

Interconnecting the GCC States

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On 20 April 2011, the Gulf Cooperation Council (GCC) celebrated the inauguration of the UAE's link to the GCC Interconnection Grid, an extensive 1200MW high-voltage system interlinking five of the six GCC countries' national electricity networks. Originally conceived in the early 1980s, the project's implementation and financing remained uncertain for two decades, until high windfall oil and gas revenues from the early 2000s and exploding power consumption rates finally prompted the GCC heads of state to officially proceed with the grid in 2004 and tender out construction contracts. Following the grid's initial inauguration in July 2009, when Bahrain, Kuwait, Qatar and Saudi Arabia first 'plugged in' to one another, the recent link of the UAE to the grid constitutes another milestone in the project's epic history. The only link left for completion is the one between the UAE and Oman, which is planned for 2013.

This article explores the economic and political significance of the GCC Interconnection Grid for the region. Currently, the regional power grid serves only as a back-up mechanism supplying electricity-deficient countries with ad hoc electricity supplies. In the long term, however, the grid has the potential to effectively become a tool for commercial electricity trade between the GCC states and hence to help create a regional electricity market, also leading to far greater economic integration; that is, if GCC policy-makers continue to support regional institution building in the utilities sector, while also engaging in necessary domestic market reforms.

Economic Benefits (and Limitations) of the Grid in 2011

The GCC grid today functions as a cross-regional security mechanism that allows the transfer and exchange of electricity between the interlinked countries' national power systems at times of emergency, i.e. when domestic reserve or generation capacity is insufficient to supply peak demand. The primary idea behind the GCC grid's emergency mechanism makes use of cross-regional differences in electrical load structures: where one country suffers a power shortage, another country's 'idle' capacity can help support a neighbour's system stability, by providing extra reserve or generation power. The mechanism benefits both parties since the receiving party pays back the electricity in kind, thus supporting another neighbour at times of emergency.

This regional security mechanism is badly needed: fast rates of energy demand growth, including in the electricity sector, have led to high consumption growth rates for electricity in several GCC states since the 1970s. Total regional consumption of electricity between 1980 and 2009

rose nearly tenfold and is forecast to continue to grow at high rates along with the expected high economic growth in a region with average GDP growth figures of between 5 and 9 percent in the past decade. Per capita consumption rates are already among the highest in the world in parts of the GCC, with Qatar and the UAE leading global per capita demand tables for electricity (see Table 1). Economic diversification programmes since the 1970s aimed at raising non-oil output have driven much of this consumption growth. In addition, electricity in the GCC has been subsidised by the state for nearly four decades, leading to a zero or near-zero cost of energy used by citizens and their companies, with the result of a lack of incentive to save energy or to invest in greater energy efficiency.

Table 1: Comparative Economic Indicators for the GCC

	<i>GDP per capita, PPP (constant 2005 international dollars), 2008</i>	<i>Population thousands 2008</i>	<i>Electricity Production (TWh) 2008</i>	<i>Electricity Consumption (TWh) 2008</i>	<i>Electricity Consumption p.c. (KWh) 2008</i>
Bahrain	32,233	1,106	11.2	10.5	10,390
Kuwait	45,539*	2,496	48.6	42.6	13,373
Oman	23,333	2,867	15.3	13.3	4,619
Qatar	84,043	1,448	20.3	18.8	12,694
Saudi Arabia	21,692	24,807	191.9	174.5	7,563
UAE	54,143	4,765	81.1	70.6	16,500
Total GCC	-	37,491	368.5	330.2	-
OECD	30,801	1,216,299	1080.9	8398.6	8,399

* Number for 2007

Source: World Bank; Arab Monetary Fund; Arab Union of Electricity Producers; OECD: World Bank and EIA

The consequence of the region's long-term consumption growth for electricity has been recurrent electricity shortages in recent years, with power outages and load shedding occurring along the entire Western Gulf coast with frustrating regularity between May and November, annually. Businesses and the region's energy-intensive industries make substantial losses each year during times of blackouts – the emirate of Sharjah alone, for instance, has calculated the expected losses made during its *annus horribilis* 2009 to over AED70mn (US\$19mn). New electricity connections for businesses can take several months, and the shortages have impeded the development of a number of new energy-intensive industrial projects. Shortages of natural gas, the main fuel used in power generation in several GCC states, have further constrained electricity production even where enough generation capacity exists. Meanwhile, investment in new capacity has been lagging for years, a result also of missed opportunities during the 1990s and early 2000s where plans for new capacity investments did not take off. And so, the GCC states have – somewhat paradoxically – turned from the world's premier energy exporter to a region struggling with its own domestic energy demand, specifically in the area of electricity.

In this context, the GCC Interconnection Grid constitutes thus far the most ambitious and most comprehensive regional approach towards energy security among the GCC states. Hopes for a major contribution of the grid towards more system stability in the region, particularly at peak times, have of course only been implicitly made, for none of the GCC heads of states wishes to create the impression that anyone's energy security depends on a neighbouring country. In any case, the resulting 'enhanced' collective security is expectedly imperfect. The GCC states suffer from what can be called 'peak load collectivism' which implies that patterns in the Gulf states' demand for electricity, are fairly similar; peak times coincide during the summer months, when air conditioning drives up electricity demand, and in the afternoon hours. A maximum of only one hour time difference between the East and the West coast of the Arabian Peninsula further limits the variability of peak load times across the region. While there may still be space for improvement in the coming years with regards to new spare capacity coming online, there are arguably limits as to how much security of mind the GCC states can realistically expect from their new interconnection grid in the short to medium term.

There is also the separate question of whether or not the system under its current form of usage is particularly economical. Commercially speaking, the grid is clearly far from recovering its initial costs of an estimated \$3 billion, excluding the still incomplete UAE–Oman link which will increase costs further for the latter two countries. The high sunk investment into the grid stands in contrast to a few, ad hoc-based and comparably small-quantity transfers of electricity so far not exceeding 1 percent of each member's total domestic consumption. Technically, the grid is hence under-utilised. None of this comes as a surprise: security of mind always comes with a cost, and while the grid in the long run may lead to some cost recovery, and perhaps even savings, in the short run no miracles can be expected.

The Potential for Regional Electricity Market Development

A more interesting question to ask, however, is whether or not in the long run the GCC grid could evolve into more than merely a security mechanism for the region's electricity producers. The grid constitutes a tool with a variety of uses, including the option of commercial trade in electricity between the GCC states. One of the most important questions GCC decision-makers will have to ask themselves in the future is whether or not they want to turn the GCC grid into a backbone for such trade, which would imply a common market for electricity in the region.

A regional electricity market in the GCC would potentially imply gains for all: electricity trade along the lines of more mature markets such as in Europe or North America suggests substantial efficiency savings can be made investment-wise; economies of scale and temporary or long-term cost advantages can be gained, on a more flexible, more reliable and effectively more efficient market. Electricity would be traded based on a cost/efficiency advantage of its utility producer vis-à-vis other regional producers, both in the short and the

long term. The argument for commercial trade is particularly strong when seen in the context of many of the GCC states' declared aim of diversifying their sources of energy in power generation, towards more renewables and, in the cases of the UAE and perhaps Saudi Arabia, nuclear power. While their European counterparts are debating whether or not alternative energy and regional commercial trade can work together, the GCC states may have a unique opportunity to demonstrate their own model of sustainable energy use in combination with commercial objectives. If these are the goals of GCC decision makers, the grid's launch comes arguably at exactly the right time.

Nevertheless, the emergence of such regional trade, if desired by GCC policy-makers, and the creation of an effective regional electricity market along the lines of European and North American power markets need to be taken as a long-term endeavour which lies at best a decade away. Current market realities in the GCC states are far from fulfilling the conditions that basic regional market trading would require, most principally in the areas of overall market liquidity, diversification of energy sources used for power generation, and the thorny issue of utility sector liberalisation including domestic electricity pricing. Market liquidity is lacking most critically through the marked absence of sufficient levels of spare generation capacity in most GCC states, with Qatar currently being the only candidate with potential to export electricity at times of peak demand inside the country. In the rest of the region, peak demand consumes typically all domestic capacity, rendering large-scale commercial exports unthinkable at present.

Lack of diversity among fuel used for power generation currently prevents many of those types of cost advantages that are essential in large power markets such as in Europe. Natural gas and oil dominate the GCC power sectors as the primary source of generation, with individual small-scale renewable projects barely making a contribution. Bahrain, Qatar and Oman rely to nearly 100 percent on natural gas for power generation. Renewables and nuclear energy in particular have the potential to raise cross-regional cost advantages and efficiency savings through electricity trade. Market liberalisation in many GCC states, meanwhile, remains imperfect; despite some reform efforts, most notably in countries such as Oman and Bahrain, vertically integrated national utility companies still dominate the power sectors of Saudi Arabia, Kuwait and the UAE, limiting domestic competition and private investment.

More critically, domestic pricing of electricity remains heavily regulated, with prices subsidised below costs, effectively distorting demand and supply in many parts of the region. Recent pricing reforms in the residential sector such as in Saudi Arabia in summer 2010 have begun tackling this issue, but many Gulf producers of oil and natural gas find it politically too sensitive to change their domestic pricing structures for energy in view of their populations' expectations about low-cost energy. Many industries, such as aluminium and steel production, moreover depend with their cost advantage on plentiful and cheap electricity. Commercially traded electricity, by contrast, will be priced based on the full cost of production plus exporting company profit

margins and the transmission fees for trading. Thus imported electricity will be unable to compete on prices with domestically produced power, a point which may yet prove to be one of the biggest hurdles to GCC economy trade in electricity in the mid to long term.

Political Significance

Perhaps even more than economics, the GCC grid in its current use may be seen as being politically very significant for the region. The economic integration of the GCC states has been one of the fundamental aims of the organisation since its creation in 1981. Cooperation through shared infrastructure projects, collective security efforts (including in energy), and the creation of a common market for goods and services have been objectives pursued through the decades, at times under strong criticism from within the region regarding the lack of progress in many proposed areas of such cooperation, including the failed pan-GCC gas pipeline and the as yet unachieved currency union. In this context, the GCC Interconnection Grid marks one of the few bright spots in the GCC's more recent history: it is a tangible achievement made possible by collective efforts and political will, with enormous economic potential for the long-term development of the region as a

whole. Its symbolic value is thus high.

In sum, there is much to gain from the GCC Interconnection Grid if decision-makers in the region continue to unite behind the shared goal of a regional energy trading scheme. Electricity markets throughout most of the GCC states are already undergoing structural reform, and it is domestic as well as regional policy-making which will be crucial in deciding the outcome of past and current efforts with regards to GCC electricity market integration. For a European observer, the GCC experiment is in any case a worthwhile case to follow: ongoing reform and debate behind European electricity trading schemes revolve around a number of issues the GCC states yet have to face, including the necessary extent of individual countries' domestic market liberalisation and the interplay of renewable energies and commercial electricity trade – in both cases, the GCC states are likely going to see their own models evolve in the coming ten to fifteen years, provided the policy focus remains on regional energy market integration as well as domestic market reform.

This article is based on an OIES working paper by the author titled 'Interlinking the Arab Gulf: Opportunities and Challenges of GCC Electricity Market Cooperation', forthcoming in July 2011.