

## GCC: The Backbone of Power Sector Reform

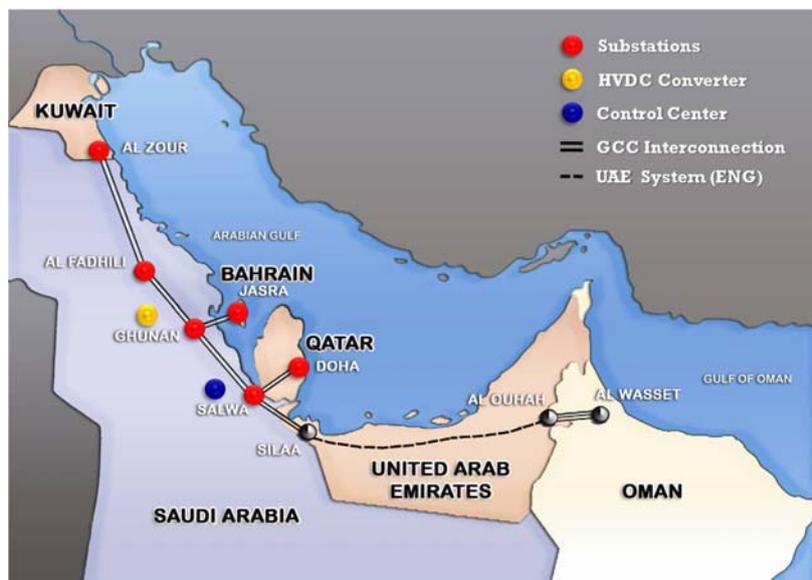
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Since 1981 the six countries in the Gulf Cooperation Council (GCC) have made substantial reforms to their electricity sectors. Hassan K Al-Asaad looks at the evolution of the GCC power grid and its potential for both regional and international exchange and trade.

Driven by the so-called 'second oil boom', the Gulf Cooperation Council (GCC) countries – which comprise the United Arab Emirates, the Kingdom of Bahrain, the Sultanate of Oman, the State of Qatar, the Kingdom of Saudi Arabia and the State of Kuwait – have achieved an average sustained growth of almost six per cent annually, thus making the GCC one of the most robust economic blocks in the world.

Instigated in May 1981 with the main objective to develop and solidify the political, economical and social ties among the member states, the GCC countries have been opting for energy intensive industries (such as petrochemicals, steel, aluminium and cement), as well as focusing on other industries such as the real estate and tourism sectors.



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*The GCC grid, aka 'the backbone', will provide greater opportunities for IPPs and IWPPs to be established in strategic locations close to resources*

All these factors, along with a high birth rate of seven per cent (one of the highest in the world), have led to a fast-growing demand in electricity. The electricity sector in the region has been encountering exponential growth which has reached almost ten per cent annually in many of its member states, thus requiring approximately \$100 billion worth of investments to meet growth for the next 15 years. The current demand for electrical power in the GCC countries is approximately 70 GW and this is expected to triple over the next 25 years.

Realizing the massive investments required to meet and maintain such demand most GCC countries have made substantial reforms to their electricity sectors.

## **POWER SECTOR REFORM**

Electric utility reform means different things to different people in different countries. No one model fits all countries. Regardless of what model one chooses the basic model for electricity reform involves separating generation from transmission and distribution, by the process of: unbundling the vertically integrated structure; allowing competition to exist in generation; allowing transmission and distribution companies to provide equal access to all network users on a non-discriminatory level; and establishing an independent regulatory body. The most important step in any sector reforming is to clearly understand and articulate a country's goals and constraints.

Typical goals may include: reducing electric costs on governments (i.e. investments in generation); attracting private capital by removing bureaucratic policies; maximizing public revenues from the sale of government owned assets; and creating an efficient and environmentally sustainable electricity sector.

Power sector reform is beginning or underway in many regions and countries around the world, particularly in the GCC region. Reforming is resulting in independent power production and competition in generation, decentralization, privatization, unbundling of generation from transmission and distribution, and even – in some countries – competition in distribution.

## **REFORMING THE GCC's POWER SECTOR**

Realizing the financial burden the GCC countries are currently and potentially experiencing to meet power demands, the GCC countries (with the exception of Kuwait) have embarked on unbundling their power sectors into separate generation, transmission and distribution segments – thus providing opportunity for these business segments to focus on their core business, and also encouraging capital investments from the private sector.

Reform efforts in most of the GCC countries are limited to opening up the power sector for private investment in generation, transmission and distribution, however, much consideration is being given by the GCC governments, with Oman leading the way, by implementing laws to facilitate reform.

## **UNITED ARAB EMIRATES (UAE)**

The rapid increase in the demand for electric power in the UAE led to the formation of a privatization committee for both the power and water sectors. Abu Dhabi, the largest of the seven emirates in the UAE, has undergone major reforms in its power sector since the 1990s.

Prior to 1999 the sector had been vertically integrated and managed by the government. In 1998, a new law was adopted which began reformation of the sector. The new law reformed the sector based on a 'single-buyer' model and established the following entities:

- Four generation and desalination production companies.
- A single-buyer company to purchase the electricity and water production from, and to supply gas to, the GDs.
- A transmission and dispatch company, with the responsibility for electricity and water transmission.
- Two distribution companies for the supply of electricity and water to customers.
- An independent regulator responsible for both economic and technical regulation of the power and water sectors.

These companies were initially wholly owned by the Abu Dhabi government through the sector authority, the Abu Dhabi Water and Electricity Authority (ADWEA).

However, more than four-fifths of the production of electricity and water has been sold to independent water and power providers (IWPPs) under long-term power and water purchase agreements (PWPAs). With the privatization of some of the six IWPPs the government still retains full ownership of the monopoly businesses of procurement, transmission and distribution.

## **KINGDOM OF BAHRAIN**

The Ministry of Electricity and Water was recently converted to a quasi-government authority – this retains responsibility for the generation, transmission and distribution of electricity in the Kingdom as a first initiative of reform to its power sector.

Shifting from a vertically integrated model to a single-buyer model Bahrain has allowed private sector participation in generation, and has privatized its generation stations (Al-Hidd and Al-Ezzel power plants), which were government controlled.

It intends to establish a regulator to ensure that private sector participation leads to the effective development of the electrical power sector in the country.

## **KINGDOM OF SAUDI ARABIA**

Following a Royal decree in 2000, the Saudi Electricity Company (SEC) was established as a result of merging the ten regional power companies responsible for the Kingdom's power supply. However, to provide opportunities to the private sector to compete and alleviate the financial burden for investments to meet the power demands, the government has permitted the private sector to invest in power generation. The formation of Marafiq in the industrial cities of Jubail and Yanbu, and the establishment of the Water & Power Corporation (WEC) in the western province of the country have been a major boost to privatization.

As part of the reformation process, the Electricity Services Regulatory Authority (ECRA) was established in November 2001. The ECRA is responsible for regulating the supply of electricity, issuing licenses for electricity projects, ensuring compliance with conditions of licenses, and the protection of rights of consumers, investors, producers, transporters and distributors.

A proposed electricity sector reforming plan for a three-stage electricity market evolution over the period 2008–2016 was developed. The plan will consist of:

- **Unbundling & Generation Competitions (2008–2010):** involves the unbundling of the SEC into operationally independent generation, transmission, and distribution companies, and the introduction of competition in power generation. It will see the creation of four generation companies from existing SEC assets, a power procurement company to act as a single-buyer, and a grid company to own the transmission system and act as an independent system operator.
- **Wholesale Competition (2010–2013):** will introduce wholesale competition, increase the size of the parallel market, create distribution companies (owned by the SEC), establish a spot market allowing non-discriminatory access by large electricity customers to the grid and implement a wheeling tariff set by ECRA.
- **Retail Competition (2013–2016):** will introduce a full wholesale electricity market being operated by an independent system operator. Both generation and distribution companies will have independent roles in the market with a restricting role for the single buyer.

Currently, major industrial consumers are allowed to generate their own power and sell off excess power to SEC transmission.

## **SULTANATE OF OMAN**

The Ministry of Housing, Electricity and Water was responsible for the whole electricity generation, transmission and supply until August 2004

A law was then promulgated under Royal Decree No. 78/2004, which went into effect on 1 May 2005, further driving the privatization of the power sector and opening more opportunities for private investors, and the establishment of an independent regulator.

The law provided a transition period to transfer from the self-regulated vertically integrated arrangement to a new market structure in accordance with the transfer scheme. The transfer scheme specified 1 May 2005 as the transfer date.

The responsibilities of the Ministry of Housing, Electricity and Water were then transferred to newly formed successor companies: The Electricity Holding Company; Oman Power & Water procurement Company; Oman Electricity Transmission Company; Muscat Electricity Distribution Company; Mazoon Electricity Company; Majan Electricity Company; Rural Areas Electricity Company; Rusail Power Company; Wadi Al Jizzi Power Company; and the Al Ghubra Power Company.

The electricity and water sector in the Sultanate comprises of three separate and distinct market segments: the main interconnected system in the north of Oman; the rural systems of the Rural Areas Electricity Company; and the Salalah power system. With the exception of the Electricity Holding Company the successor companies are now responsible for the electricity functions previously undertaken by the Ministry of Housing, Electricity and Water.

The government does not plan to, at this stage, privatize the procurement company, however plans are underway to privatize the transmission and distribution side of the sector. The government has already privatized one of the three government-owned production facilities, namely the Al Rusail Power Company.

## **STATE OF QATAR**

The government has already initiated a programme for the reform and privatization of the electricity sector. Functional separation of generation, transmission and distribution has been allowed, along with private sector participation.

The Qatar General Electricity and Water Corporation (Kahramaa) is responsible for the transmission and distribution segments, whereas generation has been transferred to the newly formed Qatar Electricity & Water Company. The government grants licenses to private sector entities to build generation plants and is currently studying the possibility of privatizing Kahramaa and forming a transmission and distribution company.

## **KUWAIT**

The power sector is controlled by the Ministry of Energy and is responsible for the operation, development and expansion of the sector. The electric supply industry is state-owned and has a vertically integrated structure. Although its annual electricity demands are amongst the highest in the GCC region, the Kuwaiti government has, so far, no plans to reform the electric power sector and it is likely to remain vertically integrated.

In general, the GCC countries are reforming their power sectors in order to allow competition at the generation level through the introduction of independent power providers (IPPs) and IWPPs, and to establish separation in their current single-buyer market to introduce more competition.

## THE GCC POWER GRID

It was 27 years ago when the leaders of the United Arab Emirates, the Kingdom of Bahrain, the Kingdom of Saudi Arabia, the Sultanate of Oman, the State of Qatar and the State of Kuwait met in Riyadh to form the GCC.

Of the many objectives and goals that were agreed upon, one of the most unique was achieving the long-term comprehensive development strategy goal, which states: "The complete interlinking of the infrastructure network among the GCC States, especially in the fields of electricity, transportation, communication and information".

Hence the GCC Interconnection Authority was established to meet that objective. Ever since then, the Authority and its Interconnection project have been the focus of much public interest – especially as the link was in planning for many years, creating a notion among many observers that it was only a dream.

It did not become a reality until the contracts were awarded in 2005, which changed the dream into a reality. There is no doubt that the interconnection will provide a lot of operational, economical, environmental and technological benefits.

The main economic benefits of the project are to provide improved security of the power supply and better economic efficiency through savings in the operating reserves installed capacity.

However, for the GCC countries the purpose of the interconnection is to share generation reserves and installed capacity in order to reduce additional investments in generation infrastructure – a matter of great concern which has topped the agendas of the six member states.

In particular, the Kingdom of Saudi Arabia, with its supportive role in achieving this interconnection, will benefit immensely as a result of the consequential reduction in the installed generating capacity and associated operating and maintenance (O&M) costs.

The projected economic benefits in an interconnected system (as opposed to an isolated system) could result in reducing the total installed capacity by approximately 2000 MW, and the required capacity reserves by approximately 50 per cent. Associated with the reduction of costs would be the O&M costs required in the six GCC countries. With an interconnected system the total cost savings for O&M is projected to be close to \$309 million.

In essence, interconnections between states provide linked countries with an alternative source of operating reserves and support during emergencies. It can also provide diversity to the available sources of energy supply – instead of depending on domestic resources for energy (i.e. fossil fuels such as oil and gas) the interconnection can increase system efficiency through the diversification of energy resources such as importing power from countries which generate it more economically from nuclear or hydropower.

In the case of certain fuels or resources such as hydropower and other renewable resources, an interconnection is the only feasible means of making such resources available to other areas. This leads to the development of these diverse energy resources for the benefits of the entire region, thus allowing less costly power to be delivered from distant locations, often displacing important, expensive fossil fuels and utility projects.

Apart from providing security of power supply, interconnections have gained importance as a mechanism to improve the economic efficiency of power systems. With the development of power interconnections, individual power systems can be operated and expanded as part of a larger regional system, thereby providing countries with income through the export of excess power to other countries and regions. Due to the large availability of gas and crude oil for

power generation in some GCC countries, the potential for exchanging economic energy between power systems exists.

Though the investment is huge, the Authority envisions that the GCC grid system could be expanded to trade energy, not only within the GCC, but also with other interconnected regions, like North Africa and Europe (UCTE). The GCC Interconnection grid will make it possible to create a common GCC electricity market, which will ultimately provide a number of advantages to the GCC countries.

The newly reformed regulations in the GCC states have been promoting participation of local and international investors in the power sectors, resulting in lower production costs as a way to achieving lower electricity prices. In addition, private investors are now allowed to develop mega-projects with access to expanding markets, including, not only the GCC, but other power pools such as the EJILST (Egypt-Jordan-Iraq-Lebanon-Syria-Turkey) Interconnection, the Arab Maghreb (Libya, Tunisia, Algeria, Morocco and Mauritania) Grid and the UCTE (European power grid).

The existence of the GCC grid, commonly known as the 'back-bone', will also provide opportunities for the establishment of power plants close to resources thus giving freedom for IPPs and IWPPs to select a strategic location, realizing the potential in dealing with a large size market, while facing minimal risks.

Extending the GCC grid to other grids such as the EJILST or the UCTE will provide an opportunity for the export of surplus power to other regions. For instance, during winter when demand for power is low in the GCC, there will be an advantage to exporting power to regions in Europe where power demand is high.

The market will also encourage energy interchange when demand for power in the GCC region is high during the summer seasons – this can be met by importing from regions where demand is low during the same period.

## **GCC AND BEYOND**

The GCC interconnection will act as a gateway towards achieving regional and pan-Arab power pools, thus promoting social, economic and environmental development and cooperation in the Middle East and North African countries.

With this accomplished, not only will the GCC Interconnection Authority be a symbol of unity and cooperation between the six GCC countries but will be a 'launch-pad' for other cooperative projects such as the water and railway interconnection grids.

The GCC grid, aka 'the backbone', will provide greater opportunities for IPPs and IWPPs to be established in strategic locations close to resources