Mena faces up to carbon challenge

Promoting economic development and meeting climate-change commitments is a tricky balancing act, particularly for the Middle East and North Africa's hydrocarbon-fuelled states. Justin Dargin looks at the challenges – and the possible solutions

Carbon conundrum: Mena's energy ambitions must also meet climate-change limits

THE rise in energy consumption in the Middle East and North Africa (Mena) region over the past 20 years has been dramatic. The region now records some of the highest per capita energy consumption rates in the world. However, many observers often overlook this phenomenon due to a focus on the consumption patterns of other emerging markets, such as the BRICS countries – Brazil, Russia, India, China and South Africa. The assumption that the region contains nearly limitless amounts of hydrocarbons and that its export potential could never be endangered further compounded this neglect.

Nonetheless, since the early 2000s, the Mena region has emerged as one of the highest energy consuming regions in the world, behind India and China. Increases in population and energy intensity in the industrial and residential sectors were the main drivers of this increase. Migration to cities, as well as the spread of Western-style consumption patterns has exacerbated already increasing consumption rates. Gas deficits began to appear in the region, especially in the Gulf Cooperation Council (GCC) states, around 2007-2008. There were several reasons for this.

The steadily rising price of oil since 2000 caused GDP, at least in the Gulf countries, to increase rapidly. From 1998-2008, the GCC economies grew at a rate of about 7.6% per annum. In the same period, annual gas and power demand consumption rates tracked economic growth, growing at 5.5% and 6.1%, respectively, according to a Booz & Co report, *Gas Shortage in the GCC: How to Bridge the Gap*. Moreover, the global financial crisis, which drove the price of Brent down from $145 a barrel in July 2008 to just $36/b in the fourth quarter of 2008, caused Opec to impose strict quotas to create an oil price floor. As most natural gas produced in Mena is associated gas, these quotas also curbed natural gas output.

Several other factors also played a crucial role in the natural gas shortages. Rapid demographic growth; a natural gas pricing framework that supplies the fuel at regulated prices; a lack of comprehensive energy efficiency policies; economic industrialisation and diversification strategies centred upon gas-intensive industries; and energy strategies that sought to increase oil production

through the use of gas-oriented enhanced oil production (EOR) all played decisive roles in expanding the regional gas deficits.

One of the key culprits and the common thread between the various energy challenges is Mena's energy pricing framework. Energy pricing is significant because it is an issue that has the potential to increase energy efficiency, create incentives for unconventional natural gas production and drive down demand. Over the past 30 years, combined gas demand in Mena and Turkey has nearly doubled every decade since 1980, reaching about 526.3 billion cubic metres (cm) in 2011, according to BP data. In 1980, when the regional governments initiated their industrialisation programs, and population growth, at least in the Gulf, was minuscule, the region accounted for less than 3% of global gas demand. Now, the figure stands at around 12%. Over this 30-year period, significant domestic demand, centred upon petrochemicals, industrial expansion in the energy-intensive industries, power generation and water desalination, developed in almost every energy-rich Mena country.

Gas consumption

Power generation consumes the lion's share of gas in the region: according to research for the report *Mena Strategy: Natural Gas in the Mena Region*, about 44% of consumption is feedstock for power plants. The petrochemicals sector dominates industrial demand and is responsible for much of the projected gas demand growth in the industrial sector. The steel and cement industries and export-oriented aluminum production are also significant gas consumers. Regionally, natural gas supplies about 60% of power generation, but this differs from country to country. For example, in Qatar, natural gas supplies nearly 100% of power generation feedstock, while in Egypt, gas provides about 80%. Gas provides about 98% of power generation in the UAE, but during the peak summer months, especially in the northern Emirates, power plants often utilise fuel oil when gas is not in sufficient supply.

However, in the aftermath of the Arab Spring, regional governments are finding it difficult to achieve substantive energy pricing reform – any increase in fuel prices could, they reason, spark further unrest. In light of this difficulty, one of the best methods to cut energy intensity and demand would be to create a carbon trading platform. A carbon trading platform, which operates as a de facto carbon tax, would be able to reach the strategic aims of Mena policymakers as they struggle with increasing demand. As carbon intensity and energy intensity rates are more or less interconnected, the creation of a carbon mitigation scheme is an alternative method of introducing energy efficiency measures into the economy.

Lowering energy intensity is not only vital to reducing energy consumption, but could also help reduce pollution and carbon emissions

Lowering energy intensity is not only vital to reducing energy consumption, but could also help reduce pollution and carbon emissions. The Mena region has the highest levels of carbon dioxide (CO_2) emissions per capita and per dollar of manufacturing output. Moreover, it is second to South Asia in terms of air and urban pollution. As may be seen from Figure 1, Qatar is the leading per capita carbon emitter in the world; Kuwait is a close third. Overall, carbon emissions in the Mena region have more than doubled over the past three decades, with the GCC at the forefront.

However, the data has to be placed in the proper context. In historical terms, the region has a low absolute carbon emissions rate. This is partly because the consumerism and manufacturing that defined the OECD countries for the majority of the 19th and 20th centuries has only recently taken hold in the region. The Mena region has about 5% of the world's population and is responsible for slightly less than 5% of global carbon emissions, according to World Bank data. With the exception of Saudi Arabia (1.3%), no single Mena country emits more than 1% of global emissions. Furthermore, the variances among Mena countries have to be recognised. GCC carbon emissions are much higher than those of other resource-poor Mena countries (See Figure 2). While emissions are quite high on a per capita basis, they still constitute a small share of global carbon emissions in absolute terms. It appears that Mena's real GDP has a quadratic relationship with CO_2 emissions, in that they increase with a rise in real GDP, and then stabilise, before registering a subsequent decrease, according to research carried out by the Bonn-based Institute for the Study of Labor.

Mena carbon emissions reductions occur in three mutually reinforcing ways: Firstly, most Mena countries undertook efforts to create a regulatory structure to control environmental pollution, especially air pollution. Secondly, as incomes rise, so does the general education level and awareness of the citizenry of the ecological impact of CO_2 emissions. Thirdly, there are both demand and supply side conservation efforts as citizens tend to be more conscious of its benefits. Multinationals and state-owned enterprises also tend to introduce more sophisticated energy saving technology to lessen CO_2 emissions. Fourthly, on an incremental basis, many Mena countries are aware of the ramifications of the current energy and power pricing framework, and its influence on both wasteful consumption and increasing carbon emissions. While the process has been moving slowly, there has been a general trend towards decreasing the amount of government assistance on price support mechanisms in the energy and power sector and a shift towards higher pricing.

Lastly, there has been a shift in understanding that not only does high carbon intensity upset the ecological balance, but it is also harmful for energy security. Energy producing countries recognize that if they reduce carbon emissions through the use of renewables and alternative fuels for domestic consumption, they will be able to release oil and natural gas for export and distribution to the value-added industries. Hence, this would have the effect of generating additional revenue for governmental

budgets. The link between carbon and energy intensity is behind the efforts of the GCC countries to combat rising energy consumption by the incorporation of carbon intensity reduction as an interrelated challenge. Dubai announced in February 2012 that it would take the unprecedented step to create a carbon trading scheme in the emirate. This follows the announcement in December 2011 of the Durban Platform The latter was the first ever successful global climate agreement whereby the world's leading carbon emitters, China, India, the US, as well as Saudi Arabia, agreed to a binding international regime to reduce carbon emissions by 2020.

The attempt to regulate carbon emissions by energy-producing Mena countries is in line with the policies of other energy producing countries (such as Australia) and major energy consuming countries (such as China). In fact, China, the largest carbon emitter in aggregate terms, increased its overall carbon emissions by 33.6% from 2006-2010, but simultaneously, due to its energy efficiency efforts, decreased its carbon intensity (carbon emissions per unit of economic growth) by 20.8%. Efficiency gains in the manufacturing process caused the decline in Chinese carbon emissions, thus illustrating the inverse relationship between energy efficiency and carbon intensity. China considers carbon trading a possible solution to cut its energy consumption. The central authorities implemented pilot carbon trading schemes in seven key cities in an attempt to reduce carbon emissions, and thereby energy consumption, by 40% to 45% by 2020.

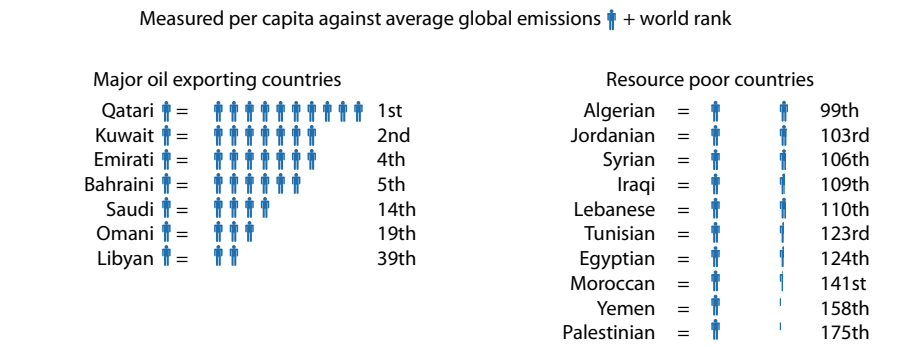
Mena policies should be targeted to curb the rise in energy intensity, but recognise that an increase in energy demand is inseparable from economic growth. As long as there is industrialisation and economic diversification, and as long as Mena population growth continues to grow, even with an aggressive energy efficiency policy, energy demand will continue to expand on an aggregate basis. However, this absolute rise will take place with a sectoral and per capita reduction in consumption. An effective energy conservation policy should have at its heart the recognition of the direct impact of economic growth on energy demand, as well as how energy consumption drives economic growth.

Related to the energy intensity reduction strategy should be a carbon intensity mitigation policy. A reduction in one naturally leads to a reduction of the other. Therefore, energy efficiency policies, such as Mandatory Efficiency Performance Standards (MEPS) and building codes, can be sustained and even expanded by the development of a national – and perhaps eventually, a regional – cap-and-trade carbon trading platform. Utilisation of commercially available technology would encourage inexpensive efficiency gains – approximately 10%-20% in energy-intensive industries such as steel and aluminum, petrochemicals and cement. These would translate into significant carbon emissions reductions that could be leveraged to bring additional revenues by their sale in a foreign or regional carbon market.

For example, an average Gulf oil and gas project has the potential to generate perhaps 1 million certified emissions reductions (CERs) credits a year. The aggregate value of the Gulf carbon trade could potentially reach $5 billion annually in the medium term. Not only would there be revenue gains by the sale of CERs, but there will also be a reduction in overall natural gas consumption in the industrial and residential sectors due to energy efficiency improvements. On top of this, the billions of cubic metres of natural gas utilised in enhanced oil recovery (EOR) could be replaced with the captured carbon used for reinjection in mature oilfields. Currently, both the UAE and Oman consume about 20% of their natural gas production in EOR-related activities. Without robust intervention, natural gas consumption in Mena EOR would likely increase unsustainably.

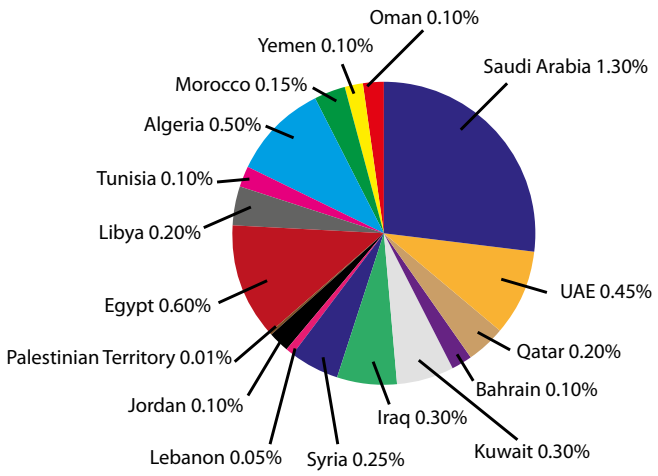
The US upstream sector has successfully deployed CO_2 EOR

Figure 1: Carbon emissions of Middle East residents



Source: Carboun

Figure 2: An individual countries share of total carbon emissions



Source: Carboun

technology for more than 40 years, and it now comprises about 37% of all EOR-related activity in the US. Moreover, there is a dual benefit to using CO_2 EOR because it can not only increase oil production in mature oilfields, but the CO_2 can also be sequestered in those same fields. Because of this potential, the Durban Platform has incorporated a carbon capture and sequestration (CCS) clause in the Kyoto Protocol's Clean Development Mechanism (CDM). As CCS falls under the CDM, it would now attract investment from industrialised countries for technology transfer, development and deployment in the Mena region.

The linking of CCS with CDM is beneficial for Mena countries. However, at present, potential Menacarbon trade suffers from the same issues as natural gas – there is no price mechanism to help industrial stakeholders estimate its value correctly. Therefore, together with energy price reform, there should be the institution of a carbon price in a cap and-trade system, introduced in incremental stages. A liberalised pricing system would also serve as a boost to energy efficiency technology investments, which could provide a structural change in industrial production for long-term emissions reductions. This is another impetus to link the carbon challenge with not just the Gulf's energy needs, but also to the overall modernisation of the regional economies.

Carbon trading

The Durban Platform, concluded in Durban, South Africa in December 2011, will have an influential role in the development of carbon trading in the Gulf region. Given the fact that it is likely to result in lowered energy consumption in the future, which would have a decisive influence on the oil-dependent economies of the Gulf, it is surprising that there has been so little substantive analysis of its potential impact. There are several reasons for this; one is that the agreement is still relatively recent that outside of press reports, there has not been enough time to digest it by the time of writing. Secondly, the Durban Platform is, at present, just an "agreement to agree" on a more substantive framework at a subsequent date. Therefore, until about 2015, there will not be a firm agreement with obligations and standards.

Nonetheless, the Durban Platform achieved the near impossible: it brought the Gulf countries – the highest per capita carbon emitters in the world, holders of about 40% of the global oil reserves and about 23% of the world's natural gas – to accept (in principle) a legally binding climate regime. After stiff 11th hour resistance, the Gulf countries finally acquiesced to a global carbon limitation agreement. The parties at the seventeenth conference of the parties (COP17) to the United Nations Framework Convention on Climate Change (UNFCCC) in December 2012 finally agreed to the rough contours of the Durban Platform. This included the principal holdouts of past climate agreements, such as the Gulf states, as well as other major emerging economies.

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The Durban Platform, which all 194 nations that took part in the negotiations accepted, has yet to be finalised, but the deadline for negotiations on legally binding carbon reductions will be in 2015, with a finalised treaty entering into force by 2020. The Durban Platform differs quite significantly from the Kyoto Protocol in that Kyoto only covers emissions limitations from the wealthy nations, the so-called Annex I signatories. However, when the Kyoto Protocol was agreed upon in 1997, the world was quite a bit different than it is today. In 1997, many developing economies were struggling with the economic fall-out of the Asian financial crisis while there was no recessionary pressure in the developed world.

The Gulf nations are currently spending billions of dollars in an effort to reduce energy consumption

The Annex II countries were developing countries at the time and as such, they were not subject to contractually binding emissions limitations. Yet, the state of the global economy evolved significantly since then. South Korea, for instance, once one of Asia's poorer countries, is now the 15th largest economy in the world, while China has emerged as the world's second largest.

Many of the largest industrialised nations – Kyoto's Annex I nations – are running unsustainable fiscal deficits; the Eurozone crisis has destabilised many European economies. In contrast, the Gulf countries have generally prospered since the late 1990s. The region boasts an annualised GDP growth rate of approximately 6%, and is home to some of the largest sovereign wealth funds in the world. Qatar, an Annex II country in the Kyoto Protocol, now has per capita GDP of about $113,000 – the world's highest. The Durban Platform recognised that the global economic reality has changed significantly in the nearly 15 years since Kyoto.

During the Kyoto Protocol negotiations, the negotiating parties incorporated the principle of "common but differentiated responsibilities and respective capabilities". They based these concepts on the recognition of two factors: the historical responsibility of Western nations regarding carbon emissions and the fact that not only do developing countries have the right to develop their economies to a certain level, but that developed countries have the financial and technological means to lower their carbon emissions.

Durban abolished the distinction between wealthy countries and poor countries. Now every signatory will eventually be bound to future emissions cuts. However, the agreement is less stringent than Kyoto because the term "legally binding" is not part of the text, instead the delegates agreed upon a final text that stipulates that the 2015 climate treaty will have a "legal form". Nevertheless, a revolutionary step for Durban and a necessary precondition for the Gulf countries was that CCS be under the clean development mechanism. The relevant text stated that CCS "is a relevant technology for the attainment of the ultimate goal of the Convention and may be part of a range of potential options for mitigating greenhouse gas emissions".

With the Durban Platform, it is arguable that the Gulf countries, which are pursuing industrialisation policies predicated on energy-intensive industries, and the world's major energy exporting nations realised that the "post oil age" is upon them and acted accordingly. At the same time, there is a certain amount of self interest in the process as the Gulf countries are experiencing an energy crisis, with an average 6% per annum increase in natural gas demand, that carbon reduction efforts will help them manage. The Gulf nations are currently spending billions of dollars in an effort to reduce energy consumption. Efforts to cut carbon emissions grants them the impetus to develop a coherent solution to balance the needs of their energy industries with the necessity of curbing emissions. The Durban Platform could very well see the Gulf develop a coherent regional carbon trading model. ●