
THE ENERGY REGULATION AND MARKETS REVIEW

FOURTH EDITION

EDITOR
DAVID L SCHWARTZ

LAW BUSINESS RESEARCH

THE ENERGY REGULATION AND MARKETS REVIEW

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For further information please email
Nick.Barette@lbresearch.com

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Editor
DAVID L SCHWARTZ

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PUBLISHER
Gideon Robertson

BUSINESS DEVELOPMENT MANAGER
Nick Barette

SENIOR ACCOUNT MANAGERS
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Adam Myers

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SUBEDITOR
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EDITOR'S PREFACE

Our fourth year of writing and publishing *The Energy Regulation and Markets Review* has been marked by significant infrastructure development needs, low oil and gas prices, financial and economic sustainability measures, and carbon reduction programmes.

As many of the world's economies have begun to regain their financial footing following the global economic crisis, we are seeing a strong focus on infrastructure development. India is heavily engaged in providing economic incentives for the development of generation, transmission and distribution facilities, and many countries have acknowledged significant generation development needs to meet growing demand, including in Central Africa, Egypt, Uzbekistan, Indonesia and Malaysia. In the wake of Russia's annexation of Crimea, Ukraine is seeking IMF financing assistance to invest in power sector infrastructure, and New Zealand is looking to build large transmission projects.

We have also seen continued efforts to promote sustainability and development of green energy resources. Denmark has created a climate council and new regulatory requirements to encourage development of green energy and to promote conservation. France has adopted an aggressive new energy efficiency and conservation law that includes a new 'carbon' tax. The United States Environmental Protection Agency has proposed a Clean Power Plan to limit CO₂ emissions from existing generation facilities by 30 per cent by 2030. At the same time, however, a federal court of appeals in the United States has determined that the Federal Energy Regulatory Commission (FERC) had no authority to treat demand responsiveness (a form of conservation) with the same economic value as generation. Korea has been exploring eco-friendly sources of energy independence, and Brazil has encouraged renewable energy development to make up for reduced hydropower in recent years. Even China appears to be working to develop clean, safe and sustainable energy that reduces reliance on coal generation.

Oil and gas prices remain low, which appears to have allowed largely energy-dependent countries (such as Japan) to secure longer-term oil purchases, but appears to have had negative impacts on countries that largely rely upon oil export revenues, such

as Russia, Angola and Iraq. Efforts to reduce reliance on nuclear generation continue to create demand for other energy sources in Germany, Japan and France.

We have seen significant energy sector regulatory reforms in many countries. In Spain and Portugal, there have been efforts to reduce the tariff deficit and promote financial and economic sustainability. Poland has worked to reform its regulatory system to encourage competition and development, while, at the same time, protecting state-owned companies from hostile takeovers. Romania has sought to encourage competition and reduce political interference with the regulatory process. The United States has continued to struggle with how to allocate transmission costs fairly and efficiently under FERC's Order 1000.

Certain countries have continued their efforts to privatise state-owned companies. Turkey has engaged in an effort to privatise its generation facilities. Cyprus is continuing its efforts to privatise its state-owned utility company. India is privatising its coal mines, and Mexico is encouraging private oil companies to bid for exploration and production rights.

On the nuclear energy front, Turkey has moved forward in its efforts to develop its first nuclear generation facility. At the same time, Japan and Korea have sought to reduce their reliance on nuclear energy, and Germany has continued on its path to shut down all nuclear facilities, all in the wake of the 2011 events at the Fukushima facility in Japan.

I would like to thank all the authors for their thoughtful consideration of the myriad of interesting, yet challenging, issues that they have identified in their chapters in this fourth edition of *The Energy Regulation and Markets Review*.

David L Schwartz

Latham & Watkins LLP

Washington, DC

June 2015

Chapter 35

UNITED ARAB EMIRATES

Masood Afridi, Haroon Baryalay and Adite Alope¹

I OVERVIEW

The United Arab Emirates (the UAE) is a federation of the seven emirates of Abu Dhabi, Dubai, Sharjah, Ajman, Fujairah, Ras al-Khaimah and Umm al-Quwain. The city of Abu Dhabi in the emirate of Abu Dhabi is the federal capital. Abu Dhabi is the largest emirate by area (making up about 86 per cent of the country's area) and the richest in terms of oil resources. Dubai is the second-largest emirate by size (accounting for about 5 per cent of the country's total area) and the largest by population. Together, Dubai and Abu Dhabi account for about two-thirds of the country's population and form the core of its economy.

The UAE's economy has traditionally been dominated by the petroleum industry but successful efforts at economic diversification have reduced the share of the oil and gas sector in the country's GDP to 25 per cent. The UAE has an open economy with one of the highest per capita incomes in the world and a sizeable annual trade surplus. The currency is freely convertible and funds can be freely repatriated. The country's free zones – offering 100 per cent foreign ownership and zero taxes – are a major conduit for foreign investment in the country. The geographical location of the UAE, situated at the tip of the Arabian Peninsula, makes it a central trading post connecting the Far Eastern economies with the Middle East, Africa and Europe. With modern communication and thriving ports, the UAE has emerged as an important trading hub between the Indian sub-continent, Europe, Africa and the Middle East.

The powers of the federal and the emirate governments are enumerated in the State Constitution of 1971. Although the country's government is based on a federal structure, the individual emirates enjoy considerable economic and political autonomy and each

¹ Masood Afridi is a partner, Haroon Baryalay and Adite Alope are associates at Afridi & Angell.

emirate largely pursues its own economic policies. Even though Article 120 of the UAE Constitution gives the federal government exclusive legislative and executive jurisdiction over electricity services in the country, in practice the larger emirates of Dubai and Abu Dhabi, and to some extent Sharjah, and more recently the northern emirate of Ras Al Khaymah, formulate and implement their own electricity policies. Hence, although there is a Federal Ministry of Energy (which formulates and implements the federal electricity policies), federal legislation on electricity is fairly limited.

Due to the significance of Abu Dhabi and Dubai within the Federation, this chapter focuses on the electricity sector in these two emirates, in addition to the federal laws and policies on electricity.

The generation, transmission and distribution of electricity in the UAE is dominated by five water and power authorities. Four of these authorities are owned by the governments of the emirates of Dubai, Abu Dhabi, Sharjah and more recently Ras Al Khaymah, whereas the federal authority that operates in the smaller northern emirates is federally controlled. These state-owned authorities serve as the exclusive purchasers and distributors of electricity in the respective emirates. Whereas the private sector has been allowed to participate in the generation of electricity, transmission and distribution is performed exclusively by state-owned authorities.

Abu Dhabi is the only emirate so far that has private sector participants owning up to a 40 per cent economic interest in a number of electricity generation plants in the emirate. Dubai has recently enacted legislation to enable private sector participation in the power generation sector. A privatisation policy has also been announced by the federal government for the northern emirates.

So far, only Dubai and Abu Dhabi have enacted laws creating specialised regulatory bodies for the electricity sector. These consist of the relatively recently constituted Supreme Energy Council (the SEC) and the Electricity and Water Sector Regulation and Control Office (the Office) in Dubai, and the much older Electricity Regulation and Supervision Bureau of Abu Dhabi (the Bureau). The Federal Ministry of Energy regulates the sector at the federal level and works in conjunction with the Federal Electricity and Water Authority (FEWA) to implement the federal government's electricity policy in the northern emirates.

Increasing population growth and urban development has been responsible for electricity demand in the UAE to grow at double-digit rates, and demand is expected to continue to grow at about 10 per cent annually for the next decade due to increasing population growth and industrial development. There is currently insufficient power generation capacity in the northern emirates of the UAE, and demand in these emirates is being met by construction of additional capacity as well as the supply of power from the larger emirates through the Emirates National Grid (ENG). Some industrial projects have not been able to secure sufficient power supply and have had to resort to captive power generation.

A number of major power projects, both in the field of conventional and renewable energy, are under development to meet the country's existing and future electricity needs.

II REGULATION

i The regulators

Federal

The UAE's Federal Ministry of Energy, the primary regulator at the federal level, was formed pursuant to Federal Decree No. 3 of 2004 (the Ministry of Energy Decree) by merging the Ministry of Petroleum and Mineral Resources with the Ministry of Electricity and Water. In 2008, the Ministry of Energy was restructured pursuant to Cabinet Resolution No. 11 of 2008 making it responsible for establishing policies for the water and electricity sectors in the UAE and ensuring that other authorities and companies in the state comply with its policies. A separate directorate for the electricity sector was established within the Ministry, which has been further sub-divided into two departments:

- a* the department of electricity and desalinated water; and
- b* the department of electricity and water organisation and control.

In 2014, the federal government further restructured the Ministry of Energy to introduce three new departments:

- a* the Clean Energy and Climate Change Department;
- b* the Rationalisation and Energy Usage Efficiency Department; and
- c* the Regulation and Control Department.

The restructuring was intended to create a more specialised and robust central regulatory authority at the federal level. However, the Ministry has had little influence in directing policy and implementing projects in the larger emirates of Abu Dhabi and Dubai and remains focused on assisting the smaller emirates in meeting their growing electricity demand.

FEWA, which was established pursuant to Federal Law No. 31 of 1999 (the FEWA Law) as amended by Federal Law No. 9 of 2008, is the dominant player in the northern emirates and engages in all segments of the market, including generation, transmission and distribution. The Ministry of Energy has announced a strategic energy plan to develop the federal government's electricity services by attracting private investment in the sector. Most of the new power projects announced in the northern emirates since the launch of this policy in 2007 have, however, been in the public sector.

Abu Dhabi

Abu Dhabi's electricity sector is regulated under Law No. 2 of 1998 Concerning the Regulation of Water and Electricity Sector (Abu Dhabi Electricity Law), as amended by Law No. 19 of 2007 and Law No. 12 of 2009. The Bureau is the regulatory body responsible for implementing the legal framework and its authority includes the power to:

- a* issue licences to conduct regulated activities;
- b* monitor licensees and ensure compliance with terms of licences issued; and
- c* make regulations as it sees fit for the regular, efficient and safe supply of electricity in the emirate.

The Abu Dhabi Water and Electricity Authority (ADWEA) owns (either wholly or as majority shareholder) and controls, either directly or indirectly, the entities responsible for the generation, transmission and distribution of electricity in the emirate.

Both the Bureau and ADWEA were established under the Abu Dhabi Electricity Law.

Dubai

Until recently, Dubai's legislation on the electricity sector was limited to Dubai Law No. 1 of 1992 (the DEWA Law), as amended by Decree No. 13 of 1999 and Decree No. 9 of 2011, establishing the Dubai Electricity and Water Authority (DEWA). More recently, Dubai has enacted a number of laws to modernise and open the sector to private investment. Two new regulatory bodies have been created: the SEC,² established under Dubai Law No. 19 of 2009, as the apex regulator for the energy sector, and the Office, established pursuant to Dubai Executive Council's Resolution No. 2 of 2010 (Dubai Office Resolution), as the specialist regulatory authority for the electricity sector.

The SEC is responsible for all initiatives relating to the energy sector in Dubai, including in relation to the privatisation of its electricity assets and implementing the provisions of Dubai's Law No. 6 of 2011 'Regulating the Participation of the Private Sector in Electricity and Water Production in the Emirate of Dubai' (the Dubai Electricity Privatisation Law). As the primary regulator of the energy sector, the exploration, production, storage, transmission and distribution of petroleum products (natural gas, liquid petroleum, petroleum gases, crude oil) is also regulated by the SEC.

The Office is authorised to regulate the electricity sector subject to supervision of the SEC. The Office is responsible, *inter alia*, for:

- a* issuing electricity generation licences;
- b* proposing legislation governing the electricity sector in Dubai; and
- c* determining and establishing standards and controls for electricity generation in the emirate.

As with the other emirates, the main player in the electricity market is DEWA, Dubai's state-owned integrated power generation, transmission and distribution authority.

ii Regulated activities

All activities connected to the generation, transmission and distribution of electricity in the UAE are regulated and require specific licences from the relevant regulatory authorities.

Under the Abu Dhabi Electricity Law, regulated activities include electricity generation, transmission, distribution and supply to premises. Any person or entity intending to carry out these activities is required to be licensed by the Bureau.

2 Member organisations of the SEC include DEWA, Dubai Aluminum Company Ltd (DUBAL), Emirates National Oil Company, Dubai Supply Authority, Dubai Petroleum Corp, Dubai Nuclear Energy Committee and Dubai Municipality.

Under the Dubai Electricity Privatisation Law, regulated activities include ‘any activity related to generating electricity [...] for the purpose of supplying to the Transmission System with produced electricity’ (the transmission system is owned and operated by DEWA). All activities relating to electricity generation, transmission, distribution and supply of electricity are considered regulated activities in Dubai and require a licence from the Office.

iii Ownership and market access restrictions

So far, only Abu Dhabi has allowed private sector participation of up to 40 per cent in its power generation sector. Even though there are laws and policies in place in Dubai and at the federal level to enable private sector participation, these have yet to materialise.

Under the UAE’s Commercial Companies Law 1984 (the Companies Law),³ foreigners are restricted to own up to a maximum of 49 per cent of a UAE company (other than in the free zones) with the majority 51 per cent required to be owned by UAE nationals. The power sector is no exception to this requirement and even if 100 per cent private ownership were to be allowed in the power sector, a privately owned power generation, transmission or distribution company would need to be majority locally owned.

Although this restriction is a deterrent to foreign investment, it is not an insurmountable hurdle as informal arrangements exist to enable the foreign investors to transfer 100 per cent beneficial interest in local companies to themselves. It is common for foreign investors to enter into side agreements with the local majority-owning partners by virtue of which the foreign shareholders assume management powers and at the same time transfer to themselves the economic interest in the shares held by the local. The local shareholder is usually paid a fixed fee as part of this arrangement for acting as a local sponsor. The authorities in the UAE have so far tolerated this practice, and as long as there is no dispute between the parties, the arrangement works to the benefit of all shareholders. The enforceability of these side agreements is questionable and untested in the local courts. Although the local partner could, in theory, take over the business by revoking the side agreements, the arrangement works well in the vast majority of cases and offers a practical way forward for foreign investors wishing to do business in the UAE.

Although the UAE free zones allow for 100 per cent foreign ownership, the free zone companies are not allowed to conduct business outside of the free zones and within UAE proper. To date, there are no power generation, transmission or distribution companies in any of the free zones in the UAE. Electricity rates are subsidised throughout the UAE and it is therefore not viable for private producers to construct power plants within the free zones. Furthermore, the state-owned authorities in the emirates of Dubai and Abu Dhabi have sufficient capacity to meet present and anticipated future needs, and this has therefore not necessitated private investment in the sector in the free zones.

The UAE’s electricity laws themselves do not impose any specific ownership restriction on foreign investors in the UAE, nor do they necessarily require government

3 Federal Law No. 8 of 1984, as amended.

participation in the sector. As a matter of policy, in Abu Dhabi, although two or more foreign joint venture partners are permitted to own up to 40 per cent of a project company, the Bureau ensures that a foreign entity does not own more than 25 per cent of the market by capacity.

Most power companies in the UAE (with some exceptions such as UTICO) are either wholly or majority owned by the federal or respective emirates' governments, and the sector is dominated by the state-owned water and electricity authorities. Of these, the DEWA and ADEWA, being the largest two, account for about 87 per cent of the UAE's entire installed capacity. As of the figures available for 2012, ADWEA accounts for approximately 52 per cent of the UAE's entire power generation capacity (at 13,849MW), DEWA for 35 per cent (at 9,646MW), SEWA for 9 per cent (at 2,400MW) and FEWA for about 4 per cent (at 1,150MW).

Abu Dhabi

ADWEA was established pursuant to the Abu Dhabi Electricity Law, and is responsible for all matters relating to formulation, development and implementation of policies for the electricity sector in Abu Dhabi,⁴ including privatisation. ADWEA is managed by a board and headed by a chairman, appointed by royal decree (Emiri decree). In addition to managing the public sector entities, ADWEA has established joint ventures with private sector companies.

ADWEA is the owner of the Abu Dhabi Power Corporation (ADPC), a holding company established to own shares in operating-level companies that generate, transmit and distribute water and electricity in the emirate. ADPC in turn owns the Abu Dhabi Water and Electricity Company (ADWEC), the single buyer of water and electricity in Abu Dhabi, and the Abu Dhabi Transmission and Dispatch Company (TRANSCO), the main transmission company in the emirate.

ADWEA has established a long-term programme for the privatisation of the electricity sector. To date, a number of independent water and power producers (IWPPs) have been established as joint-venture arrangements between ADWEA and various international power companies as BOO (build, operate, own) projects. In accordance with long-term arrangements, IWPPs are committed to selling their production to ADWEC.

The major IWPPs include:

- a* Al Mirfa Power Company;
- b* Arabian Power Company;
- c* Emirates CMS Power Company;

4 Under the Abu Dhabi Electricity Law, ADPC was established with the following subsidiaries: (1) Abu Dhabi Water and Electricity Company (ADWEC); (2) Abu Dhabi Transmission and Dispatch Company (TRANSCO); (3) Al Taweelah Power Company; (4) Al Mirfa Power Company; (5) Umm Al Nar Power Company; (6) Bainounah Power Company; (7) Abu Dhabi Distribution Company (ADDC); (8) Al Ain Distribution Company (AADC); (9) Abu Dhabi Company for Servicing Remote Areas (RASCO); (10) Al Wathba Company for Central Services; (11) Industrial Security Company; and (12) Central Workshop Company.

- d* Emirates SembCorp Water and Power Company;
- e* Fujairah Asia Power Company;
- f* Gulf Total Tractebel Power Company;
- g* Ruwais Power Company;
- h* Shuweihat Asia Power Company PJSC;⁵
- i* Shuweihat CMS International Power Company;
- j* Shams Power Company PJSC; and
- k* Taweelah Asia Power Company.

The ownership of the IWPPs is split 60:40 between ADWEA (or its subsidiaries) and the foreign investor. The project companies are usually structured as joint stock companies incorporated in Abu Dhabi. The most common ownership structure is one in which ADWEA incorporates an intermediate holding company to own a 60 per cent stake, which is in turn held 10 per cent by ADWEA and 90 per cent by the Abu Dhabi National Energy Company PJSC (also known as TAQA).⁶ A few project companies have other ownership structures.

The Shuweihat S2 IWPP⁷ was commissioned in October 2011, adding a further 1,510MW to Abu Dhabi's power generation capacity and 100 million imperial gallons of potable water each day. The electricity and water supply from Shuweihat S2 plant will be purchased by ADWEC under a 25-year power and water purchase agreement.

Dubai

DEWA was established as an independent public authority owned by the government of Dubai, responsible for the development and provision of utilities in the emirate. DEWA is managed by a board of directors whose members are appointed by Emiri decree.

5 In February 2011, a PPA was signed between ADWEC and Shuweihat Asia Power Investment BV, a company owned 60 per cent by ADEWA and 40 per cent by Sumitomo Corporation of Japan and Korea Electric Company (KEPCO) (each holding 20.4 per cent and 19.6 per cent respectively). The plant, with a generation capacity of 1,600MW, was commissioned to its full commercial operation in July 2014.

6 Delmon, Jeffery and Delmon, Victoria Rigby, *International Project Finance and PPPs – A Guide to Key Growth Markets 2012*, Chapter 16, p. 26 (2012). TAQA, in which ADWEA owns a 51 per cent ownership stake, was established under Abu Dhabi Decree No.(16) of 2005 and serves as ADWEA's investment arm in the emirate and abroad. Other Abu Dhabi government entities own a further 21.5 per cent of TAQA with the total government shareholding being 72.5 per cent. The remaining 27.5 per cent of TAQA is owned privately. The shareholding of TAQA provided on its website is not consistent. The shareholding is also stated as follows: ADWEA 52.4 per cent, other government entities 22.1 per cent and non-government shareholding 25.6 per cent.

7 Shuweihat 2 is owned by Ruwais Power Company, a joint venture of TAQA (54 per cent), ADWEA (6 per cent), GDF SUEZ (20 per cent), Marubeni (10 per cent) and Osaka Gas (10 per cent).

DEWA is an integrated supplier owning and operating in all segments of the electricity market in Dubai. DEWA owns and operates 11 plants in the emirate whose individual capacities vary between 400MW to 1400MW, with a total installed capacity of over 9,600MW. Although the Dubai government wants to promote private investment in its electricity generation sector, to date, all of the power generation capacity of Dubai, except for captive power produced by certain entities (e.g., DUBAL), is owned by DEWA.

Dubai has only recently passed legislation allowing the private sector to participate in electricity generation. The Dubai Electricity Privatisation Law is broadly modelled on the Abu Dhabi Electricity Law. The Dubai Electricity Privatisation Law authorises DEWA to establish project companies, by itself or in collaboration with third parties, for the generation of electricity.

The only independent power project (IPP) launched in Dubai to date is the Al Hassyan 1 IPP, a 1,600MW gas-fired power plant, for which bids were solicited in December 2011. DEWA proposes to retain a 51 per cent ownership share in the project, which is the first of six planned IWPPs in Dubai forming part of a power and water complex with total capacity of 9,000MW. The project has, however, been deferred indefinitely. According to a recent press release from DEWA, the authority has awarded a contract for consultancy services in relation to the Al Hassyan project. Another press release was issued earlier this year stating that the contract for the plant would be awarded by June 2015. It is expected that phase 1 of the plant will produce 1200MW by 2020.

DEWA added a further 900MW to its installed capacity in 2012 through an expansion of the Jebel Ali Power and Desalination Station 'M' plant from 1,135MW to 2,060MW. A further expansion of the M-station is now proposed which will add a further 700MW to its installed capacity.

All existing electricity plants in Dubai are currently gas fired, but by 2030 Dubai plans to generate 5 per cent of its energy requirements from solar power, 12 per cent from coal, 12 per cent from nuclear power and the remainder from gas.

Northern emirates

FEWA is responsible for the generation, transmission and distribution of electricity in the northern emirates of Ajman, Ras al-Khaimah (please also see below), Fujairah and Umm al-Quwain. The growing demand for electricity in the northern emirates is being fulfilled by the announcement of a number of new projects sponsored by FEWA. In addition, the government of Abu Dhabi is assisting these emirates in the short term by supplying electricity through expansion of its own power sector.

FEWA is governed by a board of directors whose members hold office for a term of three years. FEWA is authorised under the FEWA Law to establish private power generation plants in the northern emirates. A number of projects are presently under development in these emirates but these are primarily owned in the public sector.

FEWA acts as the single point of sale for all power generated in the northern emirates. Electricity transmission and distribution networks within the northern emirates are also primarily owned and operated by FEWA. However, recently, TRANSCO has expanded its operations to assist FEWA in planning, developing and operating its water and electricity transmission assets in the northern emirates. In addition to FEWA, certain

private power companies such as UTICO are involved in the generation, transmission and distribution of power in the emirate of Ras Al Khaymah.

Sharjah

Sharjah created its own electricity authority in 1995, known as the Sharjah Electricity and Water Authority (SEWA) (established pursuant to Sharjah Emiri Decree No. 1 of 1995, as amended by Emiri Decrees No. 46 of 2006 and No. 20 of 2008), which is authorised to 'own, manage, operate and maintain' power stations and electricity transmission lines. As with the other emirates, SEWA is responsible for the generation, transmission and distribution of electricity in Sharjah. SEWA is authorised to determine electricity prices and connection fees, which are subject to approval by the Ruler of Sharjah.

Ras Al Khaymah

On 10 March 2013, the Ruler of Ras Al Khaymah issued an Emiri Decree No. 4 of 2013 On the Establishment of the Ras Al Khaymah Electricity and Water Authority (RAKEWA) (the RAKEWA Law). This authority is tasked with the regulation, management, operation and maintenance of power stations, water desalination plants, electricity distribution and transport networks in the emirate. The new authority is also responsible for controlling prices of electricity and water in the emirate. Most importantly, the authority is responsible for fulfilling the electricity needs of the emirate, planning for the generation, transport and distribution of electricity in the emirate and managing the government's investments in the sector.

RAKEWA is to be managed by a board appointed by the Ruler of Ras Al Khaymah, to be headed by a chairman. The board is authorised to issue regulations relating to the electricity sector, which shall be binding on all entities involved in the electricity and water sectors in the emirate.

Despite the establishment of RAKEWA, practically FEWA continues to own, manage and operate the electricity resources situated in the emirate and is the *de facto* authority on ground. The RAKEWA Law does not contain any provisions for the transfer of assets from FEWA to RAKEWA and it is presently unclear whether RAKEWA will replace FEWA in Ras Al Khaymah or if the two authorities will operate jointly in the emirate.

iv Transfers of control and assignments

Any transfer of control or assignment of an interest in an IWPP requires the consent of the relevant regulator.

Under the Abu Dhabi Electricity Law, a licence may not be transferred unless it specifically permits its transfer. Prior consent of the Bureau is required for any transfer (including the creation of security over assets of the licence holder), which consent may be subject to such conditions as the Bureau may consider appropriate.

Under the Dubai Electricity Privatisation Law, licensed entities are not permitted to transfer or assign their licences without the prior approval of the Office. In addition, licensed entities may not dispose-off, sell, lease or otherwise transfer, including granting of a security interest over, their 'main assets' without prior approval from the Office.

Main assets are those moveable and immovable assets necessary to conduct the regulated activities and operate the electricity generation facilities.

In addition, the Companies Law contains a statutory pre-emptive right in favour of existing shareholders in the case of limited liability companies. Pre-emptive rights do not apply to shares of joint stock companies.

III TRANSMISSION/TRANSPORTATION AND DISTRIBUTION SERVICES

i Vertical integration and unbundling

The electricity transmission and distribution networks in the UAE are firmly owned and controlled by the state-owned water and power authorities, each of which enjoys a monopoly in its particular area of operation. These authorities are vertically integrated and operate in all three segments of the market.

Abu Dhabi

ADWEA's wholly owned subsidiary TRANSCO operates Abu Dhabi's transmission networks. TRANSCO supplies electricity from the generation companies to the two distribution companies of Abu Dhabi, each of which is also wholly owned by ADWEA. These are:

- a the Abu Dhabi Distribution Company (the ADDC), which operates in the city of Abu Dhabi and the western region of the emirate; and
- b the Al Ain Distribution Company (the AADC), which operates in Al Ain city and the surrounding areas.

Recently, in response to the power shortages faced in some of the smaller emirates, TRANSCO has become involved in the planning, development and operation of electricity transmission networks in the northern emirates. TRANSCO's involvement, given its resources and experience, coupled with ADEWA's supply of its excess power, has largely alleviated the power problems faced by these emirates in the past.

Dubai

DEWA is the sole purchaser of electricity in Dubai and presently owns all the generation, transmission and distribution capacity of the emirate.⁸ DEWA's transmission and

8 DEWA operates a network of overhead lines (876 kilometres of 400kV, 437 kilometres of 132kV and 113 kilometres of 33kV lines) and underground cables (1,486 kilometres of 400kV, 1,992 kilometres of 33kV and 24,942 kilometres of 6.6 and 11kV lines) that are, in turn, connected to a distribution system of lower voltage substations and distribution lines. Over the past few years, DEWA has further enhanced the electricity transmission networks of the emirate. This includes construction of substations at Jebel Ali (December 2012), the International Media Production zone (February 2013), the Dubai Marina (May 2013) and Seih Al Dahl (February 2014). In March 2013, DEWA has signed a contract to supply,

distribution network is constantly being expanded as new real estate and industrial projects are set up across Dubai.

Northern Emirates

FEWA performs much of the same functions in the northern emirates with respect to electricity distribution and transmission as TRANSCO in Abu Dhabi and DEWA in Dubai.⁹

Emirates National Grid

The ENG project was launched in 2001 under a Cabinet Resolution No. 79/4 of 2001 'On the National Project of Linking the Power Grids' to connect and enable sharing of power between the UAE's seven emirates. The ENG project was launched by the Ministry of Energy with the purpose of enhancing integration between the various electricity and water authorities in the UAE, each of which contributed proportionately to the capital investment required to build the ENG. The ENG is owned by the following authorities in the proportions stated below:

- a* ADWEA: 40 per cent;
- b* DEWA: 30 per cent;
- c* FEWA: 20 per cent; and
- d* SEWA: 10 per cent.

Dubai and Abu Dhabi's power grids were connected by the ENG in the middle of 2006, whereas SEWA's connection to ENG was completed in May 2007. Connection to the remaining northern emirates transmission networks was completed in April 2008.

Due to its larger production capacity and extensive distribution network, ADWEA has increasingly been assisting the other emirates in meeting their power demand. ADWEA exported about 13,664GWh of electricity to other emirates via the ENG in 2012, up from 12,228GWh in 2011.

The GCC Grid

The UAE is also connected to the rest of the GCC through the GCC Grid, through which it can trade electricity with the remaining GCC countries. About 56MW (peak time) of electricity was exported by Abu Dhabi to the GCC Grid in 2011 whereas 7MW (peak time) was imported in 2012.

extend and activate a new 132kV underground transmission cable network to redistribute the electricity load. This 300 million dirham project was completed in October 2014.

9 In May 2013, FEWA signed two contracts with the Saudi National Contracting Company Limited to commission a 33/11kV transmission station and upgrade a number of 33/11kV and 132/33/11kV stations in the western region (Ajman and Umm Al Quwain), the central and eastern region (Fujairah and Dibba) and the northern region (Ras Al Khaimah). The contracts envisage civil and cable works and geographical information systems (GIS) and will cater for demand from the Northern Emirates from 2013 up to 2018.

ii Transmission/transportation and distribution access

Abu Dhabi

The Abu Dhabi Electricity Law requires ADWEC to purchase all power produced within the emirate. Although the Abu Dhabi Electricity Law contemplates private ownership in all segments of the electricity supply chain, so far private ownership has been limited to generation only.

Dubai

The Dubai Electricity Privatisation Law prohibits a licensed entity from selling electricity to any entity other than DEWA.

iii Rates

Abu Dhabi

ADWEC, being the single buyer of electricity in the emirate of Abu Dhabi, purchases electricity from the power producers under long-term power and water purchase agreements (PWPAs) and sells it to the distribution companies via annual bulk supply tariff (BST) agreements. The distribution companies pay ADWEC the BST for the electricity purchased and receive revenue from their customers and a subsidy from the government. TRANSCO is paid a transmission use of system (TUoS) charge by the distribution companies.

The components making up the electricity tariff in Abu Dhabi are the following:

- a* BST, which is the charge paid by the distribution companies to ADWEC for its generation costs (in turn paid by ADWEC to power producers).
- b* TUoS, which is the charge paid by the distribution companies to TRANSCO for use of its transmission network.
- c* Distribution use of system (DUoS), which is the fee that the distribution companies charge for use of their distribution network.
- d* Sales cost, or the cost incurred by the distribution companies for serving customers for meter reading and billing.
- e* Government subsidy, consisting of direct payments from the government to the distribution companies. The quantum of the subsidy allows the government to determine the electricity tariffs for different classes of consumers. The higher the subsidy, the lower the tariff charged.

The electricity tariff is determined by adding components (a) to (d) and subtracting (e).

The rates charged by the state-owned power companies (ADWEC, TRANSCO, ADDC and AADC) are subject to government control, exercised via the Bureau. The Bureau sets their revenue target on the basis of which the control prices are determined. The remainder of the revenue is paid as a subsidy by the government to the distribution companies. All transactions between the power sector companies and any related tariffs are required to take place on the basis of their economic costs. This helps the government keep subsidies to a minimum.

The BST is calculated for each calendar year on the basis of parameters prescribed by the Bureau. The calculation of BST requires the estimation of the costs for procuring and dispatching electricity generation to meet the forecasted demand. Starting 2012, the

structure of the BST comprises three components (expressed in fils per kWh) charged on an hourly basis for electricity purchased at different times of the day, for 'Fridays' and 'non-Fridays' and in different months of the calendar year. These three components are:

- a* a system marginal price charge estimated to indicate the short-term marginal costs (excluding back-up fuel (BUF) costs) of providing units at different times of the day;
- b* a BUF levy charge estimated to reflect the additional costs associated with the burning of back-up fuel rather than primary fuel; and
- c* a high-peak period charge assessed to cover the costs associated with the estimated capacity payments and charged only in the peak demand occurring months of June to September, inclusive.

The TUoS charge paid to TRANSCO covers the investment, operation and maintenance costs of the infrastructure of the transmission systems, excluding assets that are dedicated entirely to a particular customer. These include substations, overhead lines, cables and associated equipment. TUoS charges also cover the costs of the economic scheduling and dispatching of electricity generation.

The rates payable to the power generation companies are determined on the basis of the PWPAs entered by them with ADWEC. These PWPAs are further discussed below.

Contracts for power generation are awarded based on a competitive bidding process after the government invites tenders to meet the emirate's power generation requirements. The bidding process is managed by ADWEA starting from pre-qualification of bidders and issuance of request for proposals through to selection of the successful bidder.

Electricity rates paid by consumers in Abu Dhabi are subsidised. In fact, UAE nationals benefit from even greater subsidies than those given to expatriate workers. The rates payable in Abu Dhabi were substantially revised last year with the introduction of a slab tariff scheme and an increase of 40–60 per cent in the applicable rates. The revised rates as published by the Bureau on its website are divided according to consumer categories as follows:

- a* UAE nationals – (flats): 5 fils per kWh until 30kWh/day, 5.5 fils post 30kWh/day;
- b* UAE nationals – (villas): 5 fils per kWh until 400kWh/day, 5.5 fils post 400kWh/day;
- c* non-UAE nationals – (flats): 21 fils per kWh until 20kWh/day, 31.8 fils post 20kWh/day;
- d* non-UAE nationals – (villas): 21 fils per kWh until 200kWh/day, 31.8 fils post 200kWh/day;
- e* industrial establishments (below 1MW): 16 fils per kWh;
- f* industrial establishments (above 1MW): 16 fils per kWh at off peak hours, 30 fils per kWh at peak hours;
- g* commercial establishments: 16 fils per kWh;
- h* governmental offices: 29.3 fils per kWh; and
- i* farms and ranches: 3 fils per kWh.

Prior to the revision to the electricity rates, the government subsidy for water and electricity in Abu Dhabi accounted for nearly 86 per cent of the cost of a unit of electricity for nationals and 50 per cent for expatriates.

Dubai

The DEWA Law empowers the board of directors of DEWA to control electricity prices charged by DEWA, subject to the Ruler's approval; however, since the promulgation of the SEC Law, the electricity prices have been determined by the SEC and DEWA now sets its prices in accordance with the SEC's directives. The SEC Law empowers the SEC to impose a 'definite tariff based on cost when necessary'. The SEC is also authorised to approve fees and tariffs on the services offered to the public by 'energy service providers' (meaning the power generation, transmission and distribution companies).

In 2011, Dubai passed Executive Council Decision No. 16 of 2011 on the Approval of the Electricity and Water Tariff in the emirate of Dubai (the Dubai Tariff Decision), which sets out the electricity and water tariffs for Dubai. The Dubai Tariff Decision provides for a slab tariff scheme and authorises DEWA to add the 'the fuel price difference' to the electricity tariffs charged to consumers. The consumers are divided into (1) industrial (2) residential (3) commercial (4) governmental, charitable, public utility, etc. and (5) houses and farms of nationals. UAE nationals are subject to tariff rates equal to roughly one-third of the rate applied to other residential consumers.

DEWA has since 2011 increased electricity rates and pursuant to the Dubai Tariff Decision, introduced a variable fuel surcharge in its electricity tariff. The electricity tariff in Dubai now comprises the electricity consumption charges, the fuel surcharge and meter charge. The fuel surcharge component requires consumers to pay for any fuel cost increases using 2010 fuel prices as the benchmark, thereby passing on the risk of international fuel price fluctuations to the consumer. This has enabled the company to increase revenues, reduce demand growth and earn higher profits. The present fuel surcharge rate applicable in the emirate of Dubai is 6.5 fils/kWh.

As with Abu Dhabi, power projects in Dubai are proposed to be awarded on the basis of a competitive bidding process. DEWA is responsible for managing the bidding process in the emirate (bids for the Al Hassyan project were solicited through DEWA). IWPPs, once established in the emirate, will enter into PWPAs with DEWA for the offtake of their power production capacity.

IV ENERGY MARKETS

i Development of energy markets

The electricity market for private power producers in the UAE is comprised of the state-owned water and power authorities each of which act as the single point of sale in their respective areas of operation.

Contracts for power generation are awarded on the basis of a competitive bidding process, administered by ADWEA in Abu Dhabi, DEWA in Dubai and FEWA in the northern emirates. To date, only Abu Dhabi has permitted up to 40 per cent private ownership in the generation of electricity. Although Dubai has enacted new legislation

permitting private sector participation in the electricity sector, as at the date of writing no private sector company has yet established a power generation plant in Dubai.

ii Energy market rules and regulation

Under the Abu Dhabi Electricity Law, ADWEC is required to contract with power producers for the purchase of all production capacity from licensed operators in the emirate. ADWEA is authorised to allow 'by-pass sales' from power producers directly to eligible consumers provided that:

- a* the first independent commercial power generation project in the emirates shall have commenced commercial operations;
- b* the majority of the shares in such company are privately owned; and
- c* the Bureau issues a report stating that the energy market in the country is stable enough for it to be in the public interest that the sale of electricity by producers to eligible consumers be permitted.

To date, no 'by-pass sales' of electricity have been allowed by ADWEA in Abu Dhabi and all existing producers in the emirate are required to sell their production exclusively to ADWEC.

Similarly, power producers in Dubai are obligated by law to sell their entire production capacity to DEWA.

All power generation companies in the northern emirates and Sharjah are required to sell their power production to FEWA or SEWA respectively. With the establishment of RAKEWA, the functions presently being performed by FEWA in Ras Al Khaymah may be taken over by RAKEWA in the future. FEWA is, however, presently the principal authority for the electricity sector in the emirate. The government of Ras Al Khaymah is the only emirate thus far to have allowed a private sector utility company, UTICO, to participate in the generation, transmission and distribution of electricity in the emirate.

iii Contracts for sale of energy

ADWEC pays the generation companies the tariff agreed under the PWPAs. The PWPA serves both as a grant of concession and offtake agreement.¹⁰

The PWPAs usually have a term of about 20 to 25 years from the commencement of commercial operations. Payments to IWPPs by ADWEC under PWPAs comprise three main components:

- a* capacity (or availability) payments covering the fixed costs of the plant (return on capital, depreciation and fixed operating and maintenance costs);
- b* operation and maintenance costs, paid when plant is available for production irrespective of whether and how much the plant produces; and
- c* output (or energy) payments for variable operation and maintenance costs, payable only for the electricity actually produced by the plant and dispatched.

10 Delmon, Jeffery and Delmon, Victoria Rigby, 'International Project Finance and PPPs – A Guide to Key Growth Markets 2012', p. 26 (2012).

The primary fuel used in the power generation sector in the UAE is natural gas, accounting for 90 per cent of all production. As is often the case in such models, fuel costs are pass-through, and ADWEC is required to procure and supply fuel to the electricity producers under the Abu Dhabi Electricity Law. ADWEC acquires the natural gas from two sources, the Abu Dhabi National Oil Company and Dolphin Energy Limited (purchased from Qatar via a pipeline connecting both states) for onward supply to the power producers.

Power plants are required to stock diesel oil and crude oil as back-up fuel. According to the standard PWPAs, generation companies have to stock up enough back-up fuel for their plants to run at full capacity for seven days.

PWPA payment rates under some of the agreements are subject to annual indexation against US and UAE inflation or the US\$/dirham exchange rate.

ADWEC is required by the standard PWPAs to pay certain other supplemental payments to the IWPPs, such as start-up, shut-down costs and back-up fuel costs. Some PWPAs may also have provisions for payment by the relevant party of liquidated damages for delay in performance and of interest on late payments.

To date, Dubai does not have a standard power purchase agreement in place. DEWA's first proposed joint venture with the private sector, Al Hassyan 1, has been deferred until further notice. Any agreements entered with IWPPs in Dubai are likely to be modelled on the existing PWPAs signed by ADWEC.

V RENEWABLE ENERGY AND CONSERVATION

i Development of renewable energy

High energy use, encouraged by subsidised energy prices and the construction of energy intensive industries such as aluminium smelting has resulted in the UAE having one of the highest per capita carbon footprints in the world. The development of renewable energy is therefore crucial in reducing the country's carbon footprint and diversification of its economy away from fossil fuels. The UAE has announced that it aims to produce 7 per cent of electricity from renewable sources by 2020.

A number of showcase projects have been launched in Abu Dhabi and Dubai to kick-start the development of renewable energy in the country.

Abu Dhabi

Abu Dhabi has established the Abu Dhabi Future Energy Company (Masdar)¹¹ to spearhead the emirate's renewable energy initiative. Masdar City, a project of Masdar on the outskirts of Abu Dhabi City, is proposed to be run entirely on renewable energy as a zero carbon emissions city. Masdar City has also won the rights to host the headquarters of the International Renewable Energy Agency.

11 Masdar is a wholly owned subsidiary of Mubadala Development Company, one of the Abu Dhabi government's main investment arms.

Masdar currently produces 10MW of electricity at its solar photovoltaic power plant located at the Masdar City for supply of clean power to the project. It has also launched a carbon capture and storage project in the UAE.

Most significant is Masdar's 100MW solar power plant¹² at Madinat Zayed, which was inaugurated on 17 March 2013. Known as Shams 1, it is one of the largest parabolic trough power stations in the world. This project is expected to be followed by the Shams 2 and Shams 3 solar power projects. Among other sustainable projects launched by Masdar in the UAE include Masdar City's 10MW solar PV array in Abu Dhabi, Masdar City's 1MW rooftop installations, 100MW photovoltaic plant in Al Ain, and a 30MW onshore wind farm on Sir Bani Yas Island. Two new solar photovoltaic plants called Noor 1 and Noor 2 are proposed to be constructed by 2020, which will have a combined generating capacity of 250MW. With the success of its pilot project involving the installation of solar photovoltaic cells on 11 school and government buildings across the emirate, Masdar proposes to further expand the installation of solar panels to reduce dependence on hydrocarbon fuels.

Masdar is also actively expanding its international investments in clean renewable energy; some of its projects include the Seychelles wind power project (6MW), the Mauritania solar power project (15 MW), and Spain's Gemasolar (20MW) and Valle 1 & 2 solar power projects (100MW). Masdar is also a 20 per cent stakeholder in the London Array wind farm in the United Kingdom, which produces 630MW of electricity. In partnership with the International Renewable Energy Agency, the Abu Dhabi government, also granted US\$57 million in loans to Argentina, Cuba, Iran, St. Vincent and the Grenadines and Mauritania to finance renewable energy projects.

E.ON Masdar Integrated Carbon, a joint venture between E.ON and Masdar, develops and invests in carbon abatement projects in industry, power and oil and gas across Africa, Asia and the Middle East under the UN's clean development programme.

Dubai

In 2010 the SEC developed the Dubai Integrated Energy Strategy 2030, according to which Dubai will diversify its energy sources so that by 2030 it can fulfil 5 per cent of its energy demand from solar energy, 12 per cent from nuclear energy, 12 per cent from clean coal and 71 per cent from natural gas.

As part of this strategy, in January 2012, Shaikh Mohammad Bin Rashid Al Maktoum, the Ruler of Dubai, launched a 12 billion dirham solar power project, known as the Mohammad Bin Rashid Al Maktoum Solar Park. This solar park is expected to have a total installed capacity of 3,000MW. The projected capacity of 3,000MW is expected to be reached by 2030. The project is being implemented by the SEC in Dubai and is being managed and operated by DEWA. In the first phase, scheduled to be completed by October 2013, the SEC approved the construction of a 13MW solar photovoltaic power plant and a sub-station to connect the facility directly to DEWA's power grid. The plant is being constructed under joint partnership between the six members of the SEC

12 The project company, Shams Power Company, is 60 per cent owned by Masdar, 20 per cent by Total SA and 20 per cent by Abengoa Solar.

at a project cost of US\$33.8 million. The second stage, a 200MW photovoltaic plant, is underway based on the independent power producer model. DEWA has recently announced that it plans to invite tenders for the third phase of the solar park by the end of 2015 to increase its output by a further 800MW.

Last year, the emirate of Dubai issued Executive Council Resolution No. 46 of 2014 Concerning the Connection of Generators of Electricity from Solar Energy to the Power Distribution System in the emirate of Dubai (Resolution 46) to encourage the generation of electricity using solar panels. Resolution 46 enables DEWA consumers to supply power to DEWA's grid by connecting their solar panels and the power supplied to DEWA can then be adjusted against the consumer's electricity bill.

In July 2013, Dubai launched a waste-to-energy conversion project through a landfill gas recovery plant at the waste collection site in Al-Qusais. To date, this is the first land fill in the region to run its entire operation with electricity generated from landfill gas. In due course, the plant is expected to increase capacity from its current 1MW to 20MW by 2020. Plans to implement a similar project in the Jebel Ali landfill are also proposed by the government.

Dubai has also established the Dubai Carbon Centre of Excellence (DCCE), responsible for encouraging and developing strategies towards reducing the emirate's dependence on carbon fuels and reducing carbon emissions.

UTICO, a privately owned utility company, is in the process of tendering the construction of a new 40MW solar plant in Ras Al Khaimah. This same company is also collaborating with Shanghai Electric to set up a 1.5 billion dirham coal power plant project to be set up in Ras Al Khaimah. This coal power plant is expected to generate 270MW of clean coal power once completed in 2015.

Although the UAE's recent steps towards developing more renewable energy projects in the country are commendable, the projects launched so far will fulfil only a small part of the country's total energy requirements. Despite the announcement to produce 15 per cent of the country's total energy requirements from renewable sources by 2030, the UAE has not set itself a mandatory renewable energy target. The UAE's electricity demand is expected to grow at close to 10 per cent for the next decade, which will require a substantial increase in conventional gas and diesel-powered plants. Furthermore, most conventional power plants in the UAE also host water desalination plants, making the development of such additional capacity crucial in fulfilling the country's growing water requirements. The country's primary focus is therefore expected to continue to remain in developing conventional power and water desalination plants.

In order to encourage private investment in renewable energy, the government needs to enact formal legislation to regulate the development of renewable energy. A subsidy for renewable energy sources combined with a feed-in tariff that guarantees that electricity generated from renewable sources will be purchased for a minimum price can be introduced as a further incentive.

Nonetheless, recent initiatives in the field of renewable energy launched in Dubai and Abu Dhabi along with creation of specialised entities to further develop the renewable energy projects have made the UAE one of the most dynamic and exciting markets for renewable energy in the region.

Nuclear energy

The UAE is signatory to the Treaty on Non-Proliferation of Nuclear Weapons 1968 (signed in 1996), the Comprehensive Nuclear Test Ban Treaty 1996 (signed in 2000), and the Convention on the Physical Protection of Nuclear Material (signed in 2003). In addition, the UAE has signed an agreement with the International Atomic Energy Agency (IAEA) for the application of safeguards in connection with the Treaty on Non-Proliferation of Nuclear Weapons.

The UAE aims to produce a significant part (approximately 9 per cent) of its electricity from nuclear technology. The UAE released a nuclear policy in 2008 and has since then promulgated a regulatory framework for development of nuclear energy in the country. In addition to collaborating with the IAEA and the World Association of Nuclear Operators, the UAE has signed cooperation agreements with Korea (2009), the United States (2009), France (2008) and the United Kingdom (2008) for the development of peaceful use of nuclear energy.

The Federal Authority for Nuclear Regulation (the FANR), the federal nuclear energy regulator headquartered in Abu Dhabi, was established in 2009 under Federal Law No. 6 of 2009 Concerning the Peaceful Use of Nuclear Energy. The FANR is tasked with the responsibility of setting up the procedures and measures to be followed for the development of nuclear technology in the UAE. The FANR has issued regulations governing, *inter alia*, licensing, site location, design, construction, commissioning and operation, as well as standards for safety, transportation and storage facilities, radioactive waste management and physical protection of nuclear materials. The UAE has also created the International Advisory Board (IAB), an independent body consisting of independent international experts on nuclear energy who will offer guidance to the country's nuclear program on compliance with international safety, security and proliferation standards. The IAB is presently chaired by Hans Blix, the former IAEA Director General.

The UAE has been making rapid strides in establishing its first nuclear power station. The Emirates Nuclear Energy Corporation (ENEC), an Abu Dhabi government owned company established by Federal Law No. 21 of 2009, is constructing the Barakah nuclear power plant in Abu Dhabi with a total capacity of 5,600MW. The project consists of the construction and installation of four 1,400MW reactors with the first reactor scheduled to be completed in May 2017 and the fourth by 2020. Barakah is the first of four nuclear plants planned to be constructed in the country.

ii Energy efficiency and conservation

The UAE has one of the highest rates of electricity consumption per capita. This high usage is encouraged by the electricity and water subsidies given by the government to its citizens and in certain emirates to foreign expatriates. Dubai has progressively reduced and removed most of its electricity subsidies and Abu Dhabi is contemplating similar measures. Efficiency in energy usage is now being recognised as one of the key issues in trying to meet the country's growing energy needs in a sustainable manner.

In 2010, Abu Dhabi imposed a mandatory rating system for construction of energy-efficient buildings in the emirate under the Estidama initiative. Starting from September 2010, all new development communities, private buildings and villas in the emirate are required to meet the minimum of one-pearl rating. All government led

projects have been mandated to meet a two-pearl rating (the highest being a five-pearl rating).

The Dubai government has also enacted the Green Buildings Regulations to encourage sustainable building practices. These regulations are enforced by the Dubai Municipality and apply to all new buildings constructed (including changes or additions to existing buildings) in the emirate. To this end, the Office has licensed nine energy service companies to retrofit more than 30,000 buildings in the emirate of Dubai to make them more energy efficient.

In order to attract foreign private investment in the sector, Dubai has created a free zone dedicated towards development of green technologies and energy conservation known as the Energy and Environment Park (EnPark). EnPark is also Dubai's first master-planned community built on sustainable principles.

Through recent investment in its transmission system, DEWA succeeded in reducing the percentage of line losses in its electrical network to 3.26 per cent in 2014 from 6.28 per cent in 2001 and has simultaneously increased the efficiency of its energy generation by 22 per cent between 2006 and 2014. As part of its demand growth management strategy, DEWA has introduced a slab tariff that has been successful in reducing demand growth to 3 per cent despite a 5 per cent growth in end users in 2011. FEWA also has a slab tariff in place for the northern emirates whereas ADWEA is proposing to launch a similar tariff structure in the near future.

iii Technological developments

Masdar has established the Masdar Institute of Science and Technology (MIST), a state-of-the-art research centre and university, in partnership with Massachusetts Institute of Technology. MIST is a graduate-level university that aims to provide solutions to issues of sustainability, focusing on advanced energy and sustainable technologies, through research.

Although it is a brand new institute, according to its website, over 30 research projects are currently underway, covering solar beamdown, innovation ecosystems, smartgrids and aviation biofuels. In addition, according to its website, a number of patents are already pending registration.

MIST is likely to play a leading role in development of advanced technologies in the UAE in the coming years.

VI THE YEAR IN REVIEW

The UAE has seen double-digit increase in the demand for electricity in recent years and is expected to continue seeing rapid growth in the coming years.

In order to meet this growing demand, Abu Dhabi has allowed private power companies to participate in its energy sector for a number of years. More recently, due to the rapid growth in demand for power in the country, Dubai and the federal government have both launched initiatives to permit private sector participation in the generation of electricity. The government of Ras Al Khaymah has established its own electricity and water authority to meet its growing power demand. The rise in property prices in Dubai has caused a spillover of residents into the smaller emirates of Shariyah, Ras Al Khaymah

and Ajman, thereby fuelling demand for power and putting pressure on the electricity infrastructure of the smaller emirates. Dubai enacted the Dubai Electricity Privatisation Law and the FEWA Law was amended in 2008 to enable private investment in the sector. Recent press reports suggest that it may take some time before the electricity markets in Dubai and the northern emirates are opened to foreign investors, but if energy demand continues to grow at current rates, these emirates would need to resort to private investment in the sector to increase output. Transmission and distribution networks continue to be owned by the state owned monopolies and the status there is unlikely to change in the foreseeable future.

The need for specialised regulation is recognised and Dubai has enacted a number of laws to modernise its regulatory framework. Two specialist regulators for the energy sector, the SEC and the Office, have been established, with the latter focusing primarily on electricity. The enactment of the Dubai Electricity Privatisation Law can be directly attributed to the creation of these specialist regulatory bodies. The electricity sector in Dubai, however, continues to be dominated by DEWA. Earlier this year, Dubai issued Law No. 06 of 2015 on 'The Protection of the Electricity Grid and Public Water Systems in the Emirate'. This new law is intended to protect the electricity and water transmission and generation infrastructure in Dubai.

High subsidies and heavy reliance on fossil fuels for generation have resulted in the UAE having one of the highest per capita carbon footprints in the world. Rising fuel prices have created a growing recognition that the energy demand cannot be met only with investment on the supply side but that demand-side management programmes and energy conservation measures are equally important in matching demand with supply. Increases in electricity tariffs coupled with the introduction of slab tariffs in Dubai and the northern emirates have helped curb demand growth in these areas and relieved pressure on the sector. Due to the effectiveness of the slab tariff introduced by DEWA, Abu Dhabi is also proposing to introduce a slab tariff in the near future.

Green building regulations and a mandatory rating scheme have been introduced in Dubai and Abu Dhabi respectively to encourage energy conservation.

The country has set itself the goal of ensuring 15 per cent of its energy requirements in 2030 are met from renewable sources. Dubai has set itself a target of generating about one-third of its energy from clean, renewable or nuclear sources by 2030. To meet these targets, a number of projects have been launched.

Dubai has recently inaugurated a solar energy park that will, on completion in 2030, have the capacity to produce 3,000MW of electricity.

Abu Dhabi has launched the zero carbon emissions and zero waste Masdar City project to be powered exclusively by renewable energy sources. Masdar, the owner of the project, has started work on development of a number of renewable energy projects, including solar and wind.

A specialist regulatory body for the nuclear energy sector has been created. New regulations governing various segments of the nuclear chain are being developed and issued. Construction work on a nuclear power plant is currently underway at Barakah in the emirate of Abu Dhabi, and commissioning is expected in 2017.

Although efforts at diversification are commendable, the sector looks set to continue to be dominated by the existing players and the primary focus is likely to remain on the development of conventional water and desalination plants. With the

growing demand for electricity across the UAE, the authorities are continuing to invest significantly in hydrocarbon based power generation facilities, which are increasingly being supplemented by development of alternative and renewable energy.

VII CONCLUSIONS AND OUTLOOK

As seen above, in addition to the drive towards privatisation, notable developments towards energy diversification and introduction of renewable sources have taken place. These developments, however, remain restricted to the government sector and more needs to be done to encourage private sector participation both in conventional and renewable energy.

The state-owned monopolies in the various emirates are likely to continue to dominate the sector in the foreseeable future. The requirement under the Companies Law to maintain majority ownership in local hands means that foreign private investors will have to work with the local water and power authorities as junior partners or, when full private ownership is permitted within the sector, with local partners as the majority shareholders.

Although Abu Dhabi has seen foreign investment in the electricity sector for a number of years, the other emirates are increasingly beginning to recognise the benefits of encouraging private sector participation. This change in attitudes is driven principally by necessity as electricity demand continues to grow at a rapid pace, driven by increasing population and economic growth.

The energy sector in the UAE is likely to continue seeing rapid changes and as the economy continues to grow, demand is likely to create opportunities for private investment in the sector. In addition, the completion of the GCC Grid and its proposed expansion to countries such as Turkey by 2019 will create further opportunities for private sector investment in the sector by enabling cross border trading of power. The governments of Dubai and Abu Dhabi are continuing to take a number of measures to diversify their power production by encouraging investment in alternative and renewable energies. For the time being however, investment in the sector looks likely to continue to be led by the state-owned water and power authorities.

Appendix 1

ABOUT THE AUTHORS

MASOOD AFRIDI

Afridi & Angell

Masood Afridi is a partner at Afridi & Angell specialising in the areas of infrastructure and project finance, corporate and commercial, and energy law.

After working as an associate at the New York offices of the law firm of Sidley & Austin, he joined the Dubai office of Afridi & Angell in 1993. For several years, he has been a frontrunner in Pakistan's energy sector, and has participated in the development of numerous thermal and hydel power projects in the country. He has also been nominated from time to time to resolve other global issues with the power purchaser on behalf of the industry.

Acting in the capacity of project developer's lead counsel, Mr. Afridi has concluded transactions with a cumulative value of over US\$3 billion spread over several project finance transactions.

Mr Afridi has an LLM in international business and trade law from Fordham University (1990) and an LLB from the University of Bristol. At Fordham University, Mr Afridi received the Edward J Hawke Prize for graduating with the highest grade point average in his class.

HAROON BARYALAY

Afridi & Angell

Haroon Baryalay is a senior associate at Afridi & Angell, having joined the firm in 2011. Prior to joining Afridi & Angell, Mr Baryalay worked at Haidermota & Co in Pakistan, from 2006. His practice areas include project finance, corporate and commercial, and the energy sector.

Mr Baryalay has an LLM from Harvard Law School (2005), an LLB from the University of London (2004) and a BSc in economics from the Lahore University of Management Sciences (LUMS) in Pakistan (2001).

ADITE ALOKE

Afridi & Angell

Adite Alope is an associate at Afridi & Angell, having joined the firm in 2013. Prior to joining Afridi & Angell, Ms Alope was as an associate in Trilegal, New Delhi. She advises on the development and financing of infrastructure projects. She has advised extensively on the development of renewable energy projects in India as well as on public private partnerships

Ms Alope has an LLB from Amity Law School, Guru Gobind Singh Indraprastha University, in India (2009).

AFRIDI & ANGELL

Jumeirah Emirates Towers

Office Tower, Level 35

Sheikh Zayed Road

Dubai

United Arab Emirates

Tel: +971 4 330 3900

Fax: +971 4 330 3800

mafridi@afриди-angell.com

hbaryalay@afриди-angell.com

aaloke@afриди-angell.com

www.afриди-angell.com