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**Towards A Lower Carbon  
Energy World:  
The Middle East Factor &  
Its Shift To Cleaner Energy**

By

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Although the world remains divided into a **paper economy**, a **dangerous element of casino capitalism** and a **real economy**, a division which I explained in my presentation to this prestigious Institute in May 2009, the global trend now is a shift to lower carbon energy. Many countries in the Middle East are shifting to cleaner energy for domestic use and it will not take too long for them to export cleaner sources of fuel and electricity and large volumes.

Before I go further into these developments, I would like to explain that this time, I am proposing to the Japanese Government and private corporations a re-engineering of the trade and business partnerships between Japan and the Greater Middle East (GME). The GME is a most vital part of the energy world as it stretches all the way from Russia to Pakistan and from China's Central Asian borders to the Mauritanian coast on the Atlantic.

My presentation concentrates on the reasons why leading Middle East exporters of fossil fuels are themselves shifting to cleaner energy for their domestic use, and I will present the models of Abu Dhabi, Qatar and Saudi Arabia - with emphasis on Abu Dhabi's Masdar-related projects (Masdar is the world's first zero-carbon city being built in Abu Dhabi emirate), Qatar's LNG/GTL and related ventures, and Saudi Arabia's investment in clean energy R&D and solar energy use (for domestic needs and export to Europe and other GME markets nearby).

These three models will have great impact on the future of the energy world. This is because already countries from Turkey to Egypt have seen their reserves of fossil fuels deplete rapidly in recent years and, as they have become net importers of energy sources, they are jumping on the golden opportunity to shift to low carbon fuels, energy conservation, energy efficiency, etc.

The Middle East's domestic oil demand has risen sharply and is expected to keep rising rapidly in the coming years. But these three model countries are intending to shift from fossil fuels to cleaner alternatives for their domestic use. This trend will spread quickly in all the major desert parts of the world, including China and India.

Turkey, for example, at the end of 2009 had remaining conventional crude oil reserves which could meet its domestic consumption for only one year and gas reserves enough for just two months. Turkey's recoverable reserves were at end-2009 put at around 39.4 million tons of crude oil and 6.1 BCM of natural gas. Turkey's crude oil consumption was put at around 31.1 million tons/year (t/y) and natural gas consumption at nearly 36 BCM/year.

The Turkish Energy and Natural Resources Ministry on April 8, 2010, unveiled a five-year strategic energy plan to the media and made these alarming revelations. The ministry said that, in 2010-2014, Turkey will spend US\$20 billion on renewable sources (renewables) and other alternative sources of energy, thus increase power generation using resultant domestic resources, diversify natural gas suppliers, increase the amount of crude oil pumped to Turkey's hub Çeyhan and begin construction of the first of its planned series of nuclear power plants by 2014.

In my proposal for re-engineering Japanese-GME partnerships covers a wide range of business opportunities in which Japanese technology and energy efficiency experience can be integral part of the partnership packages for each of the main GME countries. The business opportunities emerging from my proposed re-engineering process are huge. And the re-engineering concept which I have in mind is itself an initiative to re-energise the Japanese approach to global economics, global socio-economic inter-actions, G-20-induced reforms for the global economic order, etc.

In all this, I intend to share with the Japanese government private and corporations my 40-year experience in the energy world and in what can be gained from Japan's experiences in the energy fields, including such renewables as the new generation of nuclear energy plants, nuclear plants' safety methods, etc. Of course, I will leave this discussion to be made during the Q&A part of this meeting. And I shall be more than pleased to discuss things at greater length if any of you wish to pursue them after a leave Japan and you have my email address on this paper.

**The Global Petroleum Perspective:** Paper WTI is trading in a void which can eventually become as wide as more than \$100/barrel on one end and less than \$75/barrel at the other end. With prices of food and other commodities having gone up wildly in recent years, anything would be possible. Inflation is set to continue to rise, so will global protectionism.

As World War-II ended in 1945, no one thought that Japan's car-makers would conquer the US and the rest of the world. When it happened in the early 1980s, people wondered how soon South Korea would do the same; this has been happening since the late 1990s. Now the question is when China's car-makers will conquer the US and the rest of the world, and how soon India will follow.

The UAE Minister of Petroleum & Mineral Resources, Muhammad bin Dha'en al-Hamili on May 10 complained that OPEC members were not complying with their crude oil production quotas, contradicting other ministers who said adherence was good. "It could be better", Hamili said at an energy conference in Doha. His Qatari counterpart 'Abdullah bin Hamad al-'Attiyah, earlier on May 10 said he was "happy" with OPEC compliance, while the Chairman of Libya's state-owned National Oil Corp (NOC), Dr Shukri Ghanem, said: "It [compliance] is a little more than 50%". Dr Ghanem said: "OPEC compliance is like the price in the [paper] market fluctuating according to speculation - when the prices go up some people produce more and when it goes down they produce less".

When US the dollar rises, paper WTI falls, and vice-versa. The dollar is the main price mover for paper oil and other commodities. The paper economy and paper WTI are not affected by what OPEC does. The rules of the paper economy are different from those of the real one.

OPEC's 11 members abiding by the group's quota system have seen compliance fall since paper WTI staged a recovery in early 2009, dropping to 49% in April 2010 from above 80% in March 2009. Iraq is the only member outside OPEC's quota system.

According to an APS Energy Group report, OPEC's 12 including Iraq were in the first week of May 2010 producing 29.52 million b/d of crude oil, plus 5.9 million b/d of NGLs which are excluded from the organisation's quotas. OPEC-11's quotas for crude oil total 24.845 million b/d.

In its monthly report on May 11, OPEC raised its estimate of world oil demand growth in 2010 for a third successive month. But its figures showed economic recovery would not be enough to wipe out a supply surplus this year. It said demand would rise 950,000 b/d in 2010, 50,000 b/d higher than previously forecast. It said: "Overall, the recent signs of improvement in the global economy have been encouraging". But in view of current uncertainties, it said, the forecast for global economic growth in 2010 had been left unchanged at 3.5%. The IMF in April increased its forecast for global

GDP growth in 2010 to 4.2%.

OPEC said members' compliance with their individual output targets, with Qatar excluded, met only 51% of the targeted 4.2 million b/d cuts in April, down from 52% in March. It said in April total OPEC production including Iraq was 29.25 million b/d, showing 2010 a market surplus of over 400,000 b/d. Despite evidence of a market in surplus, paper crude oil prices in April averaged their highest level since September 2008, not once falling below the \$80/barrel mark. OPEC on May 11 said that, by then, the 2010 price of its reference basket of crude oils had averaged \$77.20/barrel, an increase of 64% over the same period last year.

While prices have generally been above the \$75/barrel level seen as necessary by the group to encourage investment, OPEC fears higher prices could significantly curb the world demand on which it relied for future revenues.

The global economic recovery was proportionally stronger in the financial and service sectors, with oil-intensive industries lagging, weakening the historical link between GDP growth and higher oil demand. On the other hand, OPEC said increased financial investment in oil and other commodities continued to support prices, though volatility in the market over the previous week had contributed to the group's complicated relationship with speculators.

Paper WTI climbed to a 19-month high of \$87.15/barrel in the first week of May, before falling by more than \$10/barrel as concerns over the euro-zone debt crisis rose. It said: "This strong volatility came despite the fact that crude [oil's real market] fundamentals remain relatively unchanged and thus highlight the continued impact of financial market sentiment on crude oil prices".

Paper WTI on May 11 fell to \$76.10/barrel on concern that Europe's bail-out of almost \$1 trillion may not be sufficient to end the region's sovereign debt crisis. Paper Brent for June was at \$79.35/barrel. WTI discount to Brent reflected the high inventories at Cushing, Oklahoma, which is the delivery point for the US light/sweet crude oil.

Paper WTI reversed an increase of as much as 0.8% after the euro dropped against the dollar and investors questioned whether the European plan will reduce deficits accumulated by Greece, Spain and Portugal. US crude supplies probably rose for the 14th time in 15 weeks, reinforcing concern that demand in the world's biggest consumer was lagging.

The previous NYMEX week in New York on May 7 ended with June WTI settled at \$75.11/barrel, down \$2 on the May 6 level and at a discount of \$3.16/barrel to June Brent which on the ICE futures exchange fell \$1.56 to \$78.27/barrel. In a four-day rout, which also hammered equities and currency markets, paper WTI lost \$11.08/barrel, 12.9%. June Brent lost 10.5% in that week, the biggest fall since late December 2008.

The June WTI settlement price on May 7 was at its lowest since Feb. 12. June WTI on May 7 was at a discount of \$3.4/barrel to July WTI – a steep contango, which made US fund/bank speculators, refiners and traders send more crude into storage in anticipation of selling at higher prices eventually. But the experts in paper oil were expecting front-month WTI soon to fall below \$70/barrel.

June WTI on May 6 had dropped \$2.86 to settle at \$77.11/barrel, a level not seen since Feb. 16, when it hit \$73.71/barrel, as the stock market plummeted. It was lower at mid-day and the price slide picked up speed as the stock market tanked. Investors flew to safer havens in gold and bonds. In London, June Brent fell \$2.78 to settle at \$79.83. The ongoing euro-zone crisis had strengthened the dollar.

Commodities priced in dollars, like oil, become more expensive for investors holding euros as the dollar rises. Efforts to stop the crude oil flowing up from a blown-out BP well at the bottom of the Gulf of Mexico (GoM) then was continuing. Crews on May 7 were to begin lowering a 100-ton concrete-and-steel box a mile below the GoM in efforts to cap the well. It was hoped the cap would collect as much as 85% of the oil gushing from broken wells after the Deepwater Horizon rig exploded on April 20 and sank. But by May 7, the oil slick from the well had not interfered with tankers delivering crude oil along the Gulf Coast.

US natural gas prices on May 6 fell as supplies continued to grow. In its weekly report, the EIA on May 5 said US gas inventories had risen 83 BCF to about 2 TCF in the previous week. That was almost 19% above the five-year average. On the NYMEX, natural gas futures on May 6 lost 6.2 cents to settle at \$3.929 per 1,000 cubic feet.

Gasoline futures continued to fall, however. In May 6 trading, gasoline fell 6.41 cents to settle at \$2.1563/gallon after shedding more than 10 cents on May 5 and about 11 cents on May 4. We had not seen a drop in gasoline prices like this since the second half of 2008. Gasoline prices reached levels which were eating into the consumer's ability to pay rents or mortgages, and the higher price was acting as a massive tax on the economy. In other NYMEX trading in June contracts, heating oil on May 6 fell 7.08 cents to settle at \$2.1137/gallon.

Crude oil stocks at Cushing by April 30 had reached a record of 36.2 million barrels, after a 1.6 million barrel rise in a week. US crude stocks had risen 2.8 million barrels despite American refinery utilisation rates of almost 90%, from about 80% of capacity in mid-March – although US crude imports had risen at the same time.

In Europe, gasoline prices had weakened as supplies had risen after refineries emerged from spring maintenance. Mediterranean demand was weak. In Asia, steady demand from India and Pakistan soaked up gasoil cargoes, which lent support to mid-distillate crack spreads. Ultra-low sulphur gasoil cargoes from Asia-Pacific could potentially move to North-West Europe (NWE), where the diesel crack spread to Dated Brent had firmed to a 2010 high of \$14.45/barrel. Heating oil crack spreads in Europe had reached their highest in over a year, as a result of firm Russian demand during the sowing season and lower supplies because of refinery maintenance”.

**Betting On Opportunity & Geo-Political Factors:** Yet big banks joining a long line of huge funds and other speculators Have been pouring unprecedented amounts of cash into oil and other commodities, betting on their own power to push prices up and on geo-political factors in the Greater Middle East (GME) and Africa. It was said in late April that alone Bank of America, Morgan Stanley, Goldman Sachs (GS) and JP Morgan had mobilised a total of \$4.683.9 trillion for the trade, mainly in paper WTI and some key fuels and gold. Goldman Sachs then predicted WTI will hit \$90/barrel in coming months. The others predicted an oil shortage in 2011 and WTI to hit \$110/barrel.

JP Morgan for example was said to have VLCCs and ULCCs filled with crude in the Mediterranean, NWE and the Far East. It was said these four US banks were together holding the equivalent of about half the amount of WTI stored in the American Strategic Petroleum Stockpile (SPR), plus a huge amount of gold, etc.

The Kuwaiti Oil Ministry's Assistant Under-Secretary and the emirate's Governor at OPEC, Nawal al-Fuza'ie, on May 4 warned paper crude oil could hit \$100/barrel if there were “dramatic developments” in the Persian Gulf or elsewhere. She said an escalation in tension between Iran and the West over the Tehran's nuclear ambitions, security developments in Nigeria and weather changes could push the price to that level. But she added that such a change in the factors would be temporary.

However, a top-ranking Saudi official on May 8 told APS that Riyadh and other OPEC members would “intervene immediately” if paper Brent were to hit \$90/barrel. He said OPEC could hold an emergency meeting ahead of its regular conference to deal with the matter if crude oil prices were to reach such a level.

Iran's Navy on May 5-12 held extensive war games in the Strait of Hormuz, a vital water-way through which 40% of the world's oil trade moves every day, after similar games held on April 22-25 by the ruling Islamic Revolutionary Guard Corps (IRGC). While experts in the six oil and gas-rich Arab Gulf Co-operation Council (GCC) states said the IRGC's were a rehearsal of a potential Hormuz blockade, Iran's Navy units on May 7 rehearsed a search of ships sailing through the water-way. These have been part of a series of manoeuvres and the test firing of a variety of missiles designed to show the West and the GCC region the might of Iran's military – both the IRGC and the regular armed forces.

Yet all these displays appear to be sending a Tehran warning against any Western or Israeli attack on

Iran. Iranian military and IRGC commanders have been stressing these displays were merely defensive, rather than preparations for aggression against any power or neighbour.

Apart from American-led efforts to secure a UNSC resolution for a fresh set of sanctions against Tehran's Shi'ite theocracy, the US Congress has prepared a bill for a unilateral fuels embargo on the country. France, the UK and Germany have signalled that they would back such an embargo on Iran. US officials have indicated that such an embargo would include measures against insurance firms covering ships that will sail to and from Iranian ports.

Iran is leading an axis of anti-US/anti-Israel forces in the GME. This vast region will be affected in the event of military hostilities between Iran and the West, with the AfPak front already affecting security in the US itself.

A Pakistani Taliban group had just threatened to send suicide bombers to the US, such as the Pakistani-born US citizen Faisal Shahzad who on May 1 put a badly planned car bomb in New York's Times Square which failed to explode (see news19AfPakIrnMay10-10).

Iran is also being accused of trying to control Iraq after the planned pull-out of US combat troops from that country later in 2010. It has managed to get Iraq's two Shi'ite blocs to merge and to form a new government for a four-year term after a March 7 parliamentary elections (see fap5IrnGovtNegMay10-10).

In a commentary broadcast on May 3, the official Iranian news agency IRNA said there was only one lion guarding its den in the "Persian Gulf" which was Iran, adding that states in the region should stop chasing the lion like a hyena to get part of the left-over food. This was reminiscent of hateful commentaries and statements against GCC states made by Iranian officials and the media during the Iran-Iraq war of 1980-88.

Will there be a war between Iran and the Western powers? No one outside really seems to know. But **Iran's internal crisis, the worst since the fall of the Pahlavi monarchy in early 1979, continues to deteriorate, undermining the legitimacy of the theocracy's Supreme Leader Ayatullah 'Ali Khamenei and President Mahmoud Ahmadi-Nejad**, both being called "dictators" by their Khomeinist opponents who accused them of having rigged the June 12, 2009, presidential elections. It is alleged that both Khamenei and Ahmadi-Nejad are controlled by the IRGC, which has militarised the theocracy.

The opposition Green Movement, led by followers of the late Imam Ruhullah Khomeini (founder of the theocracy), is determined to stage massive rallies throughout Iran on June 12 to mark the 2009 drama. If this internal crisis worsens further, if the US imposes a fuels embargo on Iran, and if the Khamenei regime was to externalise its trouble, then it would be possible for the IRGC to provoke US and other Western naval units trying to enforce the ban. In that case there could be a war.

Yet even in the event of war, the IEA will immediately declare a state of emergency and release the strategic stockpiles of its member-states. In that case, world oil prices will fall – just as they did in January 1991 when the US led a war to liberate Kuwait from Saddam's Iraqi forces. Immediately as that war began, world oil prices fell sharply.

The Turkish government, having close ties with Iran, is offering to mediate between Tehran and Washington. Having become one of Iran's main trading partners, Ankara is quietly working with Tehran on proposals for Iranian gas to reach Europe through the Nabucco project. Iran has long been eager to export natural gas to Europe and Turkey is the easiest transit route since there already exists a pipeline from Iran's offshore South Pars gas field to the Turkish market.

In parallel, Ankara and Moscow are working on a 63 BCM/year gas pipeline to the EU to pass through Turkish waters in the Black Sea as part of a long list of Russian geo-strategic projects, with Russian President Dmitry Medvedev having visited Turkey on May 11-12 (see gmt20TurkWhoMay17-10).

## **The Three GCC Economic & Energy Models**

The six GCC states are spending between \$900-1,000 billion in this decade on a variety of sectors, and this provides a huge market for both Western and Asian companies. Alone Saudi Arabia is spending about \$400 billion on its economic sectors in 2010-14. The Abu Dhabi-led UAE is the second biggest spender on projects, followed by Qatar and Kuwait. Bahrain and Oman are the smaller spenders, but their projects remain considerable.

Over \$500 billion will be spent on new specialised cities in the region. These will be for industry, various aspects of a knowledge-based economy, clusters for scientific R&D, cities for nuclear and low carbon energies, cities for biofuels, etc. Some of the GCC states are to invest in huge agricultural projects abroad so the output is imported to make biofuels, among things other than their domestic food requirements.

More than \$137 billion will be spent on the GCC region's power generation and desalination sector, which is facing a record capacity building programme over the coming years. In view of the growing role of private developers, the biggest challenge for utilities may be not building the capacity but securing the feedstock to fuel it. With new gas allocations at a premium in much of the region, the GCC states are increasingly turning to cleaner alternatives for their domestic energy. The region's first coal-fired power plant could be commissioned in Oman in 2015 and will be followed two years later by the first nuclear power station in Abu Dhabi.

Abu Dhabi, financially the world's wealthiest emirate in per capita terms, is the leading GCC investor in cleaner energy projects to be built within its territory. It is spending between \$105-125 billion in just five categories of projects, excluding several other sectors in which investments are expected to be considerable as well.

It will not be long before Saudi Arabia, with the world's largest reserves of conventional crude oil, over-takes Abu Dhabi as an investor in cleaner energy projects. Planners in Riyadh predict that Saudi Arabia may become one of the few largest exporters of solar energy in the world.

Riyadh is planning for Saudi Arabia's share of the world's petrochemicals market to be bigger than its share of the global oil market in five years. That means there will be massive spending on expansion of the Saudi petrochemicals industry, with emphasis on finished and semi-finished chemicals. Saudi Aramco is spending over \$100 billion on integrated oil refining and petrochemicals JVs both in the kingdom and abroad.

Yet Abu Dhabi, leader of the seven-emirate UAE, is for now the trend-setter in the GCC region's shift to cleaner, low-carbon energy for its domestic market. In just one category, nuclear energy, it is spending over \$40 billion in four 1,400MW atomic power plants under a contract with a South Korean consortium signed in December 2009.

The state-owned Abu Dhabi Future Energy Co. (Masdar) is having the world's first zero-carbon city built of six square kilometres of desert land. This is the foundation of a wider plan by the emirate to leverage its position as a research and development hub for energy technologies through investment. Already the City of Abu Dhabi has become the capital of the world of renewable energies, underlining the importance of Abu Dhabi's model in the shift to low-carbon fuels for its domestic market and export.

Thus, developments taking place in Abu Dhabi are on the radar screens of global leaders in many fields. The long-term aim is to create within the emirate a broad range of innovative industries which will generate a steady flow of ideas and new technologies. The heart of this vision is Masdar City (see its profile in news11A-DhabiMar15-10). The series of Masdar-related projects will entail an investment of \$25-30 billion. It is spending \$20-25 billion on the petrochemicals sector, \$10-15 billion on natural gas development projects, and another \$10-15 billion on the electric power sector excluding the nuclear plants.

The Saudi model will be on the global radar screens in the next decade, when the kingdom's vast desert will source solar power for domestic use and for export. The Saudi model will be followed by

Egypt, where the shift of renewables is being considered seriously, and other countries in the GME.

The Qatari model has been on the global radar screens since 2008, when it became the world's largest exporter of LNG. By end-2010, Qatar's LNG production capacity will have risen to 77 million t/y, but its mega-trains will have the potential to produce over 83 million t/y, i.e., over 2 million b/d of crude oil equivalent. Qatar by early 2012 will have become the world's largest exporter of zero-carbon fuels from gas to liquids (GTL) plants. It will soon become the world's second largest exporter of helium.

The GCC region has proved to be the most economically stable and resilient part of the world. It has been the area least affected by the global economic crisis. In relative terms, the political risks in this area are among the lowest in the GME.

Of course, the GCC area is likely to become one of the riskiest places for anyone to be in the event of a military confrontation between Iran and the Western powers. But Russia and China, along with other developing heavyweights in the Group of 20 (G-20) powers, are now doing all they can to prevent such a confrontation; and they are more likely to succeed than let things go out of control.

Iran is leading an axis of anti-US/anti-Israel forces in the GME. But Syria, a key part of this axis, is counting on Turkey to revive its efforts to arrange for indirect peace negotiations with Israel. This was on top of the agenda of Syrian President Bashar al-Assad's May 8-9 visit to Turkey, where the talks were joined in Istanbul by the Emir of Qatar, Shaikh Hamad bin Khalifa al-Thani. The same subject was discussed in Damascus on May 10-11 during a state visit there by Russian President Medvedev and his talks with Assad and in Ankara with Turkey's leaders (see [gmt20TurkWho'sMay17-10](#)).

The Middle East has long been unstable and the scene of major wars. Today's flash-points include Iran's nuclear development, the Arab-Israeli dispute, sectarian tensions in Iraq and tribal conflict in Yemen. On April 22-25 and May 5-12, Iran held war games in the Straits of Hormuz (see above).

Yet the economic resilience of the GCC states has been remarkable. No GCC government has defaulted on foreign currency obligations, with the credit strength of these governments having sustained a series of regional traumas which included the 1979 Iranian revolution, the 1980-88 Iran-Iraq war and the post-2003 chaos in Iraq. The Kuwaiti government continued to service its external debt during the Iraqi invasion and occupation of the emirate in 1990-91, although it was prevented from making payments on some local currency obligations.

When the political temperature rises, so do oil prices. The years of booming oil revenues have often coincided with political eruptions. The GCC gains when oil production has been disrupted elsewhere. Saudi Arabia's oil output rose by 3 million b/d in 1989-91, while Iraqi supply all but stopped. A sustained disruption of oil exports through the Gulf would be damaging.

However, most GCC states have built up considerable buffers of foreign exchange and offshore financial assets. The Saudi Arabian Monetary Agency (SAMA) had foreign assets worth just over \$400 billion at end-2009, enough to cover the quietly reforming Wahhabi kingdom's annual imports five times over.

Some GCC states have alternative oil export routes which bypass the Straits of Hormuz. Oman exports directly via the Indian Ocean, Saudi Arabia's 5 million b/d Yanbu' export terminal is on the Red Sea, and Abu Dhabi will in 2011 have a 1.5 million b/d crude oil pipeline to Fujairah outside the Gulf.

The GCC's domestic politics have been resilient. The most serious recent troubles include a spate of Qaeda attacks in Saudi Arabia in 2003-06, Shi'ite violence in Bahrain during the 1990s, and the June 1995 coup in Qatar when the current ruler took power from his father. Yet these events did not break the continuity of government.

With the odd exception, the process of political succession in the GCC region has proceeded more smoothly than outside observers expected. One example was the late 2006 accession of the current Emir of Kuwait, Shaikh Jaber al-Ahmad al-Sabah, after the death of his brother Shaikh Jaber. Initially, power passed to his distant cousin crown prince Shaikh Sa'd. But due to his ill health, the National

Assembly intervened to replace Shaikh Sa'd with Shaikh Sabah.

Bad scenarios in which the political and economic health of the GCC states could be threatened include an all-out conflict between Iran and the West, and a serious split within a ruling family. Private sectors are more sensitive to political risks than public sectors. There is also a range of sensitivity to shocks reflected in the current ratings architecture. Bahrain is more vulnerable than other GCC states, given its smaller buffer of foreign assets and its political tensions.

The wealthiest GCC states are more protected by their huge offshore financial resources or, in the case of Saudi Arabia, by its sheer size. The GCC region is, relatively, more politically challenged than many others, and this is accounted for by the rating agencies' sovereign risks, which are not as high as they might otherwise be.

Additional limitations include the volatility of economic output and transparency problems. But, Tristan Cooper of Moody's Investors Service in Dubai on May 6 wrote, "one should place GCC political risks in context and evaluate their impact under a range of scenarios, weighing their probability with care... GCC states have built up considerable protection against political disturbance".

**GCC Economic Ambitions:** One of state-owned Saudi Aramco's locally integrated projects, the proposed Jubail JV with Dow Chemical, will cost almost \$18 billion. PetroRabigh, a JV with Sumitomo Chemical, is expanding on the same scale. There are three other such integrated projects in Saudi Arabia - one is a 400,000 b/d refinery and petrochemicals plant in Jubail as a JV with Total, a similar one in Yanbu', and the third in Jizan near the border with Yemen. Saudi Aramco and ExxonMobil have a huge JV in China as one of a series of integrated projects to be built abroad (see omt16SaudiOverseasOct19-09 & down16SaudiPrivatPetchmOct19-09).

A key project in this sector is the **Abu Dhabi Polymers Park (ADPP)**, which has been progressing despite the global recession in 2008-09 and power shortages. The ADPP has had little impact from the global financial turmoil, despite a fall in demand for polymers. Power will be coming in phases and the ADPP estimates it will have around 650MW by 2015. ADPP is a unit of **Abu Dhabi Basic Industries Corp (ADBIC)** and is expected to generate up to \$4.5 billion/year from the plastics conversion industry by 2015. This will be the world's largest plastics conversion cluster, producing over 1 million t/y of plastics in 50 conversion units by 2012.

The European major **Borealis**, 65% owned by the Abu Dhabi state's International Petroleum Investment Co. (IPIC), is to be a key player in this park as it will be a partner in a JV called **Chemaweyat**, whose complex by 2013 will be producing 8 million t/y of petrochemicals.

A major part of ADPPs' 4.5 sq km area in **Abu Dhabi Industrial City** at the Taweelah power generation centre has already been allotted. The ADPP is to have two JV partners. Forming an alliance with a major international logistics company is one of ADPP's top priorities along-side technical support services. In early 2009, the ADPP completed a joint study with Danish logistics provider Maersk on the feasibility of providing supply chain services at the park.

The ADPP will have the UAE's first naphtha cracker, 1.45 million t/y, as well as propylene and ethylene derivatives plants; a world-scale reformer, and xylene, benzene, cumene, phenol and derivatives units. Naphtha feedstock for the cracker is to be sourced from the Ruwais refining complex. Feedstocks will be piped from Ruwais to the Chemaweyat complex at Taweelah.

These are just examples of mega-projects to diversify GCC economies.

**Oman is developing a "Mini-Rotterdam" in the coastal area of Duqm**, about 560 km south of Muscat. This will have an oil/condensate export terminal and feature an integrated 200,000-300,000 b/d refining and giant petrochemicals complex to be built in JV with IPIC. The state-owned Oman Oil Co. (OOC) will be IPIC's partner in this, with construction to begin in 2011. Duqm is to include a strategic fuel storage tank farm, a free trade zone, downstream industries as well as a dry dock, a harbour, an airport, commercial and residential areas and a tourism centre.

Oman and fellow GCC states are seeking to expand petrochemical production downstreams into more

complex, higher-value plastics (see down6OmanRefPetchFeb8-10).

**Saudi Nuclear/Renewables Centre Planned:** Saudi Arabia is to establish a civilian nuclear and renewable energy centre to help meet increasing demand for power as the country pushes forward with economic diversification and expansion plans. The King ‘Abdullah City for Nuclear and Renewable Energy will be based in Riyadh and will be led by Hashem ‘Abdullah Yamani, a former commerce and trade minister. Although all discussions have focused on civilian uses of the technology. Riyadh and the other five GCC states do not want to lag further behind Iran and Israel in developing nuclear technologies.

The move positions the kingdom, the largest Arab economy, alongside Abu Dhabi, Kuwait and Qatar, as well as Egypt and other Arab states seeking to develop nuclear energy for civilian use. On April 16, France and Kuwait signed a civilian nuclear co-operation agreement, and Paris is negotiating a similar agreement with Saudi Arabia.

Although Saudi Arabia has about 25% of the world’s oil reserves, increasing domestic and global demand has prompted plans to spend \$80 billion in power-generation and transmission capacity over the next eight years to keep pace with industrial and desalination needs. But the country’s officials are alarmed by increasing oil and gas consumption.

Saudi Arabia now burns between 1.25-1.5 million b/d of crude oil to meet domestic and industrial demand. Saudi Aramco CEO Khaled al-Faleh warns **domestic Saudi energy demand will rise 150% by 2028 to 8.3 million b/d of oil equivalent, from 3.4 million b/d in 2009**. He says that, unless the kingdom has developed nuclear and other renewable energies before long, Saudi Arabia will eventually cease being a major oil exporter.

Saudi Arabia is witnessing sustained rise in demand for power and desalinated water due to high population growth and subsidised prices of water and power. The government subsidises energy for domestic, industrial and agricultural use. Although the price of paper WTI in 2009 averaged almost \$70/barrel and reached a record of \$147.27/barrel on July 11, 2008, the Saudi government sells crude oil for domestic use at only \$5/barrel. Saudi Aramco estimates the kingdom spends about SR30 billion (\$8bn) on fuel subsidies a year. (see news20GCC-InvstMay17-10).

Next in Masdar’s order of priorities in Abu Dhabi is **energy efficiency** - itself being a hugely important source of energy which in April was the focus of a presentation made in Riyadh by visiting US Energy Secretary Steven Chu. A US-Chinese scientist who won the 1997 Nobel Prize in Physics and now directs the American shift to renewables, Prof Chu in April toured Saudi Arabia, Abu Dhabi and Qatar – the heavy investors in cleaner energy. He praised these countries for their investment in a knowledge-based economy and studies into new technologies.

In a special presentation to the Riyadh-based secretariat of the International Energy Forum (IEF), Prof Chu said his GCC tour’s mission was to underline the benefits of carbon capture, solar energy and other renewables and biomass. He laid emphasis on the socio-economic and cultural benefits of energy efficiency.

Dr Chu pointed to a revolution taking place: With the world’s transportation sector consuming up to 80% of the fossil fuels being used today, the race to promote efficiency in this domain is very much in progress. **The target for the car engines worldwide is to yield 35.5 miles/gallon by 2016**. Future truck engines are to be more energy efficient. Jet engines are undergoing massive transformation, from oxygen sensors to air pressure and air temperature sensors, all are being under the spotlight.

The engines throttle position sensors and jet engine temperature sensors are being looked at closely, so as to help **push energy efficiency to new levels**. The new refrigerators are to use six times less energy. The cost of solar cells is coming down.

**Breakthroughs in nano tube designs are making them more energy efficient.**

The aluminium refining process, so energy intensive, is undergoing massive changes, with battery charging mode being looked at.

All this is to herald a **more energy efficient era**. Dr Chu pointed to the strides in renewables and the nuclear renaissance taking place in various parts of the world. A new energy model is being worked out. He said fossil fuel would still be a part of the new era, of the new global energy equation, yet may not be as dominant as it is today. Technology is getting into the driving seat (see omt10SyriaGlobalPerspMar8-10).

**The Abu Dhabi Edge In Chip-Making:** Abu Dhabi's Advanced Technology Investment Co. (ATIC) is one of the other success stories in focus. ATIC in 2008 was spun out of Mubadala Development Co. (MDC), Abu Dhabi's sovereign investment vehicle. ATIC, illustrating the scale of Abu Dhabi's high-tech manufacturing ambitions, is a fast-growing contract chip maker. Headed by Ibrahim al-'Ajami, ATIC in 2009 made two multi-billion-dollar acquisitions. It thereby joined a select band of companies with the scale and the pockets to compete in the cutting-edge contract chip industry.

On the wall of 'Ajami's office in Abu Dhabi, a web of geometric patterns cut into what looks like a bronze-gold disc is set in a dark wood frame. But, rather than a piece of modern art or a vinyl record, the object is a wafer, a slice of pure silicon semi-conductor material worth about \$6,000, which is at the centre of 'Ajami's ambitions. A pristine wafer, made up of integrated circuits, is the end product of the semi-conductor industry. A 300 millimetre wafer may contain 200 dies and each die may contain up to 2,000m transistors. Produced in conditions 100,000 times cleaner than a medical operating theatre by tools which cost up to \$600 million apiece, each wafer takes about three months to manufacture.

ATIC in 2009 invested \$1.4 billion in a **JV with Advanced Micro Devices (AMD) of the US** to spin off its manufacturing arm into a new company called Globalfoundries. (AMD had suffered nine consecutive quarters of losses and rising debts as it tried to keep up with Intel, the world's biggest chip-maker. Then, in September 2009, ATIC paid \$1.8 billion for a **majority stake in Chartered Semiconductor of Singapore**.

Contract chip-makers manufacture wafers to the designs of other manufacturers and Chartered was the world's third-biggest. Including debt and convertible preference shares, the deal was worth \$3.9 billion. The FT on March 4 quoted 'Ajami as saying: "For the next three years we're going to invest whatever it takes to build this company up. I want to make sure that Globalfoundries grows faster than any other global foundry [chip manufacturing] company in the world".

'Ajami's financial targets are simply revenues – saying: "top line in year one and top line in year two. The core theme of the Chartered acquisition was really customers, and it is really the driving force behind that acquisition". The Chartered deal was a move to ensure that Globalfoundries had access to customers when new capacity being built in facilities in New York and Dresden was to come on stream. The deal gave ATIC exposure to growth in Asia, which Globalfoundries lacked given it had factories only in Europe and the US. Mubadala retains 19.3% in AMD.

Abu Dhabi's rulers have given a team of technocrats the task of diversifying the emirate's revenues away from oil and gas. Aerospace, renewables and high-tech engineering, among others, have been identified as industries of the future which will provide skilled, well-paid jobs for UAE nationals in a knowledge-based economy.

Every month, 'Ajami flies to Singapore, Dresden, New York and San Francisco to visit ATIC's units. He says: "It's tough... We have conference calls late at night at least and we have conference calls early in the morning. It's a truly global company. It's the biggest management challenge".

It is not just geography which is a problem. Temasek, the Singapore sovereign wealth fund (SWF) from which ATIC bought its stake, spent 22 years trying to make money out of Chartered. Singapore's disposal of its shares was a recognition that it had failed to build a world-class company.

Semi-conductors are all about the scale needed to cover R&D costs and huge investment in manufacturing facilities. Chinese companies have tried to enter the business, but failed to make money. Only Taiwan, home to United Microelectronics Corp and Taiwan Semi-conductor Manufacturing International Co. (TSMC), has succeeded. TSMC, which has a market share of 49% according to iSuppli, is the clear industry leader and plans capital expenditure of \$5 billion in 2010 alone.

ATIC is responding by building a \$4.5 billion manufacturing facility in Saratoga, New York, due to be finished in 2012. It is expanding a similar facility in Dresden from 25,000 wafers a month to 60,000, at a cost of \$3 billion. It is expanding its plants in Singapore.

Managers expect that, with the ATIC investments, Globalfoundries will roughly double its capacity in 300mm wafer production. But even TSMC has said that it is worried about falling margins. 'Ajami says: "If you are well positioned in the market place then actually you can generate the kind of returns [you want]. The problem is only very few companies do it. I think they (TSMC) are going to be around and they're going to do very well, but I think the market is ready for another significant player. I think customers have indicated that very clearly to us. It's not a volume game, it's really a whole evolving dynamic between capacity and prices and technology leadership".

## **Gazprom & The Shale Gas/CBM Factors In USA And Pacific**

The Kremlin-controlled Gazprom is desperate to secure a near-exclusivity of natural gas supply to the EU, having just begun construction of the 55 BCM/year Nord Stream pipeline to NWE and aggressively pursuing the 63 BCM/year South Stream project. It seems it is even willing to join the Nabucco consortium and fill at least half of its planned 31 BCM/year capacity with Russian natural gas – a development which has encouraged ÖMV of Austria to consider joining the South Stream consortium.

ÖMV leads the Nabucco consortium and, at the urging of Italy's energy giant ENI, is also discussing the prospect of Gazprom joining the European group (see gmt19TurkPipelinesMay10-10). The Kremlin is arguing that, against EU's concern that such a development will make Europe dangerously dependent on Russian natural gas, there is Moscow's worry that it will thus become just as badly worried by a heavier dependence on the European market.

The over-riding factor in all this is the **constant discovery and rapid development of shale gas in the US** which is forcing LNG exporters to divert their liquefied methane to Europe and other markets. Another potentially equally important factor is the discovery of **huge coal-bed methane (CBM) in China and Australia**. CBM is 98-99% pure methane which only requires dehydration of the gas (to remove the moisture) to achieve pipeline quality.

**China has just found a huge CBM pool in its Ordos Basin, estimated to contain 10.7 TCM of recoverable gas.** Shell and PetroChina are exploring this basin. But a tiny US-based firm has just discovered 3.8 TCF of CBM in its relatively very small part of the Ordos Basin.

Experts say the **CBM discoveries in Australia and China could be just a "tip of the iceberg"**. In Australia, already **several CBM-to-LNG ventures are being formed**. LNG from CBM has lower calorific value than conventional methane, the resultant price discount is making it a viable alternative to current LNG supplies.

Beijing already has given Moscow signals that the proposed two pipelines from Russia to China, with a combined capacity of 80 BCM/year, might have to be put off for decades. Other potential Asian gas importers may shift to shale gas and CBM if they are made available in the Pacific region. China has major shale gas prospects in several parts of the country.

Hence the importance of Medvedev's May 11-12 visit to Turkey. Before becoming president in 2008, Medvedev used to be chairman of Gazprom. And after becoming PM in that year, Vladimir Putin has devoted a major part of his time to Gazprom's geo-strategic projects. PM Putin's August 2009 visit to Ankara and his talks with PM Recep Tayyip Erdoğan and other Turkish leaders concentrated on these Gazprom projects.

As one of the sweeteners, Putin on Aug. 6, 2009 signed a protocol for the Kremlin-controlled oil giant **Rosneft to join the 1.5 million b/d Trans-Anatolian Pipeline** to be built to pump crude oil from the Black Sea port of Samsun to the Çeyhan marine terminal and oil hub on Turkey's Mediterranean coast. He and PM Erdoğan signed a protocol for the South Stream gas pipeline. In another sweetener, Putin agreed to consider favourably a request for BOTAŞ to be allowed to re-export Russian gas to other markets.