

# A carbon solution for the Gulf's energy deficit

By introducing a carbon-management strategy, GCC countries could reduce energy consumption and carbon emissions, and conserve their oil and gas resource for future generations. By Justin Dargin, research fellow, Dubai Initiative, Harvard University

Climate change has the potential to affect every country on earth, albeit in different ways. While the industrialised countries bear the historical responsibility for the accumulation of greenhouse gases (GHGs) in the atmosphere, developing countries, especially the Bric nations (Brazil, Russia, India and China) and the Gulf Co-operation Council (GCC) countries – Saudi Arabia, Oman, Qatar, Kuwait, the UAE and Bahrain – are rapidly catching up, and sometimes surpassing, the West as a result of breakneck energy-intensive industrialisation.

Despite their rapid economic growth, the rising stars of the developing world are still saddled with antiquated, GHG-spewing industrial technology, while their low adaptive capacity make unmitigated climate change a particularly harrowing spectre.

## Reliant on oil and gas

The GCC nations have relied on oil and gas revenues to promote economic growth, transforming these countries into a platform for frenetic industrial activity. The GCC countries, as with the Bric nations, face the dual challenge of meeting rising domestic energy demand, needed to maintain development, while ensuring their carbon emissions remain within a globally acceptable volume. Although the GCC countries are not included under the Kyoto Protocol on climate change, as they were not on the list of countries defined as being industrialised, global pressure is growing for them to confront their carbon emissions.

China is the world's top aggregate carbon polluter – overtaking the US in 2008. The GCC countries emitted 0.72bn tonnes of carbon in 2006, about 12% of China's total emissions (see Figure 1), according to the World Bank. But with its smaller population and rapid industrialisation, the Gulf states far outpace China in per capita emissions, at around 26 tonnes, compared with China's 4.6 tonnes (see Figure 2).

Consequently, the GCC's energy and industrial sectors have come under increasing international scrutiny as one of the main culprits in the sustained rise of GHG concentrations in the atmosphere.

Natural gas is a strategic sector for GCC governments, providing the base for their broad-based economic and industrial diversification policies. Gas became the primary fuel of choice for Gulf industrialisation through the development of energy-intensive industries such as petrochemicals and cement, and steel and aluminium smelting. Judged against the region's rapid economic



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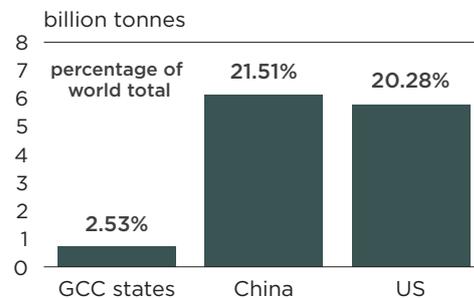
growth, the gas-based diversification strategy achieved some measure of success.

Over the past decade, the petrochemicals industry in the Gulf has expanded significantly, transforming the region into an exporting power. But while this policy was successful, it exposed some unforeseen weaknesses in the Gulf energy sector. The unrelenting industrialisation and diversification drive through energy-intensive industries placed significant

demand pressure on gas production, with every GCC country, except Qatar, experiencing shortages and power blackouts. As yet, there is no coherent regional energy policy in place to meet the challenge.

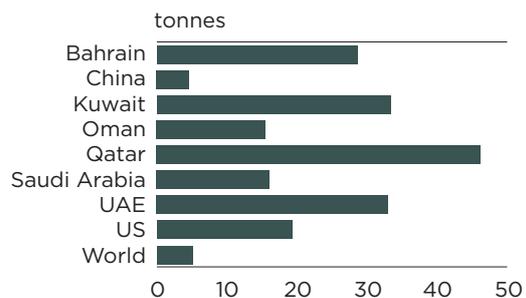
The factors behind the rapid growth gas demand varies across the region (see Table 1), depending on a country's

Figure 1: Carbon dioxide emissions\*, 2006



Source: World Bank

Figure 2: Per capita carbon dioxide emissions\*, 2006



Source: World Bank

ability to manage its economic activity and industry, its resource endowments, and the degree to which it can modify its economic and energy policies. But it is possible to pinpoint some common ground: rapid economic expansion, driven by rising oil prices between 2002 and 2008; expanding populations, with growth rates exceeding the global average; governmental policies promoting gas for water-desalination and electricity-generation projects; economic strategies encouraging energy-intensive, gas-reliant industries; increased gas use for enhanced oil recovery; gas-price subsidies, incentivising overconsumption; and a dearth of effective demand-management policies.

The inability of production to keep up with demand, coupled with the absence of a market-based allocation framework, raised serious questions about how to share

Given the steady rise of Gulf gas demand, global outcry against large carbon footprints and the lack of a viable energy-efficiency strategy, many Gulf states have considered whether carbon-mitigation strategies could meet these challenges. It is in the best interest of GCC countries to develop a carbon-mitigation framework – preferably a market-based cap and trade system – that would decisively limit carbon emissions through energy-efficiency gains in the industrial and power sectors.

By utilising commercially available technology, inexpensive efficiency gains are possible – around 10-20% in energy-intensive industries such as steel and aluminium, petrochemicals and cement. A reduction of only 10-20% in gas demand would have a meaningful effect in a region that, for much of the first decade of the 2000s, had an average annual gas demand growth of about 7%.

**Table 1: Natural gas in the GCC energy mix**

| %            | 1985 | 2009 | % change |
|--------------|------|------|----------|
| Bahrain      | 76.6 | 91.2 | 19.1     |
| Kuwait       | 29.7 | 41.6 | 40.1     |
| Oman         | 41.2 | 61.1 | 48.3     |
| Qatar        | 88.9 | 79.5 | -10.6    |
| Saudi Arabia | 29.5 | 31.7 | 7.5      |
| UAE          | 37.9 | 81.1 | 114.0    |

Source: Organization of Arab Petroleum Exporting Countries

Over the past decade, the petrochemicals industry in the Gulf has expanded significantly



the increasingly scarce gas supply among the various industrial and economic sectors. And with rising, competing calls on the region's gas reserves, the sustainability of an industrialisation strategy based on supplies priced well below international markets may not be viable.

While the Gulf petrochemicals sector succeeded in securing market share and is forecast to be the dominant region in production and exports by 2025, some question whether, in reality, the GCC countries are simply subsidising petrochemicals consumption in developed economies. The question of whether they are maximising the productive value of gas resources through petrochemicals development is complicated by the constant threat of WTO action against dual-pricing strategies that are alleged by many Western detractors – but also many in China and India – to be illegal subsidies.

### The sustainability of an industrialisation strategy based on gas supplies priced well below international markets may not be viable

A cap-and-trade carbon-mitigation scheme would allow energy-intensive companies to purchase and sell emissions certificates to each other. Cap and trade is essentially an administrative approach to mitigating emissions by providing economic incentives for achieving quantifiable reductions by placing limits, or caps, on a specified number of emissions sources. Generally, a governmental body sets a cap that declines over time and then allocates a sufficient number of permits to equal the cap. Each permit, or allowance, equals 1 tonne of carbon dioxide equivalent.

Although emissions from all entities covered by the cap may not exceed the maximum allowable volume, individually they may reduce emissions (theoretically) by the most cost-efficient method. To avoid paying the carbon price, carbon-intensive industries attempt to either become more efficient, invest in renewable-energy technology, or switch to less carbon-intensive fuels, for example.

A 2009 paper by the London School of Economics concluded that potential GCC carbon-emissions mitigation schemes would have better success by focusing on large-scale industrial projects, rather than on end-users and small-business initiatives. Because large-scale enterprises are often state-owned, the study argued that top-down change is relatively easy. But GCC populations view cheap energy as a birthright and attempts to raise power tariffs would meet tremendous resistance.

#### Positive market prospects

While conceding that carbon mitigation would be an unpopular regional strategy, the market prospects for carbon trading in the Gulf are significant. GCC states are in an exceptional position to take the lead in carbon trading and developing a lucrative carbon market with binding caps that would cut emissions, while generating revenue for renewable-energy projects. The average Gulf oil and gas project has the potential to generate perhaps 1m certified emissions reductions (CERs) credits a year. In contrast, the average biogas or renewable



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energy project in most developed countries could generate an average of 100-200 CERs credits annually. The overall value of Gulf carbon trade could potentially reach \$5bn a year in the medium term.

The main obstacle to a GCC carbon-trading platform is political inertia to act collectively. The not unjustified fear of Gulf countries is that if one were to implement unilateral carbon-mitigation regulations, joint-venture partners and non state-owned energy-intensive enterprises would relocate to a neighbouring country with less stringent regulations. Consequently, the most important step in developing a regional carbon-trading platform is that the GCC states act collectively.

### Gulf governments and companies are still developing renewable and nuclear projects in an attempt to meet soaring energy demand

In forging an optimal carbon-abatement programme, there is no need to reinvent the wheel. Gulf regulators can use North American and EU experience with market-based environmental mechanisms. With a nuanced understanding of the region's characteristics, Gulf regulators can create a carbon-trading platform that accounts for the myriad fossil fuel projects and ensures that not only is economic growth unhampered, but also that a self-generating income stream would flourish developing links between regional banks, the nascent Islamic project-finance sector and large renewable energy and carbon capture and storage (CCS) projects.

Before the global financial crisis in late 2008, the Gulf countries took some noteworthy first steps in the fight against climate change and the regional gas-production shortage, with a number of GCC nations undertaking multi-billion dollar green investment plans.

In 2007, Qatar was singled out by UN Development Programme for the highest per capita carbon emissions in the world, estimated to be at 79.3 tonnes. In a bid to change its image, Qatar became the first GCC member

to join the World Bank's Global Gas Flaring Reduction project, which aims to reduce carbon emissions through tight controls on gas flaring – a significant contributor to the region's carbon emissions.

In 2008, Abu Dhabi launched a \$22bn future-energy initiative, Masdar City – the world's first “zero-pollution, zero waste city”. Masdar, the company commissioned to carry out this vision, plans to leverage funds to build a clean-energy portfolio for investment in green technology across the Middle East and North Africa.

In 2006, Qatar said it would complete its own 1.2 square km, \$2.6bn energy city by 2012. Energy City Qatar would employ as many as 20,000 people and serve as an energy hub to the commercial, technical and human resource needs of global and regional energy firms, with a heavy focus on renewables. Both Masdar City and Energy City Qatar are to serve as models for future, low-carbon Gulf cities.

Masdar also aims to build CCS facilities in the Gulf region – plans initially designed to take advantage of a carbon-trading exchange that was to start up in Dubai in 2009. One large carbon-capture agreement was signed in 2008 by Masdar and Bahrain's Gulf Petrochemical Industries to jointly reduce GHG emissions under the UN Clean Development Mechanism (CDM), earning CER certificates that could be sold to companies in industrialised nations.

The GCC also hosted two competing plans to develop carbon-trading platforms. In Dubai, state-run Dubai Multi Commodities Centre (DMCC) and carbon-credit company EcoSecurities were to build a carbon exchange by the end of 2009. A second proposed exchange was to be built in Doha, Qatar, by the Doha Bank, also in 2009. Each project was to make its respective country the regional hub of global carbon-credits trading and earn CER certificates from planned CCS projects.

#### Plans derailed

Most regional plans were, however, were derailed in late 2008 by the global financial crisis. At the time of writing, many of these plans remain on hold.

After the dual impact of the global financial crisis and the collapse of the December 2009 Copenhagen climate negotiations, Gulf governments and businesses are taking a prudent approach towards entry into regional carbon trading. Both the public and private sectors will probably delay any significant steps towards development of a carbon platform until at least 2012, and the definition of a new global climate accord to replace of the Kyoto Protocol.

Nevertheless, Gulf governments and companies are still developing renewable and nuclear energy projects in an attempt to meet soaring energy demand. And the Gulf countries are re-evaluating their formerly conservative outlook towards participation in international affairs. Saudi Arabia is now the only Opec and Gulf nation in the G-20; in 2009, the UAE became the headquarters of the International Renewable Energy Agency; while in 2006 Qatar became, and remains, the world's leading liquefied natural gas exporter.

The Gulf's increasing global role and its persistent energy shortages will significantly influence the region to implement some form of sustainable, carbon-management strategy. And when a global climate accord is eventually reached, the Gulf states will be well placed to monetise their renewable energy investments, paving the way for a Gulf carbon-trading platform. ●