Central Europe.

This, coupled with the EU-funded efforts to physically interconnect the natural gas grids of EU members in Central Europe, has made it increasingly difficult for Russia to use natural gas pricing as a foreign policy tool. This is a major change in the way Moscow has dealt with the region for the past decade, when it rewarded closer ties with Russia with low gas prices (as with Belarus) and increased rates for those who defied it (the Baltics).

Russia is increasingly looking to the rapidly developing Asian region to diversify



its export markets and develop its own remote eastern regions, should challenges in the European market continue intensifying. One aspect common to all the strategies Russia is set to pursue for the next decade is the high capital needed to complete them; the Eastern Siberia-Pacific Ocean oil pipeline alone is set to cost nearly \$15 bn. Despite the effects of the financial crisis in 2009, Russia still has vast capital reserves earmarked for these large-scale projects, but these funds are not infinite.

The country's ambitious plans require an amenable business environment capable of stimulating massive investment, but long-term confidence in Russia's policy stability remains elusive. The new gas production coming on-stream soon in Azerbaijan, Turkmenistan, Australia, Tanzania, and East Mediterranean may further aggravate the gas glut problem for Gazprom, drive the prices downwards, and change the geopolitical dynamics.

***Europe cannot be ruled out from the new dynamics.*** EU nations will be left far behind the US unless they address high energy costs that are worsening the continent's industrial decline. As EU industrial output declined, the US has been re-industrialising with the help of a cheap-energy boom following the exploitation of shale gas. Some industry, especially the chemical sector for which gas is a feedstock as well as an energy source, has been relocating to the US to take advantage of it.

The Commission has said natural gas prices in the EU are roughly four times higher than in the US. The gap could narrow, especially if the US exports more, but that is complicated in terms of domestic politics. EU leaders held a summit to focus on energy earlier this year when they acknowledged it would be hard for the EU to match the US shale gas revolution because of different geology, land ownership and environmental concerns.

Economic problems in the EU are also reflected in declines in energy consumption. Eurostat reported that gross inland energy consumption declined 6 percent from 2008-11. A modest uptick in consumption was reported in 2010 with 1.76 bn tons of oil equivalent but declined in 2011 to 1.70 bn tons.

Europe is missing out on the natural gas boom that is transforming energy use in the US and Asia, instead burning cheaper, dirtier coal imported from America. A European boom in shale gas extraction remains highly unlikely in the near future due to low levels of support among politicians and the public. Bulgaria and France have banned exploratory drilling that employ controversial hydraulic fracturing technology.

While the shale gas development has been much contested in many European states, low gas prices have continued in the US. If this is the case, the economic impact of the unconvensionals could be felt in two ways: Firstly, as a pressure on the gas prices in the European market, and consequently it would also add pressure on the existing long-term contracts with price indices that do not reflect changes in market prices for natural gas. Secondly, due to the relatively cheaper gas of the US, some large gas-consuming companies are



considering building their new industrial sites in the US, leading to lower demand for natural gas in Europe.

Nuclear is another issue that has changed significantly, which has lost importance, although many European countries have taken nuclear as part of the solution for climate change equation. A declining economic outlook for Europe, however, has also slowed down the progress of developing new nuclear projects. With shale gas becoming more available in the US, the coal exports to Europe have increased significantly from 2010 to 2013. The US continues to become a global coal supplier, especially to Europe.

The following issues require actions to be taken.

- First, regarding renewables, some renewable energy producers are in economic trouble because of the economic downturn and retroactive cuts of the European promotion schemes such as feed-in-tariffs. These schemes should be more aligned with each other and with the internal European market.
- Second, as far as Russia is concerned, it would be necessary to establish price-indexed formulas for natural gas imports without compromising the objectives of long-term gas contracts, i.e. to find a balance between competitive gas prices and secure delivery/supply- relations.
- Third, with regard to China, as it has become an enormous energy consumer (which affects European energy markets and prices), Europe must get ready for it by reducing the fossil fuel demand in the long term, this may be encouraged by a strong price signal for CO<sub>2</sub>.

Gas is becoming too expensive a fuel for Europe. With gas demand further down, it looks like the major producers will be compelled to agree to alternative pricing. More than half of Europe's supply of the fuel is bought through long-term contracts linked to the price of oil, and that will remain the case until 2014. (Please note that Brent crude has climbed 72 percent over the past four years).

Even after a wave of renegotiations, most prices for gas from Gazprom, which meets about a third of the EU's needs through contracts tied to oil, were revised down no more than 10 percent. Disputes remain with RWE, Germany's second-largest utility, and the Polish gas company known as PGNiG.

The planned construction of LNG export terminals in Australia and the US in 2015 should lead to an increase in the security of supplies to Europe but the overall positive effect on European prices is questionable as LNG is more expensive than pipeline gas. LNG prices must fall if it is to be affordable for buyers in the EU, India and China. A price of \$9 to \$11 per mbtu is needed if the fastest-growing consumers are to be able to stop subsidizing the fuel.

***Energy trading flows shift to East Asia.*** Evolving demand and supply

patterns will open the door for increased global trade opportunities. Around 2030, the nations of North America will likely transition from a net *importer* to a net *exporter* of oil and oil-based products. The changing energy landscape and the resulting trade opportunities it affords will continue to provide consumers with more choices, more value, more wealth and more good jobs.

The trade patterns have already considerably changed in world energy. Over the last decade, relations between the Gulf Co-operation Council (GCC), East Asia and India have intensified as trade among the regions becomes important. East Asia now accounts for over 57 percent of all the GCC's external trade, supplanting falling trade volumes from Western countries. East Asia and India are already considerably dependent upon the GCC for their oil and natural gas needs. Strong economic growth in the region will ensure that this hydrocarbon dependence increases, creating the potential for a gradual geopolitical shift on the part of the GCC member countries towards East Asia and away from the West.

The Gulf region is already reorienting its oil and natural gas exports away from Western markets towards emerging markets in Asia. Reliance on Asian markets as a destination for exports will grow as the US shifts to energy self-sufficiency. As the US demand for GCC natural gas and oil exports wanes, the importance of Asian markets to the region will grow.

This trend has combined with the global financial crisis (and the subsequent sharp drop in energy demand from industrialised countries) to cause oil producers to shift their exports away from the West and towards Asian markets: China's increasing demand for GCC oil and natural gas is unlikely to taper off for at least the next two decades, and provides a dependable market for exports due to expected high economic growth rates. These shifts will lead to a strengthening of GCC-Asia strategic ties more broadly.

For example, a quarter of Iraqi oil, about 2.5 mn barrels a day, will be heading for China by 2035. Saudi Arabia is now a major supplier to Beijing. This relationship is part of a shift that is tipping the balance of power in the energy world. As its oil demand grows and its own reserves deplete, China is becoming increasingly dependent on crude imports from the Middle East. That is coinciding with an equally historic process in the western hemisphere – North America's gradual transition towards self-sufficiency in energy and its waning reliance on imported oil.

Out of the approximately 13 mbd of crude oil produced by the GCC, about two-thirds are exported to the Asia-Pacific region. South Korea and Japan are the most heavily dependent on Gulf crude, and currently receive 70 percent and 80 percent of their oil imports from the GCC, respectively. China imported over 36 percent of its oil from the Gulf, while Gulf oil exports comprised approximately 45 percent of India's oil. Oil exported from Saudi Arabia to China and India consisted of 20 percent and 19 percent total oil imports, respectively.

Overall trade between the GCC and East Asia (South Korea, Japan, Taiwan, China) grew from \$480 bn in 2008 to \$814 bn in 2012, nearly doubling in four years. While the US and the EU together accounted for about 85 percent of trade with the GCC in 1980, this number had shrunk to 21 percent by end-2012. During the same period, total trade with Asia grew to 57 percent by the end of 2012, up from 10 percent in 1980.

Some projections indicate that up to 90 percent of GCC oil exports could be destined for India and China as these markets mature. Chinese demand for oil is projected to grow by 3.6 percent annually between 2012 and 2030, and by 1.29 percent between 2030 and 2040. Indian demand for oil is expected to grow by 2.6 percent per annum between 2012 and 2040.

By contrast, Japanese oil demand has been declining since 2005, due to government efficiency targets, movement toward alternative fuel sources, and an ageing population. Although the Fukushima disaster seems poised to move Japan incrementally away from nuclear energy, Japan's oil consumption is still projected to shrink annually by 0.4 percent between 2012 and 2040.

Cross-border investment between East Asia (led by Japan, South Korea and China) and the GCC (led by Saudi Arabia and the UAE) has grown along with rising Asian demand for GCC hydrocarbons, and many investments revolve around energy projects to ensure market access for East Asian countries.

Further evidence of the Gulf's orientation eastwards is evident in Saudi Arabia and Kuwait's funneling of investments into refineries located in China, Indonesia, Vietnam and India, where consumption of GCC hydrocarbons and petrochemicals is expected to continue rising. In 2012, Kuwait Petroleum Corporation and Sinopec agreed jointly to develop a 300,000 b/d full-conversion refinery and petrochemical project in China.

***Geopolitical tensions are on the rise and point to confrontation.*** Energy has long been a major determinant of the international system. Energy transitions have historically been accompanied by shifts in the distribution of global power. Today, while the world holds vast reserves of oil, there are legitimate concerns about the ability to access and develop these resources due to factors such as political instability, resource nationalism, and limited capacity of the industry.

The transfer of power from West to East has now become a cliché and is quickly gathering pace. As a result, not only the game itself, but also the players and rules of the game in energy have been changing. In this process, the Gulf is poised to become one of the key players and influencers, particularly as far as the shaping of the global energy game is concerned.

Let's not forget: major shifts of power between states, not to mention regions, occur infrequently and are rarely peaceful. In the early twentieth century, the

imperial order and the aspiring states of Germany and Japan failed to adjust to each other. This conflict resulted devastated large parts of the globe. Today, the transformation of the international system will be even bigger and the rising new powers are nationalistic, seek redress of past grievances, and want to claim their place in the sun. Thanks to the fruits of globalisation, more people now have microwaves to power, cars to fuel and houses to heat.

Another facet of the new geopolitics of energy is the looming prospect of a scramble for control of the Earth's remaining resource deposits; the Arctic's emerging significance is evidence of this. The Arctic is widely believed to hold the Earth's sole remaining significant deposit of untapped hydrocarbon reserves. Furthermore, given the rapid thinning of the Arctic shelf due to climate change (easing access to the Arctic's hydrocarbon 'riches'), competition over the region is becoming fiercer.

The stakes are high in the region, with Russia, Canada, the US, Norway and Denmark jostling for what they regard as their sovereign piece of the Arctic pie. True to its Petrostate form, Russia is leading the Arctic carve-up, with firm rhetoric proclaiming its ownership of the region. In 2007, Russia confirmed global fears by sending a nuclear powered submarine to plant a Russian flag on the Arctic seabed. The region is slowly emerging as a geopolitical flashpoint.

The new geopolitics leaves us to question whether we can expect global conflict or cooperation over energy, given that the temptation of governments to resort to military force to secure the world's diminishing natural resources will surely grow.

The 2008 Georgian war, where Russian troops invaded sovereign territory, highlighted the primacy of Russia's ambitions over international law. The 2006 Russian-Ukrainian gas 'war' highlighted the new rules of the energy game and the new geopolitics of energy in action. It is vital that the world comes to terms with them.

It is not only resource-rich countries that are gaining the upper hand in the new energy game. Industrialized importing countries are also resorting to what is called "economic patriotism" to protect their strategic sectors. The expansion of government-owned companies from hydrocarbon importing developing countries such as China and India into oil and gas exploration activities on a global scale is gaining added momentum.

The uneven distribution of energy resources among countries is a constant source of friction, giving rise to significant vulnerabilities such as the ones that occur in the Straits of Hormuz, the Malacca Straits, the East China Sea, the Caspian Sea, the KRG vs. Baghdad, and the Eastern Mediterranean as well as the domestic instabilities triggered by the Arab spring, the Nigerian labour strikes, the attacks in Algeria, the breach of contract sanctity in Kazakhstan and the ongoing Iraqi unrest). They all vividly illustrate how the above-the-ground factors could inhibit the hydrocarbon development.

Signs are in favour of more confrontation than collaboration, particularly over resources as the gap between supply and demand widens. Additionally, most resource-holders want to change the balance of interests with international extraction companies in order to maximize their gains through the so-called “resource nationalism”.

MENA and Gulf region are the most affected parts of the world from the geopolitical game in energy. Estimates of oil and gas reserves as a percent of the world total are highly uncertain – and are changing rapidly as more unconventional sources of oil and gas come to play a far greater role in global supply.

Three of the world’s top 10 producers of oil are located on the peninsula – Saudi Arabia (1), the United Arab Emirates (7) and Kuwait (9). According to reserves data from the US Energy Information Agency and the Central Intelligence Agency, as of May 2013 Saudi Arabia had the largest proven oil reserves of any country in the world, with 267.91 bn barrels or 18.17 percent of the world total. Kuwait (104 bn barrels) and the UAE (97.8 bn barrels) followed with the sixth and seventh-largest proven reserves, comprising 7.05 percent and 6.63 percent of the world total, respectively. Iran has 154.58 bn or 10.48 percent; Iraq has 141.35 bn or 9.59 percent.

It estimated that the GCC states alone had 19.2 percent of the world oil reserves versus 9.1 percent for Iran and 8.7 percent for Iraq. Some estimates put the GCC shares of the world’s proven conventional oil reserves as high as 45 percent, with the potential to rise steadily in the future. □

The region also has key natural gas producers – namely Qatar and Saudi Arabia. The BP Statistical Review of Energy for 2012 estimates that the GCC states have 20.4 percent of world gas reserves versus 15.9 percent for Iran and 1.7 percent for Iraq. Some estimates indicate that the GCC has 17 percent of the world’s conventional gas reserves. In terms of proven reserves of natural gas, Qatar has the world’s third-largest and Saudi Arabia the fourth-largest – 12-13 percent and 3.9-4 percent of the world total, respectively.

Over the past two years, mass protests have challenged regimes in almost every Arab country, but the results thus far have been highly uneven. In the short-term, the prospect that Egypt or any other country in the Arab world will successfully transition to democracy remains highly uncertain; the forces unleashed by the Arab Uprisings will continue to create enormous political and geopolitical turbulence for years to come. Under most plausible scenarios, Syria will be a gaping security hole in the heart of the Levant for years to come — Western nations will be hard-pressed to heal regardless of the level of intervention.

Iran has a long-standing ambition to be the regional super power. From

the Gulf into the Levant of Syria and Lebanon, and beyond even into Libya. And anywhere where there are Shia populations. Some Arab Heads of State call Iran "Persia" in recognition of this historical fact. This ambition brings them up against both Saudi Arabia and Egypt in particular. Iran cannot be ignored and if we do so, we do at our peril.

Iran's nuclear programs are only part of the story and one that many of our allies and security partners in the region see as less important than the other Iranian threats they face. The Arab Gulf states, Jordan, and other regional powers are at least as concerned with the build-up of Iranian asymmetric warfare capabilities, Iran's long-range rocket and missile capabilities, and the prospect of some form of major clash or war in the Gulf.

They are concerned about US resolve and willingness to maintain its forces in the Gulf to help them deter and defend against the other military threats Iran poses. They are worried that the US might reach an agreement with Iran over its nuclear weapons that will sacrifice their security and leave them open to Iranian threats and intimidation. They - and nations like Israel and Turkey - are equally concerned that the US has failed to take any meaningful stand against the role Iran is playing in Syria, its ties to the Hezbollah, and its role in supporting Shi'ite dissidents in Bahrain, Saudi Arabia, and Yemen.

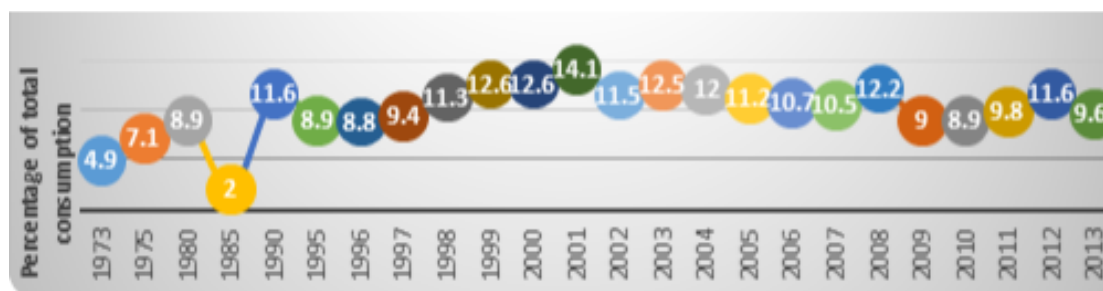
They are particularly concerned over the near collapse of meaningful US influence in Iraq and the threat Iraq will become an Iranian sphere of influence or a near-permanent source of extremism and Sunni-Shi'ite tension.

Some of their fears and concerns are exaggerated, but the new strategy the US announced in January 2012 has recognized the reality that they are critical security partners at a time the already limited capability of British and French power projection forces, and gave Middle East security the same priority as the rebalancing of US forces from Europe to Asia.

Since the beginning of the recent oil and gas boom in the US, it has become an article of faith among many foreign policy experts that reduced US dependence on imported oil will erode its interest in the Middle East and North Africa region, and as a result perhaps lead to gradual reduction in its military presence in the region.

Contrary to popular belief, the US is *not* dependent on the Persian Gulf for oil and has never been so. The region currently supplies fewer than 10 percent of US oil demand, and as Figure 1 shows, never in history has the number surpassed 15 percent. In fact, most of US imports come from the Western Hemisphere.

*Oil Imports from the Persian Gulf 1973-2013 as a Percentage of Overall US Consumption*



Source: US Department of Energy

The US is therefore much more dependent on the fluctuation of prices that may have roots in the Middle East than the oil itself. Oil being a fungible commodity with a global price, spells of political instability in the region have global consequences, regardless of the physical exposure of certain countries to MENA crude. Even if the US were to become self-sufficient in oil, that self-sufficiency does not yield low prices.

US interests in MENA have to do with many factors. Of course, oil is one of them — and an important one — but geography, Cold War legacy, Israel, terrorism, religion, nuclear proliferation, and democracy promotion are some of the no less important factors guiding US thinking on the region. Any suggestion that US foreign policy is “all about oil” ignores the complexity and multitude of US interests.

When Saddam Hussein invaded Kuwait, Persian Gulf oil represented less than 5 percent of US oil consumption. Europe, China, India, Japan, and Korea are all importing more MENA oil than the US. In essence, US taxpayers subsidize oil protection services in the MENA region for the rest of the world, while their cars and trucks use the region’s oil the least.

The US could be pushed to reduce its military presence in the region as a result of two factors: either deep cuts in the defense budget, or a shift in global priorities toward other troubled regions, but not due to a change in its energy portfolio. There are at least three good reasons to assume continuous US military commitment to the Middle East, even in the event of energy self-sufficiency:

- First, with Asia’s growing dependence on MENA energy, a US pull out from the region would essentially open the door to a stronger Chinese and possibly Indian and Russian military presence in the region, an outcome not viewed as being in US strategic interests.
- Second, a sharp increase in US energy production would strengthen the US’ economy, bolstering its currency, reducing its debt, and improving its balance of payments in ways that would allow it to maintain its military budget and hence its presence in the region. In the past four decades, due to the sharp rise in oil prices, the ratio between the cost of oil imports and the defense budget has been shrinking. This means that any policy that could reduce the financial burden of oil imports on the US economy might free up

resources and reduce the need to cut defense expenditures.

- Third, the US exports aerospace and defense products to the tune of \$100 bn per year, and more than half of the products go to MENA countries. The centrality of aerospace and defense industries to the US economy means that the US remains engaged in the markets where its products are needed most and where the strongest growth in demand is likely to be.

What if Washington and Tehran became closer? How will that influence the security of the Gulf nations? This question could be considered of timely importance due to the various positive communiqués between President Obama and his Iranian counterpart Rouhani that have been taking place since the election of the latter. But even without those communiqués going back and forth, Gulf citizens should be seriously engaging in public discussion about the meaning of normalization of relations between Tehran and Washington.

All signs point to the inevitability of such an outcome. America knows that – in Reagan’s words – “without Iran’s concurrence, there can be no enduring peace in the Middle East.” And he was not only speaking of the Iran-Iraq war. Also, as China seeks to find a place in the Gulf, its only access will be through an alliance with Iran. Something the Americans – and Russians – may not welcome. Thus, one may expect America to make efforts and pull Iran back from getting too close to China than it already is. Iran also knows that its strategic interests – economic and security – are with better relations with America.

So it is only a matter of time, the main question here would be: Is this a threat for the Gulf countries?

Iran has the fifth largest oil reserves and the second largest gas reserves in the world. In addition to these resources, Iran has a population of 70 mn, 65 percent of whom are under 30 year-old and are comparatively highly educated. These combined elements give the country the potential to be a major player in both the security and development of the region. Iran's geographical location makes the country strategically vital. From the south, the Arabian Gulf with its close proximity to the Indian Ocean Region and to the north, Central Asia. This means that Iran forms a geographic ‘corridor’ between Europe, Africa, South Asia and South East Asia.

More recently, in response to Iran’s perceived hegemonic and nuclear ambitions, the Sunni Gulf monarchies have moved toward tighter security cooperation, resulting in military intervention in Bahrain, political intervention in Yemen, and support for the armed opposition in Syria. The Arab Spring has also produced acute anxiety among Gulf autocrats, including exaggerated perceptions of Iranian-backed subversion, contributing to deepening sectarian rhetoric and tensions further.

Complicating this bipolar picture, however, has been the emergence of a third



pole created by the Arab Uprisings: a populist Sunni Islamist trend, dominated by the Muslim Brotherhood and other Islamist parties and their backers in the region, most notably Qatar and Turkey. This third grouping has attracted energy from both the “resistance” and “moderate” camps. Hamas, a long-standing member of the resistance, has left Damascus, moving into the orbit of Cairo, Doha, and even Ankara.

More broadly, opinion polls across the Arab world demonstrate that the rise of Arab nationalism and populist Sunni Islam has undermined the “soft power” appeal of Iran and its allies in the region. Yet, at the same time, the emergence of this new tri-polar order has also aggravated tensions within the moderate camp. Egypt, the region’s most populous state and a traditional diplomatic champion of initiatives favored by the West, has been transformed into an extraordinarily unpredictable actor.

Sharp disagreements have also emerged among a number of the region’s Sunni states. Most notably, conservative powers Saudi Arabia and the UAE have worked to undermine the Muslim Brotherhood in Egypt, while Qatar has provided Cairo with billions of dollars in assistance. And to counter Qatari and Turkish support for the Brotherhood and more radical Islamist groups fighting in Syria, the Saudis and Emirates have thrown their financial and military backing behind competing elements of the Syrian opposition.

In principle, the security of the Gulf States, the stability of the region, oil flows and economic development are much better served by normal relations with Iran. But the Gulf States know that they cannot fully normalize with Iran, unless the US also takes steps towards such normalization. Thus, such news should sound favorable to Gulf ears and they should welcome such a step and not consider it a threat, rather a condition for more stability and security.

The six Gulf States perceive the security threat from Iran differently, thus the response to a potential normalization of relations between Iran and the US would also be different in each Gulf state; and the difference is mainly related to the degree a Gulf state has security interests in the region.

Since his election, Rouhani has insisted on the need for improving relations with all the Gulf States. Skeptics are quick to point out that such statements are mere courtesy and that Iran is controlled by radicals who still believe in exporting the revolution in one form or another. Skeptics also remind us of the Khatami era and how his moderate stances were made obsolete due to the control of the radicals on Iranian foreign policy. But this way of approaching the matter over simplifies the way Iran acts in the international arena. It also overlooks important events indicative of possibilities for the future.

In the 1990s, the regional balance of power and network of alliances was shaken due to Iraq’s invasion of Kuwait. This allowed the Saudis and the Iranians to initiate good relations. But there was a limit to where they could reach due to two barriers: the US and Iranian regional interference. The US is

pivotal to Saudi security and thus the Saudis cannot go too far with a country that is hostile to the US. They can however create amiable relations as long as the opposition to the US is not polarizing.

On the other side Iranian security vis-à-vis the US depends on its control of pockets of influence in the weak countries of the region such as Lebanon, Somalia, Sudan and Yemen; which in turn has been a threat to regional stability and Saudi security. In other words Iran's quest for security depended on activities, which threatened the security of Saudi Arabia creating a second barrier for Saudi-Iranian normalization.

So, if the antagonism between the US and Iran had created conditions for a certain kind of Iranian security policy which was not in the interest of Saudi Arabia and other Gulf countries, then positive steps between the US and Iran will create new conditions leading towards a different sort of Iranian behavior. It may even be inducive to an Arab-Israeli peace treaty, something all the Gulf States want to see happening.

Today, we are back in a situation, which resembles the 1990s. There is readiness on all sides for better relations. This does not mean that it will happen quickly. There are too many issues that need to be solved: too much insecurity to be managed, a lot of mistrust to be tackled and many potential risks that need to be understood. In 1998, Secretary of State Madeleine Albright called on Iran "to join the US in drawing up a road map leading to normal relations," that call wasn't heeded then, maybe now, 15 years later, the call should also include the Gulf States. The call should be for a road map leading to regional stability, drawn by the US, the Gulf States and Iran.

### *Weakening US-Gulf energy ties*

The aftermath of the "Arab Spring" and Washington's abandonment of longtime proxies such as Egypt's Hosni Mubarak has left some governments keen to find alternative allies. Even longtime US partners feel the draw.

Upset at President Barack Obama's policies on Iran and Syria, members of Saudi Arabia's ruling family are threatening a rift with the US that could take the alliance between Washington and the Kingdom to its lowest point in years. Saudi Arabia's intelligence chief Prince Bandar bin Sultan is vowing that the Kingdom will make a "major shift" in relations with the US to protest perceived American inaction over Syria's civil war as well as recent US overtures to Iran.

Furthermore, the growth in shale gas and shale oil production in the US changed trade pathways between the GCC and the West, but does not eliminate their special strategic relationship. If projections prove correct and the US becomes energy self-sufficient by 2030, then at least one strategic pillar of US interest in the region will erode.

Recently, fears over regional instability due to the Arab uprisings have

contributed to an increased 'fear premium' for oil, thereby injecting significant volatility into the market and pushing the international oil price upward. Over the last two years, Saudi Arabia has adjusted its daily oil production in order to help stabilise fluctuating prices, fearing that rising prices may encourage oil importers to look to alternative fuel sources.

	Rank	% of total GCC trade	Total GDP (\$ trillion)	Global Ranking by 2012 GDP	Global Ranking by forecast 2030 GDP
Japan	2	12.1	5.9	3	4
India	3	10.8	1.8	10	3
China	4	10.8	8.2	2	1
South Korea	6	8.2	1.1	15	14

### **The GCC's main Asian trade partners, 2012**

Relations between the GCC and East Asia are dominated by each region's economic powerhouses, Saudi Arabia and China. China is the largest economic partner for GCC member states, and Saudi Arabia has the largest oil reserves and exports. China generally deals with GCC states bilaterally and rarely as a single bloc. However, there are signs that China is seeking to strengthen diplomatic ties through economic relations with the GCC as a whole.

Talks between China and the GCC on a free trade agreement, which have been beset by hurdles since they began in 2004, seem to be nearing an end, with both Chinese and GCC officials indicating that the deal could be signed this year.

Diplomatic ties between China and the Gulf have picked up significantly in the past decade, with notable visits by high-ranking dignitaries. King Abdullah of Saudi Arabia's first tour outside of the Middle East in 2006 was to discuss energy ties with former Chinese President Hu Jintao in Beijing. Hu paid two visits to Saudi Arabia during his tenure. There have been several high level visits between the UAE and China, culminating with several presidential visits.

China will continue to be the dominant economic partner in the region, through additional investment in GCC economies and increased access to the Chinese market for GCC investors, such as in refineries and major petrochemical projects.

Longer term, China may need to step up its naval presence in the region. Presently, US military forces serve the dual role of providing both internal and external stability for GCC regimes. Their presence acts to protect GCC states from the perceived threat from Iran and ensures that shipping lanes remain open to bring GCC energy to world markets. According to the EIA, the US received a total of 20 percent of oil imports from the Gulf in 2012, with 13 percent coming from Saudi Arabia, which indicates that the region will remain important to US direct oil needs in the medium term.

However, in the long-term, if the US shifts its military focus away from the Gulf, as the recent 'pivot' to Asia implies, China could represent another military power to secure sea-lanes, assuming Beijing continues the rapid increases in naval spending of the past two decades. Additionally, any decline in the US military presence in the Gulf may encourage China to invest heavily in naval forces to protect its access to resources and global markets.

China's likely sale of sophisticated missiles to Turkey over the objections of its NATO allies might have angered Washington and other capitals, but it should not have been a surprise. Even as the US has spent tens of billions of dollars and lost hundreds of lives in Iraq and Afghanistan, Beijing has been quietly upping its presence in the Middle East.

Although China's naval power is increasing, it remains far from competing with the US forces in the region. China does not yet possess a 'blue-water' navy, nor does it maintain any military naval bases in the GCC. There are political interests in Beijing that favour allowing Washington to foot the bill for securing Gulf sea-lanes.

Yet its presence further afield has also grown; in 2009, Beijing deployed naval forces to the Gulf of Aden following attacks on Chinese shipping vessels by Somali pirates. Additionally, in February 2013, Pakistan granted China the rights to the Gwadar Port Facilities. Lying approximately 300 miles from the Strait of Hormuz, Gwadar promises China greater access to shipping lanes frequented by tankers and could thus enhance Chinese influence in the Gulf region.

Beijing's economic, political and diplomatic clout, however, is growing fast. China's Ministry of Commerce said China-Arab nation trade now reaches \$222 bn a year, 12 times its 2002 level. That would outstrip US-Mideast trade, valued at \$193 bn in 2011.

Militarily too, China's footprint is rising. As well as maintaining a three-ship antipiracy task force in the Indian Ocean and occasionally sending ships to the Mediterranean, Beijing has deployed UN peacekeepers to Lebanon. Turkey's choice of a \$3.4 bn deal to acquire the Chinese FD-2000 missile defense system rather than rival US or European systems may be a sign of things to come.

The IEA expects China's Mideast oil imports to grow from 2.9 mb/d in 2011 to 6.7 mn in 2035, a projected 54 percent of total Chinese oil imports. Already, Chinese national oil companies are amongst the biggest players in Iraq and Iran and Beijing is both Saudi Arabia's largest trading partner and the biggest single purchaser of Iran's crude. That purchasing power has effectively allowed China and other Asian powers to determine how successful US and European sanctions on Iran over its nuclear program can be.

In the long run, some analysts suggest Beijing's oil needs could actually bring

it closer to the West, particularly on Iran. The Stockholm International Peace Research Institute says Chinese defense sales to Tehran have already notably fallen.

If Washington (were to) substantially reduce its military presence in the region, oil security concerns might compel Beijing to play a larger role in defusing the primary threat to the free flow of oil - the closure of the Strait of Hormuz. China's regional ambitions, however, go well beyond defense deals and oil. While some 75 percent of US-Mideast trade remains energy-related, China has deliberately diversified and says more than half its regional trade is now non-energy.

Infrastructure projects have been a major focus. Port operator Cosco owns part of Egypt's Port Said container terminal. Rail ventures include Medina to Mecca in Saudi Arabia, Mediterranean to Red Sea in Israel and Ankara to Istanbul in Turkey. In the longer term, there is also talk of linking Turkey and Central Asia to China by rail, providing Chinese goods access to Europe through what some analysts call "a new Silk Route".

Ultimately, Chinese investment may prompt the kind of backlash already seen in Africa. Its attempts to befriend everybody may also prove unsustainable - its stance on Syria has already irritated some Gulf States and prompted an angry protest at its embassy in Libya. For now, however, it remains broadly welcomed.

## **Key Messages**

- *As a result of the powershift and game-changing developments, the world energy has gone through considerable alterations, with new players joining the reset game and laying down different rules.*
- Current political factors, such as the Iranian ambition to dominate the region, the US policy of the New Middle East, and the ambiguous outcomes of the Arab spring, have served as pressing incentives for the rulers of the GCC to abandon their own separate interests and adopt political and economic reforms that lead to real development and integration and maintain a safe future for GCC nationals and for rulers.
- No one can deny the importance of trying to end Iran's search for nuclear weapons. Even the most effective US preventive strikes will leave a heritage of tension and confrontation in the Gulf that is likely to mean a continuing arms race and constant risk of some clash that will affect the flow of Gulf oil and the global economy. If Iran persists and actually arms its missiles and aircraft, it will trigger a nuclear arms race with Israel, push Saudi Arabia towards seeking nuclear weapons, and confront the US with making good on its offers of extended deterrence.
- *For all the talk of US energy independence, the Department of Energy does not project independence from the imports of liquid fuels its transportation sector needs to operate, that it will pay world oil prices in crisis,*

and Washington is becoming steadily more dependent on economic ties to an Asia that is becoming steadily more dependent on Gulf oil.

- At a minimum, we need to treat its security partners in the Gulf and the rest of the Middle East as real partners. To fully explain its negotiations with Iran, to make it clear there will be no deal at their expense, and that it will not focus on the nuclear issue alone. In practice, Washington also needs to make it clear that US forces and security guarantees will continue regardless of any new US agreement with Iran, and that it fully recognize their fears and concerns.
- While the age of “cheap oil” may be ending, it is still uncertain what the future level of oil prices might be. Technology may turn today’s expensive oil into tomorrow’s cheap oil. The oil market will remain highly volatile until 2015 and prone to extreme movements in opposite directions, representing a challenge for investors. After 2015, however, most of the oil exploration and development projects analyzed in the report will advance significantly and contribute to a shoring up of the world’s production capacity. This could provoke overproduction and lead to a significant, steady dip of oil prices, unless oil demand were to grow at a sustained yearly rate of at least 1.6 percent through 2020.
- There are several changes in the energy resources map that could play a role in reshaping MENA geopolitics. Among them is the discovery of vast natural gas reserves in the Eastern Mediterranean and the construction of new energy corridors to circumvent the Strait of Hormuz.
- However, the boost in US oil production is not one of them. The Middle East will continue to exhibit chronic instability due to the rise of militant Islam, weapons of mass destruction proliferation, and the acute and deep-rooted rivalry between Sunnis and Shiites. Such challenges will continue to consume large parts of Washington’s attention and, at times, significant military resources. Europe’s preoccupation with its own internal economic challenges is likely to preclude a new transatlantic division of labor and new responsibilities for Europe in the MENA region.
- If there were to be a new division of labor, it is more likely to be between the US and major Asian clients of MENA energy. But a more likely scenario is that the North American energy boomlet will be a shot in the arm to the US economy and the harbinger of an industrial renaissance and increased prosperity relative to other parts of the world. Such an economic upturn is likely to make it easier for US leaders mobilize the financial resources and public support needed to address global problems. In short: a prosperous US means an omnipresent US.
- *Solutions favourable to the environment, such as photovoltaic solar energy, may have significant effects on price competitiveness. Other solutions favourable to supply security, such as using local coal, may not be favourable*

to the environment. Energy security and the environment can also come into conflict, such as when the power system relies too heavily on intermittent renewable energy sources. Foreign policy and energy security goals may also often come into head-on confrontation. There is no single ideal solution to achieve these energy policy goals, but at best an optimal mix of solutions.

- In the new, energy-centric world, the price and availability of oil and gas will continue dominating our lives and power will reside in the hands of those who control its global ownership, financing, production, transportation, and marketing of energy.

- *Shifting Market Has Geopolitical Consequences.* The US could conceivably produce up to 65 percent of its oil consumption needs domestically, and import the remainder from North American sources and thus dramatically affect the debate around dependence on foreign oil. However the reality will not change much, since there is one global oil market in which all countries are interdependent.

- A global oil market tempers the meaningfulness of self-sufficiency, and Canada, Venezuela, and Brazil may decide to export their oil and gas production to non-US markets purely for commercial reasons. However, considering the recent political focus on US energy security, even the spirit of oil self-sufficiency could have profound implications for domestic energy policy and foreign policy.

- While the unique conditions for the shale boom in the US cannot be easily replicated in other parts of the world in the short-term, there are unknown and untapped resources around the globe and the results of future exploration development could be surprising. This, combined with China's increasing influence in the Middle East oil realm, will continue to alter the geopolitics of energy landscape for many decades.

- *Oil Boom Must Trigger Environmental Action.* Unprecedented unconventional oil development comes with environmental protection and regulation challenges. Hydraulic fracturing is increasingly perceived as contributing to water and land contamination, causing natural gas infiltration into fresh water aquifers, and even triggering earthquakes. After more than one mn hydraulic fracturing operations in the US since 1947 (hydraulic fracturing is not a new technology) and comparatively few accidents, shale oil and gas recovery activity can be managed with appropriate best practices and adequate enforcement.

- Industry needs to develop technological solutions to minimize water use, minimize and report chemical use, and carefully monitor production sites. However, if such a collective effort by industry does not materialize, government may respond with more onerous regulation in the near future that could impact US shale oil production.

- Current climate policy conversations will certainly be influenced by the

unexpected surge in oil production capacity. Policymakers will have to address the potential environmental and climate impacts of a substantial increase in oil supply. Industry should also be prepared to make appropriately large investments in developing technologies that will reduce the environmental footprint of oil production and use.

- *Decision-makers face a multitude of choices and possible actions*, some of which will succeed through sheer market forces while others require coordination between market signals and policy frameworks. More than a decade into the new millennium, the Gulf States face many challenges, both old and new, in the management of their energy resources.
- The breakthrough of shale gas in the US exemplifies the market forces driver and the slow progress of energy efficiency measures, in a context where energy prices are subsidised, illustrates the potential role of policy drivers, or what can happen when the signals are not strong enough.
- Supply-based solutions form one important part of any national or regional energy solution for the Gulf States over the long-term. The diversification of the Gulf states' fuel base – towards renewables and, potentially, nuclear power – constitutes a major step which would be capable of reducing the region's dependence on its depletable fuel stock, and hence of prolonging the lifetime of these resources for future generations. Such a step would also establish an important, and currently under-utilized, opportunity – that of raising the region's profile as a modern energy technology hub along the entire energy chain.
- *The domestic price of US natural gas has collapsed, and the US is transitioning from a net gas importer to an exporter.* The decoupling of oil and gas prices offers a historic opportunity for the US to challenge oil's hegemony over the transportation fuel market. A variety of natural gas-derived fuels have arisen that will upset this balance: natural gas can be used directly as fuel in the form of compressed natural gas; it can be used to generate electricity, which can power pure electric vehicles and plug-in hybrid electric vehicles; and it can be converted to methanol, a liquid fuel that today sells for one dollar less than gasoline on an energy-equivalent basis and can power flexible-fuel vehicles that cost manufacturers an extra \$100 to make compared to gasoline-only cars.
- *Overcoming the Gulf states' long-term challenges* will probably also involve ending the long-standing laissez-faire in the region's domestic energy sector that has characterized most Gulf states' demand management policies for decades. More pro-active policies would include: a more comprehensive promotion and enforcement of energy efficiency and energy saving targets; increasingly systematic regulation of efficiency standards for technology used in the industrial, commercial, and household sectors; and – perhaps governments' most powerful tool in managing domestic demand in the long term – a gradual reform of the region's domestic energy pricing frameworks.
- Such a reform would include a reconsideration of domestic subsidy policies, their beneficiaries, and the way in which alternative measures such as



cash transfers and 'citizens' dividends' can help achieve the same objectives while avoiding the, by now, endemic waste of energy in many parts of the Gulf. Iran's 2010/2011 reform of domestic energy prices, coupled to an overhaul of social security and the reallocation of fiscal savings into the pockets of its citizens, demonstrates the feasibility and political benefits of reform efforts.

- Many of the Gulf States' lessons could be extended to other parts of the developing world, including their immediate neighbourhood, the wider Middle East. Reflecting shifting patterns in energy consumption and supply in the wider region, the Gulf States stand to gain and lose most from any upward or downward shift in accompanying regional energy policy.
- Even in the presence of proactive policy changes, the region is unlikely to reverse the existing shift in its role on international energy markets, away from being merely the world's most important supply source of oil (and potentially gas), towards being a rapidly growing demand centre for energy (which includes a probable rising reliance on imports of natural gas and, potentially, other sources of energy). None of this constitutes a crisis. It is, rather, a gradual evolution, which can be to the benefit, or the detriment of the Gulf economies.
- The shale technology has matured and is now spreading throughout the world to other countries in Europe and Asia with similar geological shale formations. With these developments, the US will be able to pit a cheap and abundant commodity against one whose price is inflated and controlled by a cartel. Outside the US, technologies to unlock even larger reserves of non-conventional natural gas such as methane hydrates are also making progress, and could create the same economic rationale to shift from oil to natural gas in China, Japan, and the EU.
- At this point, oil would be priced globally in relation to natural gas and other energy commodities from which transportation fuels can be made. Such commodity arbitrage will reduce the strategic status of oil and limit MENA countries' ability to manipulate crude prices through production cuts. The implications for the petrodollar-dependent MENA economies could be profound, and at the very least will require them to embark on painful political reforms and a fast expansion of the non-petroleum sectors of their economies. Even then, the convulsions the region will go through during this long transition period will be closely observed from the deck of a US aircraft carrier.
- *The Gulf's energy policy cannot be formulated and treated in isolation from a wider government vision.* It is closely related to taxation, environment, competition, industry and investment, trade policies, foreign policy and security strategy, and needs to be tackled in an integrated way. Most actions require a timeframe beyond the life of a government. Therefore, a non-partisan should embrace the opposition, private sector, civil society and international organizations, based on shared goals.
- Overall, the future of the Gulf as a gas-trading hub lies very much in the region's own hands. For such a hub to emerge will require the Gulf to opt for domestic market liberalization and the necessary physical and legal

infrastructure to be built without further delay.

- *The global game-changers in energy, particularly in relation to natural gas, will work to the benefit of the Gulf* if the right policies are put in place and prompt actions launched to lower the energy prices, raise funding from international investors, step up shift to smarter industries, focus on new technologies and innovation in cleaner energy, and pursue “soft” diplomacy in its geopolitical engagement with neighbours.
- Therefore, there is a pressing need to be proactive and forward-thinking for the Gulf region to preserve their significance in world energy and respond to domestic challenges effectively. If the Gulf is serious about reaching its strategic goals in all sectors, energy has to play a pivotal role in driving its reform and growth engine.