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middle east

GCC Energy Sector – Quarterly Review

March 2011

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Introduction

The Energy Sector which has been the backbone for the GCC's economic development, had in recent years witnessed several uncertainties owing to the global economic recession, political unrest in the middle east region in countries such as Egypt, Libya, the recent Bahrain uproar, and the latest natural calamities such as earthquake and tsunami in Japan. Crude oil prices are anticipated to reach as much as US$150 per barrel by the end of 2011 on the wake of political instability in North Africa and Middle East witnessing severe fluctuations in demand and supply thereby affecting prices.

Accounting for nearly 40 percent of global Oil reserves and 24 percent of gas reserves, the GCC nations has for long held an elite status to determine the shape of global hydrocarbons sector as the largest suppliers of the most valuable and scarce resource. Blessed with an abundance of this precious commodity had enabled the countries to cash in on the robust Oil and Gas sector revenues in their ambitious and sustainable economic development plans in lieu with the fact that the supply of Oil is not likely to withstand the distant future. Thus the revenues from Oil were utilised to diversify and develop the infrastructure and other related and non related industries to achieve a balanced and sustainable development in the country. However in retrospect, the tax incentives and subsidiaries in addition to the availability of cheap oil and gas within the GCC have attracted energy intensive industries into the region further adding to the pressure on the hydrocarbon resources.

A steady rise in the hydrocarbon output in addition to the insurgence of related industries has had its obvious effects on the emission with GCC nations being rated one among the top 25 countries that emits the largest amount of per capita CO2 (Carbon Dioxide) thus remaining a significant threat to global warming. The GCC countries therefore had to resort to a series of measures aimed at harnessing alternative energy sources and renewable resources such as sea water desalination and solar power generation in order to reduce the pressures from international lobbyists to reduce carbon emission as well as to reduce local dependence on oil so as to earmark their most precious resource for exports thereby increasing their revenues.

At the pinnacle with the world's largest hydrocarbon reserves, the Kingdom of Saudi Arabia has reserved a significant proportion of its oil and gas output for exports, the revenues from which will increase the base of national economy thereby addressing the needs of growing population. However the very initiative of

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sustainable economic development is putting increasing pressures on the country's fossil fuels with its escalating demand for power anticipated to increase threefold in the next 20 years. Over 8 million barrels of oil equivalent (BoE) will be required to power the country's turbines if the power demand projected for 2028 were to be remain a reality which would represent an acute increase from the 3.2 BoE used in 2010. Given that oil production averaged around 8.25million barrels a day in November 2010, production will either need to be hiked dramatically - a move which would cut the life expectancy of local fields - or alternative power sources found. The government has already set aside $80bn worth of investments to find those solutions and bolster the country's electricity generation and distribution facilities over the next 10 years. The various initiatives in the pipeline include Saudi's interest in developing civil nuclear power capacities, determining the ideal mix of alternative energy sources such as solar, wind energy, nuclear and hydrocarbon fuelled power to suit its kingdom.

Following Saudi, UAE too has laid ambitious plans for water desalination plants in addition to using smart grid technologies in its gas and steam turbines thereby identifying unusual demand patterns and checking power wastage and peak use of power and water. UAE's Abu Dhabi National Oil Company (ADNOC) and Occidental are vying to develop Sour Gas to address the country's escalating domestic energy requirements.

The Qatar General Electricity and Water Corporation (Kahramma) is constructing its pioneering solar-powered water desalination plant thus setting its sights on leading the race to become the world's leading exporter of renewable energy. Kahramma is committing to a sizeable investment worth 15 billion Qatari Riyals for constructing power stations to cater to the escalating energy needs of the country over the next decade owing to the county winning the bid to host the 2022 FIFA World Cup football matches and the related development plans.

Amongst the rest of GCC nations, Oman has assured to invest 2 billion Omani Riyals (OMR) (US$ 5.2 billion) in energy sector under its five year plans 2011 to 2015 of which OMR 1.5 billion is to be mobilised through private sector investments and OMR 500 million through the Public Authority for Electricity and Water in the form of refurbishment of the existing energy and water networks to address the increasing demand for water and power.

Kuwait is all set to issue tenders in April 2011 in lieu of its long cherished Clean Fuels project which involves construction of atleast 30 units at Mina Abdulla and Mina Al Ahmadi refineries and would entail producing

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10 parts per million (ppm) of low sulphur diesel and Euro IV gasoline and other related products. The country also has plans to build a 500 million dinar (US$1.8 billion) waste water treatment plant catering to the cities in the south of the country by 2015. The new plant, to be located in Umm Al Hayman, south of Kuwait City, will be built in two phases. It will have the capacity to process 650,000 cubic metres per day of waste water from households in southern Kuwait. The plan is for the government to buy back the processed water and monitor the quality.

The recent political unrests cropping up in the country although dents Bahrain's long term plans, the country still has firm commitments to have nuclear power by 2017 and plans to invest US$1.3 billion into its power and water transmission infrastructure over the next three years. The country's Electricity and Water Authority (EWA) has committed BD 320 million (US$850 million) to power transmission mostly on cabling and substations. The authority will invest another BD180m on the water transmission infrastructure, handing out contracts for pumping stations, storage tanks and chemical treatment facilities. While the contracts for the electricity projects have been awarded, some of the water tenders are still outstanding. EWA have turned to public private partnerships to increase power generation capacity, which now stands at 3,150 Mega Watts (MW). Once the Al Dur independent water and power project (IWPP) becomes fully operational in June 2011, it will add another 834MW, meaning that Bahrain's total capacity will be almost 4,000MW thus easily catering to its current peak demand for 1708 MW of power. Top Energy projects completed across GCC in 2010 are listed in table 1 below.

Table 1: GCC Major Energy Projects completed in 2010

Country	Project Type	Project Name	Project Value (In US$ Million)
Qatar	Gas	Ras Gas 3 - Trains 6 & 7	13000
Qatar	Gas	Qatargas3	7000
Qatar	Gas	Qatargas4	7000
UAE	Power & Water	Fujairah 2 (F2) Independent Water and Power Project	3000
Qatar	Power & Water	Mesaieed A - Power Project in MIC	2000
Qatar	Power & Water	Qatar Transmission System Project Phase 7	2000
UAE	Oil & Gas	Borouge Complex Expansion - Phase 2: PE and PP Units	1850

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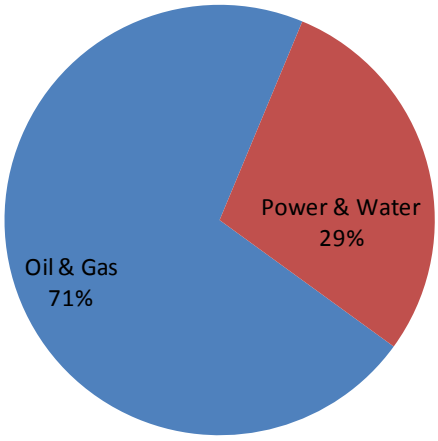
Saudi Arabia	Power & Water	Shuqaiq IWPP	1850
Qatar	Oil & Gas	Al Khaleej Gas Development Phase 2 - Onshore Package	1600
UAE	Oil & Gas	Umm Shaif Gas Injection Facilities	1597
UAE	Oil & Gas	OGD-3/ AGD-2 - Pack 2	1460
UAE	Oil & Gas	OGD-3/ AGD-2 - Pack 4	1420
UAE	Oil & Gas	OGD-3/ AGD-2 - Pack 3	1241

Source: Ventures Onsite MENA Projects Database www.venturesonsite.com

Quarterly review – December 2010 to February 2011

The last three months starting December 2010 ending February 2011 witnessed US$10,978 million worth GCC energy projects being awarded to contractors. Figure 1 provides the split of total contractor awards split by energy sectors for the period December 2010 to February 2011.

Figure 1: GCC Energy Contractor Awards split by sector – December 2010 to February 2011



Source: Ventures Onsite MENA Projects Database (www.venturesonsite.com)

The Oil & Gas sector witnessed a significant 71 percent of all contracts awarded in the quarter with projects such as Arabiyah and Hasbah Oilfield - Onshore Facilities in Saudi Arabia worth US$1,500 million, O&M of PDO Offshore facilities in Oman worth US$800 million, Ibn Rushd - Yanbu Petrochemicals Complex

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Expansion - Aromatics Plant Expansion in Saudi Arabia worth US$600 million, Sulphur handling terminal in Habshan, UAE worth US$550 million and several others.

Power and Water projects such as Kuwait's Al Zour Southern Power plant worth US$1,107 million, Qurayyah Block 6 – Combined Cycle Power plant worth US$600 million and PP10 Power Plant – Block C1 worth US$375 million in Saudi Arabia had led to power and water sector holding a share of 29 percent of total contractor awards during the three months of December 2010 to February 2011.

GCC Oil & Gas Sector Overview

Despite its marginal contribution of just 37 percent and 14 percent of world's oil and gas demand, the GCC nations together with Iran and Iraq are the undisputed leaders on the supply side possessing an approximate share of 56 percent and 40 percent of global oil and gas reserves. The GCC nations are looking up to an increased bout of optimism in their fossil fuels sector fuelled by several external forces such as the Libya and Egypt political unrest that led to a comparative lower costs of oil production chasing an increasing trend in oil prices that led to US$100 per barrel in January 2011 wherein the Organization of Petroleum Exporting Countries (OPEC) clearly exercises control of its non-members in regulating global oil and gas supplies. While global energy demand is forecasted to increase by as much as fifty percent by 2030, reliance on fossil fuels is likely to continue to be high in the near future.

Despite Oil prices hovering around US$75-80 per barrel and curtailed and controlled demand plaguing the oil sector owing to Global economic recession all through 2010, the GCC nations took charge of the situation and continued investing in constant pursuit of new oil and gas sources whilst exploring possibilities on reducing the overall cost of production.

The back end of 2010 and the beginning of 2011 spelled good fortunes for the GCC hydrocarbon sector with the gradual economic recovery turning the demand situation to the pre recession stage and a gradual and steady increase in oil prices thus enabling the GCC nations to reap the benefits of the focussed investments made in this sector during the slowdown phase. For the first time post October 2008, the OPEC countries of Saudi Arabia and UAE have cautiously increased its supply of oil boarding optimism for the oil and gas sector and the rising oil prices and inflation concerns among the global consumers.

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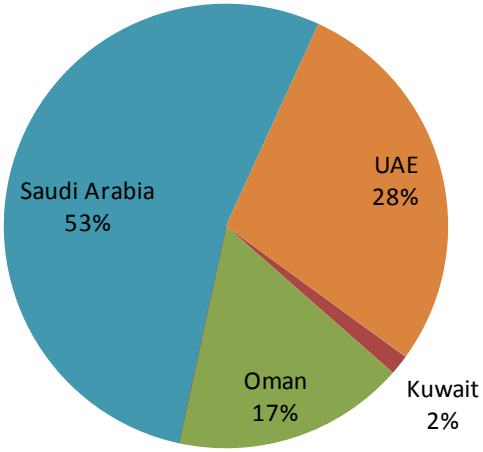
Figure 2 depicts the geographical split of GCC Oil & Gas contracts awarded in the three months spanning December 2010 to February 2011.

Figure 2: GCC Oil & Gas contractor awards split by country, Dec'10 - Feb'11



Source: Ventures Onsite MENA Projects Database (www.venturesonsite.com)

With a share of 53 percent of total GCC contractor awards the largest market of Saudi Arabia had made significant inroads in not only the GCC but global oil and gas sector. In addition to compensating the loss suffered on account of Libyan political unrests disrupting global demand for energy and oil, Saudi Arabian oil company Saudi Aramco had recently entered into an agreement to supply 200,000 barrels per day (b/d) of crude to PetroChina Co. Ltd, a subsidiary of China National Petroleum Corporation aimed at meeting its escalating demand for refined products. Saudi Aramco Lubricating Oil Refining Company (Luberef) had recently awarded a contract in January 2011 to sketch the expansion of its Yanbu refinery.

Besides its avid focus on reducing consumption to increase its share of exports, Saudi is also keen on exploring other forms of alternative energy sources such as civil nuclear power, solar and wind energy to fuel the escalating demand for power in the country. Despite lagging behind Qatar in terms of its proven merits in the gas sector, Saudi has turned its focus on to this immensely popular sector with its Karan Gas field developments in addition to other projects such as Shaybah NGL recovery program and Wasit gas development regarded as Saudi Aramco's core gas projects thus aiming to exploit its massive proven

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natural gas reserves estimated at 275 trillion cubic feet (Tcf) ranked as the fourth largest in the world behind Russia, Iran and Qatar.

UAE, the second largest oil market amongst the six GCC nations had a 28 percent share of total GCC Oil and gas contractor awards during the period December 2010 to February 2011. The gradual global economic recovery, the recent political unrest in Middle East and North African region, the natural disasters striking Japan, has propelled UAE to continue its cautious but steady increase in oil and gas investments. UAE's oil and gas hub, Abu Dhabi had very recently reinforced its supremacy in the region and increased its refining exposure by taking over Cepsa after buying half the Spanish oil company from French group Total for €3.7bn ($5bn) in February 2011.The acquisition being made through IPIC, a wholly-owned Abu Dhabi government fund responsible for investing in the oil sector outside the emirate raised Abu Dhabi's Cepsa stake to 47 percent in July 2009 for $4.7bn from 9.6 percent in 1988. Earlier in January 2011, Abu Dhabi National Oil Company (ADNOC) was considering a proposal to expand the injection of carbon dioxide into fields for enhanced oil recovery.

The UAE has the seventh largest gas reserves in the world, with around 214.4 trillion cubic feet of proven reserves, but capital costs and high sulphur content present major challenges to the development of gas sector. The UAE's Abu Dhabi National Oil Company (ADNOC) and Occidental are developing the Sour Gas to meet its chronic domestic energy needs. Production from the field is set to begin in 2014. In addition to exploring new possibilities to develop the existing oil and gas capabilities, UAE is also all set to explore alternative energy sources such as solar and nuclear energy to conserve fossil fuels thereby freeing up their resources for exports. The UAE has all the elements for developing a successful solar power industry with as many as 70 companies currently operating in solar power.

Oman, the country that has the third largest share of contractor awards during the months December 2010 to February 2011, is also making significant inroads in its oil and gas sector. Being a non OPEC member had enabled the country to record a 6 percent growth in oil production in 2010 where in the supply of oil was not constrained by OPEC quotas thus stabilizing its economic position in the global hydrocarbon sector even during the global economic slowdown. Oman expects to raise crude oil production by four percent in 2011, helped by new discoveries, as per its oil and gas sources. The country expects to reach an average of 900,000 barrels per day (bpd) in 2011 from 864,000 bpd in 2010 from its new discoveries with external

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producers. 2010 was a promising year for the country's oil and gas sector with oil prices averaging US$76.5 per barrel representing a 35 percent hike in prices as compared to 2009. In 2010, the largest oil producing company Petroleum Development Oman (PDO) achieved a daily production of 553,000 bpd of crude oil followed by occidental with 150,000 bpd. In the first week of March 2011, Oman's Oil and Gas Ministry has awarded the US' Rex Oil & Gas and the Ivory Coast's state-owned Petroci Holding an offshore oil exploration license. Block 50, off the sultanate's south east coast covers an area of 16,903 square kilometers surrounding Masirah Island in the Arabian Sea. The joint venture plans to invest around $26m on the first phase exploration on the block. The scope of the work includes reprocessing old seismic data, acquisition of 2D and 3D seismic images, processing satellite gravity data, and drilling exploration wells.

Notwithstanding the significant discoveries of new oil and gas digs, Oman is continuing with its ambitious plans in the development of Gas sector. Recent advancements in this field include PDO contemplating to pre-qualify contractors for constructing its green field US$250 million gas processing facility at the Lekhwair gas field. The project will treat about 106 million cubic feet (or 3 million cubic metres) a day of wet, sour natural gas from the Lekhwair gas field. The scope of work for the project will include the construction of a field gathering system, associated gas export facilities, condensate export pipelines and a liquid surge tank. Oman Oil Company Exploration and Production LLC (OOCEP), the upstream spinoff of the government's wholly-owned energy investment arm Oman Oil Company (OOC) will further invest $1.1 billion in the development of the gas-rich Abu Butabul discovery in its newly acquired Block 60 concession in central Oman. The amount represents the first phase investment in an ambitious project to unlock Block 60's potentially prodigious reserves of tight gas and condensates. OOCEP has set its sights on Q1 2013 timeframe to bring the field into commercial production. Output is targeted at a peak production rate of 90 million standard cubic feet per day (mmscf/d) - volumes that will go a long way in meeting the nation's escalating demand for natural gas as fuel for electricity generation and water desalination. Development of the Abu Butabul field is planned in three stages with OOCEP targeting an output of 90 mmscf/day, which is proposed to be ramped up by a further 50 mmscf/day in the next stage, with output sustained at this plateau level in the third stage.

Kuwait, the country that contributed to 2 percent of total GCC Oil and Gas contractor awards for the period December 2010 to February 2011, is forecasting a 5 percent increase in its oil production which still remains constrained by OPEC mandates. Kuwait currently accounts for 5.46 percent of Middle East regional

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demand for oil whilst providing 10.22 percent of supply. The region has consumed 391 billion cubic meters (bcm) of natural gas in 2010 and this is expected to reach 483 bcm by 2015, representing growth of 23.7%. Production of an estimated 467bcm in 2010 should reach 614bcm in 2015 thus leading to net exports rising to 130bcm by the end of the period. Kuwait consumed 3.62% of gas from the region in 2010, with its market share forecast to 3.88% in 2014. It is expected to contribute an estimated 2.83% to 2010 regional gas production and by 2014 account for 2.90% of supply. Between 2010 and 2020, Kuwait expects an increase in oil production by 38.6%, with crude volumes rising steadily to 3.45mn b/d by the end of the forecast period of 10 years. Oil consumption between 2010 and 2020 is set at an increase of 25.4%, with growth slowing to an average of 3.0% per year towards the end of the period and the country using 530,000 b/d in 2020. Gas production should raise to20.8bcm by 2020. With 2010-2020 demand growth of 70.6%, this represents an increase of import requirement 3.3bcm by 2020.

Qatar, the fastest growing economy amongst GCC nations has weathered the global economic recession extremely well backed by robust natural gas capacity and steady increase in oil production. Qatar to the global gas market is similar to what Saudi is to the global oil sector. Major development in the country's gas sector includes the Qatar North Gas field, a US$20 billion worth 25 billion cubic feet per day development. This project is so significant that the Qatari government placed a freeze on additional natural gas development projects at the North Field to enable maximum optimization of the 450 trillion cubic feet of recoverable gas reserves found in this field. The suspension will be reviewed once again in 2014, but the field already produces much of the three billion cubic feet of natural gas produces every year. Qatar is vying to extend its dominance in gas sector with an $18-billion project in collaboration with Royal Dutch Shell. The Pearl GTL complex will consist of two 70,000 bpd GTL trains and two 60,000 bpd NGL plants with their associated facilities. The project is expected to be completed later this year, and should help ease the world's energy shortage.

Bahrain although maintaining a lower profile on the hydrocarbon sector when compared to its other GCC counterparts, is also charting ambitious plans for the development of its Oil and Gas sector. The country's oil producing capability is quite minimal at approximately 32,000 barrels per day. Dented by tremendous political pressures further forcing the economy down, Bahrain still aims to produce atleast 8 million cubic

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feet per day of gas from the offshore phased development project, apart from 65,000 barrels per day of oil through its Bahrain Field Phased development Projects worth US$15 billion expecting completion by 2014. Thus with almost every member setting to grab the maximum possible opportunities provided by the global economic recovery and the turbulent political scenario across countries in the Middle East and North African countries, the oil and Gas sector in GCC is set for unprecedented developments in the coming years thus strengthening the countries respective positions in the global hydrocarbon sector.

Major Oil and Gas contractors in GCC

The following are the major oil and gas contractors in the GCC region as of 2011.

- Daelim Industrial Company
- Consolidated Contractors International Company (CCC)
- Samsung Engineering
- JGC Corporation
- Worley Parsons
- Hyundai Heavy Industries (HHI)
- Hyundai Engineering & Construction Company
- Linde
- Tecnicas Reunidas (TR)
- Kharafi National
- Tecnimont SpA
- Saipem SpA
- GS Engineering and Construction Company
- Technip
- J Ray McDermott
- SK Engineering & Construction
- GS Engineering & Construction

Latest GCC Oil and Gas projects

Table 2 provides a comprehensive list of the recently announced GCC oil and gas projects.

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Table 2: Latest GCC Oil and Gas Projects, March 2011

Country	Project name	Project value (in Ms. US$)
Saudi Arabia	Jubail - 2 New Petrochemicals Complex - Carbon Monoxide and Ammonia Plants	3000
Saudi Arabia	Jubail - 2 - New Petrochemicals Complex - PMD and TDI Production Facilities	1100
Saudi Arabia	Jubail - 2 New Petrochemicals Complex - Aniline - Formalin and DNT - Nitric Facilities	800
Saudi Arabia	Morpholine and Diglycolamine (DGA) Facility in Jubail	500
UAE	Borouge 4 - Fourth Ethane Cracker Unit	500
Saudi Arabia	Kayan Petrochemicals Complex at Jubail - n-Butanol Plant	480

Source: Ventures Onsite MENA Projects Database (www.venturesonsite.com)

GCC Power & Water Sector Overview

Power Sector in GCC is characterized by an escalating demand growing at a staggering 12 percent annually outpacing its supply thereby necessitating investments of over US$100 billion to cater to the growing needs of population over the next decade and half. A significant determined initiative that had occupied the center stage for almost 30 years in GCC's agenda is the joint demand for power, wherein the first phase which was completed in July 2009 witnessed a combined power grid connecting the countries of Saudi Arabia, Kuwait, Qatar and Bahrain. UAE which has already been linked to Oman is expected to be linked by the end of 2011 to form an integrated power grid that would then reach an impressive combined power generation capacity of 40,000 MW. The regulatory environment for the grid too has been placed together

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by the GCC Interconnection Authority (GCCIA) with a regulatory framework that allows for easy electricity trading across the region, along with an advisory and regulatory Committee with representatives from each member state. The demand for electrical power in the GCC countries stood at approximately 70 GW as of 2010 and this is expected to triple over by 2035.

To meet seasonal shortages, the governments in the GCC are expected to invest in gas-fired generating capacity and focus on incorporating energy efficiency regulations and measures to conserve power rather than trying to make changes to the subsidized tariff that is hard to remove. These economies have also tried to harness alternative sources of energy and diversify their economies away from their heavy reliance on hydrocarbons and have even set themselves strict emission limits to sustain the existing scarce resources. The countries have also pledged to invest in technologies such as carbon capture and sequestration to keep to global environmental norms.

Touted to remain a US$ 55 – 60 billion industry by 2020, the GCC Water sector is characterized by a a acutely scare commodity in one of the world's most arid regions chasing a mammoth demand driven by growing population with increasing standards of living. Possessing a limited groundwater resource in the midst of growing signs that groundwater is being depleted by over-use, the GCC is facing potential water shortages. After a temporary let-up in 2009-10 as a result of the economic slowdown, the risk of water shortages is expected to rise again. The 2011 – 2020 periods will see rising water demand, as the GCC's growing middle class adopts an increasingly water-intensive lifestyle, featuring private swimming pools, gardens requiring big sprinkler systems, and even a growing interest in golf. Over the next decade, these countries will be among the world's top per-capita users of water.

One of the main issues to contend with in the demand management of the scarce water resources is that the bulk of the region's water is directed into agriculture, a sector that contributes less than 5 percent to the GDP. Artificially cheap water has facilitated the development of water-intensive crops in a region that has no natural advantage in producing these, but where governments provide generous subsidies to ensure future food supplies. A few GCC countries have started to change this policy, for instance by phasing out energy-intensive crops or limiting the use of land for farming as well as purchasing agricultural lands abroad for cultivation for GCC needs and importing food grains, but there will be pressure to do much more over the next decade.

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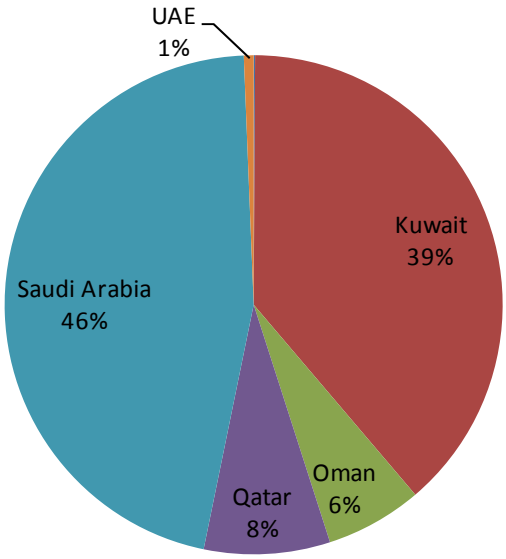
Regionally, a combination of rising temperatures and increasing populations imply that water will become increasingly scarce in the Middle East, and raises concerns about the long-term possibility of conflicts over water. Some of the less prosperous countries in the region are already looking more seriously at strategies to handle water demand, for the most part in agriculture, with the use of drip irrigation. In the longer term, there are worries that the increasing salinity of Gulf water will make desalination more difficult and more expensive. Gulf water is already highly saline, and the hot climate causes a high evaporation rate. There are also concerns on water pollution from coastal industries and sewage. To meet the growing demand, the region will have to rely increasingly on desalinated water, which is expensive and energy-intensive. There is huge scope to make economies more water-efficient. At present, there are significant inefficiencies all along the production, distribution and consumption chain, starting with energy-inefficient production and ending with water-inefficient consumption.

Figure 3 depicts the geographical split of GCC power & water contracts awarded in the three months spanning December 2010 to February 2011.

Figure 3: GCC Power and Water Contractor awards split by country, Dec'10 - Feb'11



Source: Ventures Onsite MENA Projects Database (www.venturesonsite.com)

By virtue of its large geographical size and significant economic development, the Kingdom of Saudi Arabia is the largest market for power and water in GCC. The last three months of Dec'10 – Feb'11 witnessed

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Saudi awarding a significant proportion of 46 percent of total GCC power and water contracts. Saudi Arabia is looking to diversify its domestic power industry away from its existing reliance on fossil fuels by investing heavily to make renewable energy the Kingdom's primary source of electricity, a move that will extend the life of its oil fields, protect export earnings and pay environmental dividends. As per official estimates, Saudi Arabia's demand for power will increase threefold in just over 20 years whilst the requirements for hydrocarbons to fire the country's turbines would more than double by 2028 thus severely impacting the export earnings of the country. More than 8m barrels of oil equivalent (BoE) a day will be required to ensure adequate capacity if the projections for 2028 electricity consumption are accurate, a significant increase on the 3.4m BoE used in 2010. Given that oil production averaged around 8.25m barrels a day in November 2010, production will either need to be hiked dramatically or alternative power sources found. The demand for electricity is steadily increasing - it was 40 GW in 2010 and is expected to reach 120 GW in 2032. The local demand for oil has also been growing at an alarming rate of 27 percent per annum thus forcing the need to arrive at the most optimum mix of various energy forms such as civil nuclear power, solar and wind energies required to sustain the country's leadership role in the changing global energy landscape. The government has already earmarked $80bn for investments to find those solutions and bolster the country's electricity generation and distribution facilities over the next 10 years.

Kuwait occupying a 39 percent share of the GCC power and water contractor awards for the period Dec'10 – Feb'11 will resume imports of liquefied natural gas (LNG) in March to meet the rising demand in summer from power generators. The Gulf Arab state does not have enough natural gas to meet power demand and burns a large volume of oil products at power stations. Like its oil-exporting neighbors, Kuwait has been slow to develop its gas reserves to meet domestic demand. Last year, Kuwait signed an agreement with Royal Dutch Shell and Vitol to supply the OPEC member with liquefied natural gas from 2010-2013. Kuwait, with one of the world's highest per capita power consumption rates, began importing the super-cooled gas for the first time in August 2009 through a terminal, which can deliver about 500 million cubic feet of gas. The terminal, the first of its kind in the gas-rich Middle East, is used to feed Kuwaiti power stations to meet high air-conditioning demand in summer as an interim solution while Kuwait develops domestic gas reserves. However, the country is in serious danger of facing acute water shortages if new water desalination facilities are not completed on time. Water consumption levels have escalated to an all time high of 339 million gallons per day which is just a million gallons less than the country's daily capacity.

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Planned facilities are expected to provide an additional daily 40 million gallons, which should be sufficient to cover the projected needs for next year. However, with the steadily rising population figures, the water levels will not be sufficient for 2012 or 2013. The government hopes though that by that time, the major Zoor power production and water desalination facility, set to produce a daily 200 million gallons of water, will be operational. Kuwait's first plant for desalinating sea water was established at Al Ahmadi port in 1951, with a capacity of 364 m3 a day.

Qatar holds 8 percent share of total GCC power and water contractor awards for the period dec'10 – Feb '11. As with the other Gulf States, Qatar has very limited supplies of fresh water. It ranks among the countries with the most restricted fresh water resources in the world and yet, ironically, its per capita water consumption is among the highest in the world. To meet water demand, the country depends on desalination plants and this has led to strong links between electricity and water production, with many modern power plants producing water too. Qatar Electricity and Water Company (QEWC), wherein the government holds a 52 per cent share is the main generator in country. The company had a generating capacity of 2113 MW together with potable water capacity of 105 MIGD at the end of 2007, but this will have moved up to 5200 MW and 325 MIGD by 2011, when the ongoing projects are completed. QEWC solely owns a number of power and water desalination plants including Ras Abu Fontas, Al Saliyah, Doha South, Al Wajba and Dukhan. Additionally, it has shares in a variety of independent power producer (IPP) projects including Mesaieed and Ras Laffan A, B and C.

Recent developments in Power and water sector includes Qatar General Electricity and Water Corporation (Kahramaa) construction its first solar power water desalination plant. Qatar the global leader in non-renewable energy sources is now vying to become the world's leading exporter of renewable energy. Solar and wind energy are currently the top contenders for investment and development and hence give impetus to the projects on the most conducive technology, economically viable and practical solutions.

Oman the country that holds 6 percent share of GCC power and water contractor awards for the three months of Dec'10 to Feb'11. Oman Power and Water Procurement Company estimates that the maximum power demand catered by the Main interconnected system(MIS) is expected to grow from 3,424 MW in 2009 to 6,043 MW by 2016, an average increase of around 8.5 percent or 374 MW per year. Annual energy demand is expected to grow similarly, from 15.7 TWh in 2009 to 28.6 TWh in 2016. In the Salalah System,

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the maximum demand is expected to grow from 297 MW in 2009 to 615 MW by 2016, an average annual increase of around 11 percent or 45 MW per year, with annual energy demand growing at a similar rate, from 1.7 Terra Watt hours (Twh) in 2009 to 3.6 TWh in 2016.

Demand for desalinated water in the regions covered by the MIS is expected to increase from 119 million m3 in 2009 to 272 million m3 by 2016, reflecting a policy of reduced reliance on groundwater resources, as well the effects on demand of population growth and economic development. Water demand in the Salalah area is expected to increase from 26 million m3 per year in 2009 to 49 million m^3 per year in 2016.

Oman's investment climate is strong, political risk and corporate taxes are low, and the private sector has been involved in electricity generation since 1996. More government participation would be needed to promote other alternative energy services sector by establishing energy sector policies that support renewable energy. Particularly, government financial support for feasibility studies, increased research, deployment through international partnerships and further economic analysis would be vital for shaping the future of alternative energy sector. Additionally, the government should take part in carbon markets as these markets are expanding and are a source of finance for utility sector projects. Oman's solar potential is outstanding, even though it is highest in remote area away from major population centres, whereas its wind resources are mainly in the southern part. The burning of municipal and industrial waste as well as the capturing of methane gas produced during the decomposition of waste in landfills could be also an alternative for electrical energy production. Small projects should be initiated to power rural areas by using wind energy, solar energy or both systems (hybrid system). In Oman, the water and electricity sector is set to attract an estimated US$ 7 billion in investments during 2011 – 2015 periods.

UAE, although holds just 1 percent of the total contractor awards in the GCC power and water sector for the period Dec'10 to Feb'11, is in reality the second largest market for power and water sector amongst the six GCC countries. The Power and Water desalination Industry, which acts as the mainstay of the UAE's economic expansion, is characterized by a restricted source of supply struggling to accommodate to the swelling demand aroused by ever-increasing population and superior standards of living. UAE is also one of the world's two largest desalination markets. The Emirate of Abu Dhabi has the highest per capita water consumption rate in the world, at 525 - 600 gallons a day (g/d). In the UAE as a whole, desalinated water accounts for 80 percent of total water consumption. Demand for desalination products and services in the

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UAE are projected to increase 7.7 percent annually to US$ 2.3 billion in 2013. The UAE has one of the lowest possible national renewable water resource capacities, which on a per capita basis equates to 64 m^3 per year, only to the order of 1 percent of the world average. According to industry estimates, water production in the UAE reached nearly 1,100 million gallons per day in 2009 and demand is more in Abu Dhabi and Dubai. Due to climatic conditions and high per capita income, UAE has one of the highest water consumption levels in the world. The demand is growing year-on-year due to surging population and growth in tourism, as the country also supports transit population which increases the demand for water.

Besides, the UAE also has one of the highest per capita consumption of bottled water (265 - 280 litres per year) which is due to many factors including economic potential as well as the presence of excellent local brands of bottled water. The natural recharge capacity of the Emirate of Abu Dhabi is far less compared to its total water consumption levels. The UAE's investments in water projects during the 2011 -2015 periods are estimated to be around US$ 30 - 35 billion. The country plans to build 68 rechargeable dams in the 2011 -2015 periods to supplement the 114 dams in existence.

Bahrain, despite not having awarded any contract for power and water in GCC in the last three months, has resorted to public private partnerships to fuel its power and water projects. Bahrain had 2.4 Gigawatts (GW) of installed electric generating capacity at the end of 2009, all of which came from conventional thermal sources, mostly natural gas with some oil. The peak power demand was nearing total capacity. Bahrain's Ministry of Electricity and Water (MEW) estimated that electricity demand will grow by 7 percent annually through 2020. Bahrain is connected to the GCC Interconnection Grid, which will enable it to tap electricity from other countries, as well as participating in a future regional energy market. The authorities are keen on encouraging independent power plants (IPPs) to operate and they have also privatized some power assets controlled by the public sector. Bahrain is one of the few countries in the gulf region that has laid the regulatory framework for the privatisation of the power generation industry. The private sector has already contributed to the electricity and water sector in Bahrain through the construction of Bahrain's first IPPs, Al Ezzel, and the enlargement of Al Hidd power and water station. The Al Dur independent power and water project (IWPP), when fully operational in 2011, will be the Kingdom's largest electricity and desalination plant and will be operated on a built, own and operate (BOO) basis by GDF Suez and the Gulf Investment Authority. Bahrain makes much use of its desalinated water and substantial investments are planned to increase production from the existing 143 million gallons per day, to 200 million gallons per day

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in 2011. New transmission systems and storage facilities will also be coming online in this period. In the waste water sector, production will reach 164,250 cubic meters annually by 2015, up slightly from the current 163,000 cubic meter annual capacity. Because of Bahrain's size, the bottlenecks it is facing in its water sector are easier to respond to than in larger neighbouring states, such as Saudi Arabia. In Bahrain, the water and electricity sector is set to attract an estimated US$ 21 billion in investments during 2011 – 2015 periods.

Major power and water contractors in GCC

The following are the major contractors in the power and water sector in GCC.

- Doosan Heavy Industries
- Hyundai Engineering & Construction Company
- Korean Electric Power Company (KEPCO)
- Al Arrab Contracting Company
- Samsung C & T Corporation
- Arabian Bemco Contracting
- SEPCOIII Electric Power Construction Corporation
- Alstom Power
- Hyundai Heavy Industries (HHI)
- General Electric
- Degremont
- Mitsui & Company
- Al Mabani General Contractors
- Archirodon Construction Overseas
- Larsen & Toubro
- Hyundai Engineering & Construction Company
- Areva T&D
- Fisia Italimpianti

Latest GCC power and water projects

Table 3 provides a comprehensive list of recently announced GCC power and water projects

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Country	Project Name	Project Value (in US$ Mn)
Saudi Arabia	PP12 Power plant	2000
Kuwait	Khiran IPP	1500
Kuwait	Julai'a IPP	500
UAE	Desalination Plant in Ras Al Khaimah	400

Source: Ventures Onsite MENA Projects Database (www.venturesonsite.com)

Related developments

The recent developments in GCC energy sector is governed by certain forces in both local and international level.

Political instability in Middle East and North Africa

The recent political turmoil experienced across Middle East and North Africa including Egypt, Libya and recent Bahrain and Iraq has had a significant impact on the oil and gas sector amongst GCC nations. Whilst on one hand the GCC nations had witnessed increased optimism driven by the gradual economic recovery boosting oil demand thereby witnessing a steady increase in fuel prices set to reach US$115 per barrel from the average prices of US$76-80 per barrel witnessed in 2010. The increased levels of optimism witnessed by GCC led to an increased investment in the Oil and Gas sector, particularly the gas sector in order to address their local demand thereby freeing up precious Oil for exports. Notable projects in this regard include the following:

- Qatar North Field, US$ 20 billion worth 25 billion cubic feet per
- Qatar Shell GTL (Pearl GTL), US$ 18 billion worth 140,000 bpd of GTL or equivalent to 1.4 billion cubic feet and 120,000 bpd of NGL or equivalent to 1.2 billion cubic feet.
- Bahrain Field Phased development of 8 million cubic feet worth US$ 15 billion
- Basrah Gas company's South gas project on 700 million cubic feet of gas worth US$ 12.5 billion

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- ADNOC/Oxy Sour Gas field development worth US$ 10 billion on 1 billion cubic feet of sour gas.

The escalating domestic consumption of natural gas particularly in fuelling GCC nation's power turbines has fuelled a spate of initiatives aimed at the development of gas resources both for domestic requirements as well as increasing their respective positions in the global gas market. A typical case in this scenario is Qatar which is now the third largest gas market next to Russia and Iran.

The ongoing political uproar in the Middle East and North African countries has affected the global supply of hydrocarbons thereby causing severe concerns on the consistent availability of oil thus leading to severe price fluctuations and increasing volatility. However, the role of GCC nations in controlling this relative volatility had remained quite significant wherein the OPEC nations of Saudi Arabia and UAE had for the first time post 2008 proceeded with a cautious approach towards increasing their oil output to address the growing concerns. Although such factors quite obviously represent an increased opportunity, they also put pressure on the GCC nations to further conserve their local consumption so as to free their precious reserves for exports given the fact that the countries are well aware of the fact that the scarce resource for which they are well known for is indeed not exhaustive. Additionally, the rub on effects of political turmoil experienced in Bahrain has also led them to partially shut down their operations thereby affecting their output in the short term. Therefore the situation although under control currently may lead to a yet another recessionary trend if the situation continues or worsen any further.

Japan's Energy Crisis

Right at the time when the energy markets were witnessing gradual recovery, nature struck its nasty blow in the form of earth quake and tsunami in Japan wherein the entire port of Sendai in Japan got completely washed away thereby denting Japan's economy further wherein the revival of country's depleted resources remains a significant challenge. The 9.0-magnitude earthquake in March 2011, followed by monster tsunami waves and aftershocks, knocked out the power supply, including generators for emergency use, at the plant on the Pacific coast. To add fuel to the fire, the country is also facing increasing risks of dangerous amount of radioactivity following a series of hydrogen explosions and fires at buildings housing nuclear energy reactors in the country.

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Amidst fears of a severe nuclear power crisis, it is natural for the world to turn to Middle East for fossil fuels particularly natural gas to compensate the demand. This has impacted the availability of natural gas reserved by the GCC nations for its local consumption thus tightening the situation in the market further.

However the recent respite in the form of Japan announcements on restoring electricity to reactor cooling systems at a stricken nuclear plant as efforts to prevent dangerous radiation leaks reached a crucial phase has marginally improved the situation. Electricity was expected to be reconnected to four reactor units at the Fukushima No. 1 plant on March 20th and to the remaining two on March 21st after damage from a huge earthquake and tsunami, the nuclear safety agency said. The announcement offered some hope of a breakthrough in efforts to prevent a full-blown meltdown at the troubled facility, although it is not yet clear whether the cooling system will work properly even if power is restored. Emergency services were also preparing to dump more water on overheating fuel rods in what the head of the UN International Atomic Energy Agency (IAEA) has described as "a race against time" to prevent a major disaster.

Thus the GCC Energy sector is all set to witness encouraging developments that is well dependent on the dynamics impacting the landscape of Global Energy sector of which the GCC nations remain a significant and undisputed member.

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