



The Abdullah Bin Hamad
Al-Attiyah International Foundation
for Energy & Sustainable Development



Research Series
Issue 05 – January 2017



Al-Attiyah Foundation Research Series

Expert energy opinion and insight

GCC gas: strategic variations

Efficient use of natural gas resources has always presented something of a paradox for the GCC countries. Despite sitting on more than a fifth of the world's natural gas reserves, the bloc's members have been unable to maximise domestic gas development. In the absence of a comprehensive regional gas pipeline network, they have come increasingly to rely on imported LNG to satisfy growing domestic demand. One solution is plain. The concept of a regional GCC gas grid should be given another chance, especially in a period of depressed oil prices that have capped regional economic development drivers. Such a gas grid, as well as establishing improved security of supply for gas-importing countries, would deepen economic and political integration within the GCC and could be achieved more quickly and more cheaply than today's costly alternative of rising LNG imports, often arriving from distant suppliers.

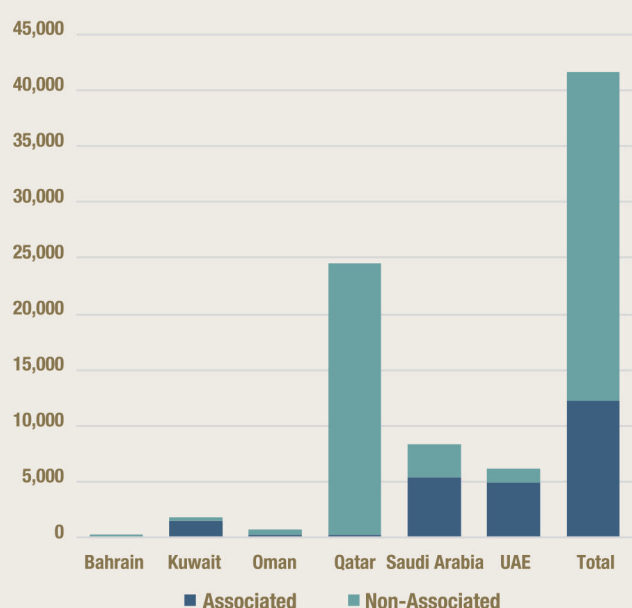
Huge gas reserves

The GCC countries' gas endowment is significant and would on its own meet global gas demand for 12 years. The six states — Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, and the UAE — hold large proven reserves and undiscovered resources of natural gas, and include major producers. The region's average reserves-to-production ratio was 102 years in 2015, almost double the global average of 53 years.

Yet despite this wealth of resource and opportunity, rapidly rising domestic gas demand is frequently not met by local supply, and some GCC countries have become significant importers of liquefied natural gas (LNG). Indeed, even as huge volumes of LNG are being exported from the region — Qatar having established itself as the world's premier exporter of seaborne gas — several GCC countries are at the same time plugging their deepening gas deficit with imports piped from neighbouring states or LNG from distant producers.

In part, this is because no single strategy for gas applies throughout the GCC, where approaches to the fuel's utilisation vary significantly from member to member. In some, gas is prioritised for domestic use to release more crude oil and petroleum products for export. In others, gas has been ring-fenced for the development of downstream gas-intensive industries such as petrochemicals and fertilisers and their secondary derivatives. This has enabled countries to hedge their reliance on oil exports, especially during periods when oil exports and revenue are restricted by OPEC output

FIGURE 01: **PROVEN NATURAL GAS RESERVES IN GCC (2016) - BCM**



quotas or by limited ability to expand oil production capacity. A third group seeks to use more modest resources to limit reliance on imported oil products and gas, part of a drive for greater energy security and self-sufficiency.



With aggregate proven reserves of 41.6 trillion cubic metres of gas, according to the 2016 BP Statistical Review, distribution among the six GCC countries is uneven. Qatar dominates this geological endowment, holding the world's largest non-associated structure — the North Field — which underpins its 25.4 tcm of proven gas reserves. Bahrain has the smallest resource at just 200 bcm (see Figure 01). Aside from Qatar, most GCC proven reserves are made up of associated gas; the production and separation of which depends on oil-production rates. This fact has made Qatar the anomaly: the GCC's only state with the ability to efficiently increase production and export capacity.

Mounting regional demand

Across the GCC, gas has become the go-to fuel and feedstock for many vital processes, including power generation, water desalination, petrochemicals, fertilisers, gas-condensate recycling, oil operations and enhanced oil recovery. That's a main reason why despite accounting for 12% of global gas output in 2015, the GCC consumed 70% of that gas within the block. Relatively new technologies, such as the use of compressed natural gas in the transport sector, have been making headway as regional governments seek to reduce emissions and pollution from the transportation sector. This will continue — and the implications for consumption are profound. According to the most recent reference study from the Organization of Arab Petroleum Exporting Countries, GCC gas demand will reach 355 bcm a year by 2020, a startling increase of 25% compared with 2015 (see Figure 02).

The potential for further growth in gas demand in the Gulf remains even greater than this, given population growth rates and improvements in living standards that exceed those elsewhere in the world. Gas consumption by the power and desalination sectors on their own is expected to grow at 8-10% annually across the GCC until at least the middle of the next decade. These two segments of the demand matrix will continue to absorb about half of the total demand for natural gas in the Gulf; the industrial sector will account for nearly 35%; and the balance will be consumed by petroleum operations to maintain pressure in oil wells (see Figure 03). In fact, the required re-injection of natural gas to maintain pressure in mature oil fields in the region, many of

which have been in production for 60 years or more, has over the past ten years become an increasingly urgent draw on domestic gas availability.

Gas investments would reduce the need to expand oil-refining capacity focused on meeting local demand, while retaining higher volumes of crude oil and products for the export markets

Given the GCC's huge oil resources (29% of global proven reserves), it seems reasonable to ask why member states have in recent years not opted to rely more heavily on crude oil and oil products to fuel power, desalination and other critical industries. Several factors explain natural gas's rise as the most viable substitute. First, growing social dissatisfaction with poor environmental standards and air quality has offered gas a profound advantage — and will continue to. Second, public awareness — and the strategic understanding — of the impact that rising consumption of oil and oil products has on volumes available for export has also grown. Despite decades of policy aimed at diversifying the GCC's hydrocarbon-based rentier economies, oil exports remain the dominant revenue provider for state budgets. A linked factor is that most GCC countries remain bound by OPEC production targets — and even non-OPEC Oman and Bahrain are committed to oil output targets as part of the November 2016 OPEC/non-OPEC agreement. These are production targets, with no limitations on exports. This sharpens the incentive to manage domestic oil consumption growth as efficiently as possible. Despite the recent easing of price subsidies for oil products, the opportunity cost of foregone oil sales to export markets remains 100-300% above domestic oil-product pricing.

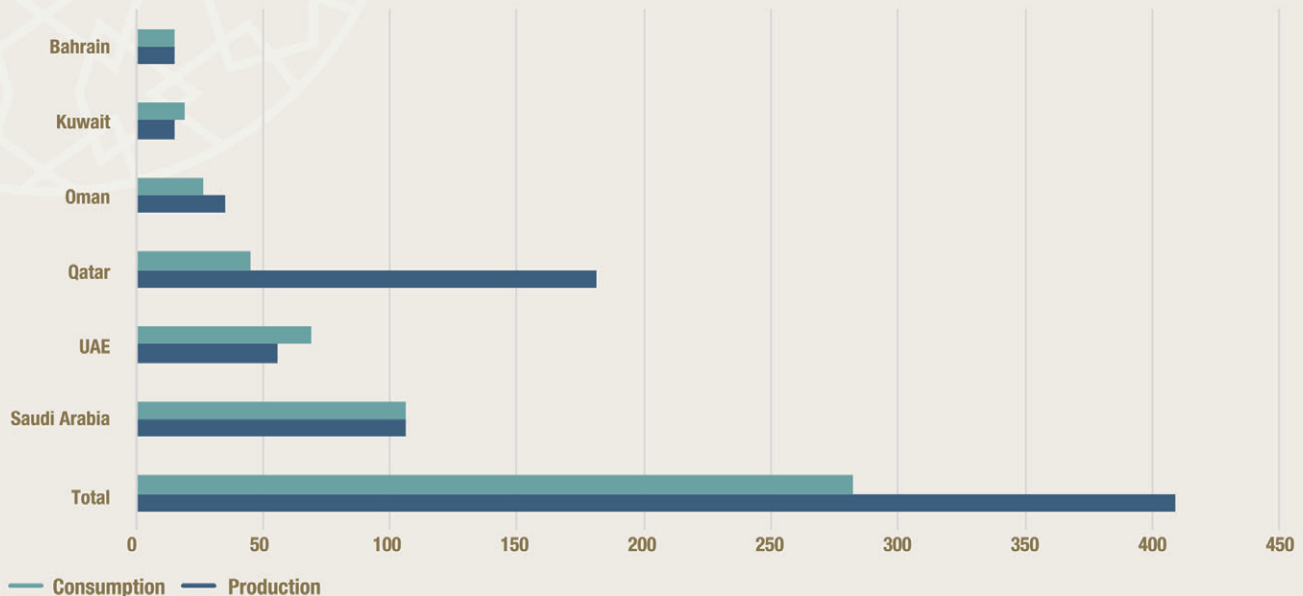
A straight gas-oil switch is not, however, always possible. Most GCC countries need to make further investments in domestic exploration and development to achieve higher gas production and utilisation or resort to higher import bills for imported pipeline gas or LNG. But gas investments would reduce the need to expand oil-refining capacity focused on meeting local demand, while retaining higher volumes of crude oil and products for the export markets.

FIGURE 02: GAS DEMAND FORECASTS IN THE GCC, 2020-35 (MCM/D)

Year	Bahrain	Kuwait	Oman	Qatar	S. Arabia	UAE	Total
2020	48.8	51.0	64.8	223.7	296.5	288.8	973.6
2025	55.4	56.8	72.3	259.7	328.8	324.5	1097.5
2030	61.4	61.8	79.0	286.4	351.0	357.3	1196.9
2035	67.2	65.8	85.6	304.8	364.0	387.5	1274.9

Source: OPAEC reference scenario in *Energy Demand Forecasts in the Arab Countries up to 2035*, December 2014

FIGURE 03: GAS PRODUCTION VS CONSUMPTION IN THE GCC, 2015 (BCM/Y)



Source: BP Statistical Review of World Energy, June 2016

A third driver for gas use over oil relates to the need to supply the growing manufacturing industry in the region with a fuel better suited for its development, and to put electricity production on a more durable footing from the point of view of efficiency and modernity. In the absence of an industrial-scale deployment of renewables and nuclear, gas remains the most suitable energy source for achieving these goals.

Gas deficits drive exploration, LNG

But all this has created a problem too. In GCC countries with modest gas reserves, or where reserves are associated with oil production and the prospects for higher oil production are limited, gas deficits are increasing. In the face of this mounting challenge, governments are either opting to dedicate more of their upstream budget to gas exploration and development, or have decided to build more import infrastructure.

Both Saudi Arabia and Kuwait fall into the former category. Riyadh in particular is aggressively exploring for new non-associated gas resources while developing its dry-gas reserves. Many of these are located in geographically dispersed small fields, or in high-pressure, corrosive and deep Khuff reservoirs, usually found below oil structures. These have proven expensive to develop, especially given the context of domestic gas prices in the region, which range from \$1-2/mmBtu. Saudi Arabia, especially, has also started to explore for unconventional gas. The kingdom, which is believed to have huge potential for tight gas, has carried out its first tight gas reservoir completion and fracture stimulation, in the Sarah formation in the Rub Al-Khali (Empty Quarter). Other preliminary tight gas prospects have been identified for exploration drilling.

Yet if plans for developing more expensive dry-gas fields and unconventional gas structures are to make a significant difference, GCC governments must tackle the issue of domestic gas prices. At present, natural gas prices still reflect the era of associated gas surpluses, and continue to be set well below the marginal cost of production for new gas.

Governments will need to establish a timetable for gradually increasing prices before reaching a full liberalisation stage. But such moves are expected to face stiff resistance both from citizens who consider cheap gas prices to be part of a producer's wealth distribution, and from large industrial companies that have taken advantage of low feedstock prices to build huge export markets for their industrial products.

LNG dominates imports

Where no strong exploration prospects exist, the region's gas-deficit countries have opted for LNG imports to cover their shortfall. Kuwait and Dubai are already operating LNG-import terminals, while Sharjah, Bahrain, Abu Dhabi and even Oman and Saudi Arabia have been seriously considering putting similar facilities in place. These countries see a strategic advantage in importing LNG, which allows some additional security of supply through diversification. The construction of the import elements of the LNG supply chain, including regasification units, especially less-expensive floating storage and regasification units, has become more competitive. The global market is well-supplied and an increasing shift towards spot sales and away from long-term contracts has also put downwards pressure on delivered LNG prices, helping buyers.

But it is the absence — with a few notable exceptions — of cross-border pipelines that is the key reason for GCC nations to seek imports of LNG. A regional gas grid was originally conceived and adopted at a 1989 GCC summit meeting, but has made scarce progress. The proposed grid comprised two main lines with a nodal point in Qatar's North Field. The first line was to run to Kuwait through Bahrain and Saudi Arabia, and the second was to link the North Field to Dubai with an extension to Oman. The full grid never came to fruition and — aside from the Dolphin pipeline, which fulfils the Qatar-UAE-Oman part of the plan — cross-border gas pipelines in the GCC are mostly notable by their absence. In addition to the short-lived Iraq-Kuwait gas pipeline, and the small gas link

FIGURE 04: GAS TRADE EXCHANGES IN THE GCC, 2015 (BCM/Y)*

Country	Piped Gas	LNG	Total
Bahrain	-	-	-
Kuwait	-	-4.2	-4.4
Oman	- 2.1	+10.2	+8.1
Qatar	+19.8	+106.4	+126.2
Saudi Arabia	-	-	-
UAE	-17.7	+4.5	-13.2

* (-) refers to imports, (+) refers to exports)

Source: BP Statistical Review of World Energy, June 2016

between Oman and Ras Al-Khaimah, the Dolphin pipeline project remains the dominant link, supplying up to 20 bcm/y of Qatari gas to the UAE and Oman. Negotiations for Dolphin took years, with the low gas sales price reflecting the tough political compromises and concessions made on all sides.

Aside from concessionary gas pricing, several factors have held up progress on a regional gas grid — and must be addressed urgently if the concept is to be successfully revisited. These include how to manage seasonal gas demand (for country gas balances, see Figure 04). Regional power demand (and consequently gas demand) peaks in the summer, due to cooling requirements, while winter demand is significantly lower. Options to manage this swing by either creating storage facilities close to the upstream or, alternatively, closer to consumption centres, should be evaluated together with their respective impacts on capital and operating costs.

The second factor is the issue of transit fees, especially where a link between two countries passes through a third. Fees paid in cash or in kind (gas), could well affect the whole economic feasibility of a pipeline network project. A third restrictive factor relates to third-party access. Under World Trade Organization rules, pipeline owners must be given full access to the domestic markets of the countries through which pipelines run. In discussions around proposed Gulf pipelines, that right for market access has not always been granted for a variety of reasons.

Finally, there is the question of energy independence. Typically, GCC states have sought to avoid being seen to depend on their neighbours for energy supply, an imperative sharpened by their role as major oil exporters.

Conclusion: revisiting a GCC gas grid

But a natural gas grid that connects the GCC, smooths out some of the pockets of gas scarcity, allows for the efficient transfer of geological wealth in a manner that more tightly binds the bloc to the mutual benefit of both its gas-rich members and gas-poor ones should be an imperative. The opportunity is now.

The weak state of the global gas market should encourage GCC leaders to reconsider the future of gas pipelines in the Gulf, especially since they would yield a similar if not better netback value than alternative uses, where prices have come under pressure. Qatar's decision to increase volumes exported through the Dolphin pipeline already reflects this sound economic rationale, despite a long period of unwillingness and reluctance to take advantage of the project's full capacity.

Above all, a GCC gas grid would also increase the security of supply for the Gulf's gas importers by allowing countries a viable alternative to their increasing reliance on LNG

Progress on utilising Dolphin's throughput capacity is significant. The Dolphin pipeline is identical in many aspects to the second main pipeline (Qatar-Dubai-Oman) envisaged in the original plans for the GCC gas-grid project and can be viewed as a fair model for new pipelines that could make up a grid. A wider gas network would increase gas resources available to the internal GCC economy and drive economic development. It would boost intra-regional trade and would represent an important step towards the long-sought public objective of political co-operation and economic integration of the Gulf countries.

Above all, a GCC gas grid would also increase the security of supply for the Gulf's gas importers by allowing countries a viable alternative to their increasing reliance on LNG — which is often shipped from distant exporter countries. In addition, by supplying as many countries and gas customers as possible along its route, a GCC gas grid would indirectly add more stability and security to regional gas trading by increasing a mutual dependency factor.

Despite these economic and social benefits, a clear strategic decision by the GCC is needed to pursue a regional gas grid. Leadership is necessary. The strategy would demand acceptance of the concept of mutual interdependence for energy supply. While political relations in the Gulf have not always run smoothly, it is worth recalling that Western European countries relied on piped Soviet gas during the years of the Cold War without allowing deep ideological differences to undermine the economic rationale of those gas links. Given the common heritage between the GCC states, which reinforce its historical, cultural, economic and political relationships, the bloc should be able to accomplish a gas network that would deliver an even better energy outcome than the European model.



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