

Chapter 24

UNITED ARAB EMIRATES

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I OVERVIEW

The United Arab Emirates ('the UAE') is a federation of the seven emirates of Abu Dhabi, Ajman, Dubai, Fujairah, Ras al-Khaimah, Sharjah and Umm al-Quwain. The seat of the federal government is situated in Abu Dhabi, which is the largest emirate by area (making up about 85 per cent of the country's area) and the richest in terms of oil resources. Dubai is the second-largest emirate by size. 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 are freely repatriable. 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, has made it a convenient trading post between the gulf and Asia. With modern communication, the UAE remains a convenient trading base for the Indian sub-continent, central Asia, Africa and beyond.

The powers of the federal and the emirate governments are enumerated in the State Constitution of 1971. Although the country is a federation, the larger emirates largely pursue their own economic policies. Article 120 of the UAE Constitution gives the federal government exclusive legislative and executive jurisdiction over electricity services, but in practice the emirates formulate and implement their own electricity policies and operate independently of each other. Hence, although there is a Federal

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Ministry of Energy (which formulates and implements the federal electricity policies), Federal legislation on electricity is somewhat limited.

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

The generation, transmission and distribution of electricity in the UAE is dominated by three water and power authorities owned by each of the individual emirates of Dubai, Abu Dhabi and Sharjah, and by a federal authority that operates in the smaller northern emirates. These state-owned authorities serve as the exclusive purchasers of electricity and distributors in each of their areas of operation. Whereas the private sector is allowed to participate in the generation of electricity, transmission and distribution is exclusively owned by state-owned authorities.

Abu Dhabi is the only emirate that has a number of private sector participants owning up to a 40 per cent economic interest in various 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 Supreme Energy Council ('the SEC') and the Electricity and Water Sector Regulation and Control Office ('the Office') in Dubai, and the Electricity Regulation and Supervision Bureau in 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'), for the implementation of 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 over 10 per cent annually in the foreseeable future. There is currently insufficient power generation capacity in some parts of the UAE, and demand is being met by selling power between the emirates through the Emirates National Grid ('the 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 help 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. 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 market.

The Ministry is responsible for formulating the federal government's policy on energy, including electricity. It has announced a strategic energy plan to develop the federal government's electricity services by attracting private investment in the sector. The Ministry of Energy also represents the country in the international petroleum community and specialised international and regional organisations.²

Abu Dhabi

In Abu Dhabi, Law No. (2) of 1998 Concerning the Regulation of Water and Electricity Sector ('Abu Dhabi Electricity Law'), as subsequently amended by Law No. (19) of 2007 and Law No.(12) of 2009 is the foremost legislation governing the electricity sector in the emirate. The sole and exclusive regulator is the Bureau and the main electricity company is the Abu Dhabi Water and Electricity Authority ('ADWEA'), both of which are established under the Abu Dhabi Electricity Law.

The Bureau's 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.

Dubai

The Dubai Electricity Law, the DEWA Law, SEC Law and the Dubai Office Resolution (each defined below) are the primary laws regulating the electricity sector in Dubai. The apex regulator is the SEC with the Office being the specialist regulatory authority. The main player in the electricity market is the Dubai Electricity and Water Authority ('DEWA').

Dubai's SEC was established under Dubai's Law No. (19) of 2009 (the 'SEC Law'). 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.

The SEC is responsible for all initiatives relating to the energy sector³ in Dubai, including generation, transmission and distribution of electricity for public consumption. The generation of electricity from renewable sources and nuclear energy is also subject to the SEC's regulatory oversight. The SEC is responsible for, *inter alia*:

- a* coordinating the affairs of energy related entities within the emirate;
- b* liaising with international and regional organisations and companies operating in the energy sector; and

2 The UAE has been a member of the Organisation of Petroleum Exporting Countries (OPEC) since 1974 and of the Organisation of Arab Petroleum Exporting Countries (OAPEC) since 1970.

3 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 within Dubai.

- c* issuing decisions and by-laws to implement 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 Law').

The Office was established in 2010 pursuant to Dubai Executive Council's Resolution No.(2) of 2010 ('Dubai Office Resolution'), and is authorised to regulate the electricity sector in Dubai, subject to the overall 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;
- c* determining and establishing standards and controls for electricity generation in the emirate; and
- d* carrying out such other duties as the SEC may assign to it from time to time.

ii Regulated activities

Abu Dhabi

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.

Dubai

Under the Dubai Electricity 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 defined as high voltage electricity cables and electricity installations and facilities owned or operated by DEWA and used to transmit electricity. All activities relating to electricity generation, transmission, distribution and supply of electricity are regulated activities under the Dubai Electricity Law and require a license from the Office.

iii Ownership and market access restrictions

Under the UAE's Commercial Companies Law 1984 ('the Companies Law'),⁴ foreigners may only own up to 49 per cent of any onshore UAE company. Therefore, as with all onshore entities, all power sector companies established within the UAE must be majority owned by local nationals, whether privately or by the government. So far, the local ownership share has mostly been taken up by the government-owned water and electricity authorities in the various emirates.

Although the UAE free zones allow for 100 per cent foreign ownership, the free zone companies are not allowed to transact business within the UAE (they are restricted to operating in the free zone itself or outside the UAE) and would not be able to supply electricity to the mainland.

The UAE's electricity laws do not impose any specific ownership restrictions on foreign investors in the UAE, nor do they necessarily require government participation

⁴ Federal Law No.(8) of 1984, as amended.

in the electricity sector. However, as a matter of policy, most companies 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 Dubai and Abu Dhabi authorities, being the largest two, account for about 85 per cent of the UAE's entire production capacity. ADWEA accounts for approximately 52 per cent of the UAE's entire power generation capacity (12,800MW), DEWA for 33 per cent (8,700MW), SEWA for 10 per cent (2,400MW) and FEWA, which operates in the northern emirates, for about 5 per cent (1,150MW).

Abu Dhabi

ADWEA was established pursuant to the Abu Dhabi Electricity Law, and it is responsible for all matters relating to formulation, development and implementation of policy of the Abu Dhabi government in relation to the electricity sector, including the privatisation of the electricity sector. 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 can also establish 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.⁵ 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;
- d* Emirates SembCorp Water and Power Company;
- e* Fujairah Asia Power Company;
- f* Gulf Total Tractebel Power Company;
- g* Ruwais Power Company;

5 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.

- h* Shams Power Company PJSC;
- i* Shuweihat Asia Power Company PJSC;
- j* Shuweihat CMS International Power Company;
- k* Umm Al Nar Power Company; and
- l* 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.

Dubai

DEWA was established under Dubai's Law No.(1) of 1992 ('DEWA Law') as an independent public authority owned by the government of Dubai. DEWA is managed by a board of directors whose members are appointed by Emiri decree.

DEWA is an integrated supplier owning and operating in all segments of the electricity market in Dubai. 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 Law is broadly modelled on the Abu Dhabi Electricity Law. The Dubai Electricity Law authorises DEWA to establish project companies, by itself or in collaboration with third parties, for the generation of electricity.

So far, DEWA had solicited bids for the Al Hassyan 1 Independent Power Project, a 1,600MW gas-fired power plant, in December 2011 but has since deferred the project. DEWA proposes to retain a 51 per cent ownership share in the project. Al Hassyan 1 is the first of six planned IWPPs in Dubai forming part of a power and water complex with total capacity of 9,000MW.

Northern emirates

FEWA is responsible for the generation and distribution of electricity in the northern emirates of Ajman, Ras al-Khaimah, Fujairah and Umm al-Quwain. FEWA is governed by a board of directors whose members hold office for a term of three years.

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.

FEWA is authorised under the FEWA Law to establish private power generation plants in the northern emirates. A number of such projects have been developed or are presently under development in these emirates.

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 owned and operated by FEWA.

Sharjah

Sharjah has its own electricity authority 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–maintain' power stations and electricity transmission lines. Within the emirate, SEWA is responsible for the generation, transmission and distribution of electricity. SEWA is authorised to determine electricity prices and connection fees, which are subject to approval by the Ruler of Sharjah.

iv Transfers of control and assignments

Abu Dhabi

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.

Dubai

Under the Dubai Electricity Law, licensed entities are not permitted to transfer or assign their licenses 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.

III TRANSMISSION/TRANSPORTATION AND DISTRIBUTION SERVICES

i Vertical integration and unbundling

As noted above, electricity transmission and distribution in the UAE is controlled by the state-owned water and power authorities, each of which enjoys a monopoly in its particular area of operation.

Abu Dhabi

ADWEA's wholly owned subsidiary TRANSCO operates Abu Dhabi's transmission networks. TRANSCO supplies electricity from the generating companies to the two distribution companies of Abu Dhabi (discussed below). Recently, TRANSCO has also become involved in the planning, development and operation of electricity transmission networks in the northern emirates.

Abu Dhabi is serviced by two electricity distribution companies each of which are wholly owned by ADWEA. These are:

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

Dubai

DEWA is the sole purchaser of electricity in Dubai and presently owns all the generation, transmission and distribution capacity of the emirate.⁷ DEWA's transmission and distribution network is constantly being expanded as new real estate and industrial projects are set up across Dubai.

Emirates National Grid

The ENG project was launched in the year 2000 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* FEWAL 20 per cent;
- 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. According to the Bureau, Abu Dhabi exported about 1,900MW of electricity to other emirates via the ENG 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 of electricity was exported by Abu Dhabi to the GCC Grid in 2011.

7 DEWA operates a network of overhead lines (875 kilometres of 400kV, 437 kilometres of 132kV and 113 kilometres of 33kV lines) and underground cables (1,250 kilometres of 400kV, 1,985 KM of 33 KV and 23,987 kilometres of 6.6 and 11kV lines) that are, in turn, connected to a distribution system of lower voltage substations and distribution lines.

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 Law prohibits a licensed entity from selling electricity to any entity other than DEWA.

iii Rates

Abu Dhabi

ADWEC, being the only 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, AADC and RASCO) are subject to government control, which is exercised through the Bureau. The Bureau sets their revenue target on the basis of which the control prices are then 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/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 (SMP) 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.

For the power generation companies, their rates 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 (RFPs) 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 as published by the Bureau on its website are divided according to consumer categories as follows:

- a* UAE nationals – domestic (remote areas): 3 fils per kWh
- b* UAE nationals – domestic (other areas): 5 fils per kWh
- c* Non-UAE nationals – domestic: 15 fils per kWh
- d* Industrial/commercial: 15 fils per kWh
- e* Governmental and schools: 15 fils per kWh
- f* Farms: 3 fils per kWh

According to news reports quoting electricity officials in Abu Dhabi, the government subsidy for water and electricity services in Abu Dhabi accounts for nearly 86 per cent of the cost of a unit of electricity for nationals and 50 per cent for expatriates.

Dubai

Under the DEWA Law, the board of directors of DEWA are given the power 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).

The electricity tariff in Dubai comprises of the electricity consumption charges, the fuel surcharge and meter charge. Electricity tariffs in the emirate are based on a slab tariff scheme whereby higher consumption attracts a higher slab rate.

DEWA has (since 1 January 2011) increased electricity rates and under directions from the SEC, introduced a variable fuel surcharge in its electricity tariff. 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 onto consumers. This has enabled the company to increase revenues, reduce demand growth and earn higher profits.

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 that are established in the emirate will need to enter into PWPAs with DEWA for the sale of their production.

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.

A number of renewable energy initiatives (discussed below) have also been launched.

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 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 must also sell their power production to FEWA or SEWA respectively.

iii Contracts for sale of energy

Abu Dhabi

ADWEC pays the generation companies the tariff agreed under the PWPAs. The PWPA serves both as a grant of concession and offtake agreement.⁸

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 despatched.

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 (ADNOC) 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 \$/dirham exchange rate (the UAE's currency is pegged to the US dollar at a fixed exchange rate of \$1 to 3.67 dirhams).

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.

Dubai

Dubai does not have a standard power purchase agreements in place as yet. DEWA's first proposed joint venture with the private sector, Al Hassyan 1, is still in the bidding phase. Any agreements entered with IWPPs in Dubai are likely to be modeled on the existing PWPAs signed by ADWEC.

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

iv Market developments

The UAE proposes to develop renewable energy sources to reduce its dependence on carbon fuels. A number of renewable energy projects have been launched in this connection (please see below for details).

In addition, the UAE has begun construction on its first nuclear energy power plant. It has developed a regulatory framework for the sector and plans to use nuclear energy to meet a substantial portion of its energy needs. This is discussed in further detail below.

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. 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 kickstart the development of renewable energy in the country.

Abu Dhabi

Abu Dhabi has established the Abu Dhabi Future Energy Company ('ADFEC')⁹ to spearhead the emirate's renewable energy initiative. Masdar City, a project launched by ADFEC to be constructed in the outskirts of Abu Dhabi City, is proposed to be run entirely on renewable energy with zero carbon emissions. Masdar City has also won the rights to host the headquarters of the International Renewable Energy Agency (IRENA).

ADFEC has launched a number of other renewable energy projects which include:

- a* production of up to 50MW of electricity at its solar photovoltaic power plant located at the Masdar City for supply to the project;
- b* a 100MW Shams Solar Power Project (60 per cent owned by ADFEC), which is expected to be completed by the end of 2012 in Madinat Zayed in Abu Dhabi;
- c* a wind turbine on Sir Bani Yas Island with a capacity of 850kW, which has already been completed. In addition, ADFEC proposes to produce up to 40MW of electricity employing the use of wind turbines;
- d* a 500MW integrated hydrogen power generation and desalination plant; and
- e* a carbon capture and storage project.

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

⁹ ADFEC is owned by Mubadala Development Company, the Abu Dhabi government's investment vehicle.

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 dirhams solar power project, known as the Mohammad Bin Rashid Al Maktoum Solar Park. This solar park will ultimately have a capacity to generate 1,000MW of electricity from solar energy. The project's capacity is to be increased in phases with production of 1,000MW of electricity expected to be completed by 2030. The project is being implemented by the SEC in Dubai and is being managed and operated by DEWA.

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.

Dubai will also host the World Energy Forum in October 2012, and given that 2012 is the year designated by the United Nations as the International Year of Sustainable Energy, it highlights the UAE's commitment towards diversification away from fossil fuels towards renewable energy.

Although the UAE's recent steps towards developing more renewable energy projects in the country are commendable, the projects launched so far will only fulfil a small part of the country's total energy requirements. Despite the announcement to produce 7 per cent of the country's total energy requirements from renewable sources by 2020, the UAE has not set itself a mandatory renewable energy target.

In order to encourage private investment in renewable energy, the government would need 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 aims to produce a significant part 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 International Atomic Energy Agency ('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 Braka nuclear power plant in Abu Dhabi (with a capacity of 5,600 MW), which is expected to be completed in phases commencing in 2017 until 2020. Braka is the first of four nuclear plants planned to be constructed in the country.

ii Energy efficiency and conservation

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.

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 3.49 per cent in 2011 from 6.28 per cent in 2001. 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

AFDEC 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 the past few 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. Dubai enacted the Dubai Electricity Law and the FEWA Law was amended in 2008 to enable private investment in the sector. Transmission and distribution continues to be owned by the state owned monopolies.

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 Law can be directly attributed to the creation of these specialist regulatory bodies.

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 7 per cent of its energy requirements in 2020 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 which will, on completion in 2030, have the capacity to produce 1,000MW of electricity.

Abu Dhabi has launched the zero carbon emissions/zero waste Masdar City project to be powered exclusively by renewable energy sources. ADFEC, 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 Braka in the emirate of Abu Dhabi, and commissioning is expected in 2017.

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.

Although Abu Dhabi has seen foreign investment in the sector for a number of years, the other emirates such as Dubai and the northern emirates remain relatively inexperienced. The other emirates are likely to follow the example set by Abu Dhabi and implement similar ownership structures and model agreements. The PWPAs, operations and maintenance contracts and engineering, procurement and construction agreements and government guarantees are likely to be modelled on those presently used in Abu Dhabi.

The energy sector in the UAE is likely to continue seeing rapid changes and as the economy, especially of Dubai, continues to recover, demand is likely to create more opportunities for foreign private investment in the sector. For the time being, growth will be managed through government solicited projects, with local participation and economic interests. While this may dilute the benefits to a private sector investor, it facilitates the ability to finance such ventures.

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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 \$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 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.

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