THE ENERGY REGULATION AND MARKETS REVIEW

NINTH EDITION

Editor
David L Schwartz

THE LAWREVIEWS

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CONTENTS

PREFACE

In our ninth year of writing and publishing *The Energy Regulation and Markets Review*, the most pressing global concerns have revolved around the covid-19 pandemic. Accordingly, many of our contributing authors have emphasised concerns associated with the effects of the crisis on energy demand and consumption, and delays in the development of infrastructure. Beyond this crisis, we have seen many other significant geopolitical changes that have added uncertainties to global energy policies. For example, oil prices have hit record lows, which has slowed exploration and production efforts, and has threatened economic stability for countries that depend upon oil revenues. The United Kingdom is now within its 11-month transition period to exit from the European Union (a process known as Brexit), creating uncertainties regarding the future of the UK's energy policies and its coordination and cooperation with the European Union, including with respect to commitments to reduce greenhouse gases (GHGs). The Trump administration's 'America First' trade policies have continued to alienate US allies and historical trading partners. Despite its withdrawal from the Paris Agreement and expressions of support from the Trump administration for the coal industry, the United States has continued its extensive investment in renewable generation resources. The 2011 Fukushima nuclear incident continues to affect energy policy in many countries. Finally, there are continued efforts to liberalise the energy sector globally.

I CLIMATE CHANGE DEVELOPMENTS

Despite the US withdrawal from the Paris Agreement, we continue to see significant carbon reduction efforts globally, including increased use of renewable resources, and measures to improve energy efficiency and reduce demand.

In the United States, despite the Trump administration's support for the US coal industry, coal and other aged fossil fuel plants are retiring at an unprecedented rate. Additionally, many states have pushed for the procurement of thousands of megawatts of renewable resources, including from new offshore wind development projects on the east coast. However, the US Bureau of Ocean Energy Management has delayed granting approvals for offshore wind projects, and the Federal Energy Regulatory Commission has imposed regulatory restrictions on the ability of state-subsidised renewable energy projects to clear in the regional capacity markets through a minimum offer price rule to mitigate buyer market power.

The European Union issued a revised Renewable Energy Directive, which will take effect in 2021, targeting 32 per cent renewable consumption by 2030. Despite continued efforts to follow through on Brexit, the United Kingdom's renewable energy targets already exceed those of the European Union. France is seeking to double its wind and solar capacity and President Macron has announced a goal to close the remaining coal plants by 2022.

Italy had previously targeted a 28 per cent reliance on renewable energy by 2030 but is now working to reach the 32 per cent target adopted by the European Union. Belgium has continued its significant offshore wind procurement efforts, and is seeking to reduce subsidies in future procurements. In Denmark, renewables already constitute 40 per cent of electricity consumption and the aim is to have all energy demand met by renewables by 2050. Germany will not meet its goal of reducing emissions by 40 per cent by 2020, or its goal to reduce energy consumption by 20 per cent as compared with 2008, but remains focused on the continued development of renewable generation, energy efficiency and conservation, as well as energy storage technologies. Poland has been struggling to meet the European Union renewable energy targets but has plans to develop offshore wind generation.

Japan has continued its efforts to develop solar and wind resources, including opening new sea areas for offshore wind. But the shutdown of most of its nuclear generation has resulted in a significant reliance upon natural gas, including liquefied natural gas, and reductions in renewable energy prices has caused a slowdown in new solar and wind development. China continues to have ambitious renewable energy goals, capping energy from coal generation to an amount equivalent to 5 billion tonnes and aiming to have 15 per cent of generation supplied by non-fossil fuel generation. Korea aims to generate 20 per cent of its power needs from renewable energy and has committed to cut GHGs by 37 per cent by 2030.

This year, Australia has reached almost 20 per cent reliance on renewable energy resources, including significant amounts of energy storage capacity (battery and pumped water) and South Africa increased its renewable independent power procurement efforts, with a goal of producing 17,800MW of renewable energy by 2030.

The United Arab Emirates aims to reduce its carbon footprint by 70 per cent by relying on 50 per cent renewable energy by 2050, and Abu Dhabi is seeking to reduce electricity consumption by 22 per cent by 2030. In Brazil, hydroelectric resources already constitute more than 60 per cent of its installed generation capacity, and efforts continue to increase wind and solar generation as the cost of renewable generation has decreased. Colombia has significant renewable energy resources and recently completed its first auctions for renewable projects, with 1,398MW awarded and installed.

II INFRASTRUCTURE DEVELOPMENT

For many countries, a reliable energy supply remains the primary concern, regardless of fuel source. As only 35 per cent of Myanmar is connected to the grid, there are continued efforts to electrify remote parts of the country. Lebanon is hoping to solicit bids for the development of 890MW on floating barges to increase electricity supply. Panama and Colombia continue to seek foreign investment.

South Africa is utilising its Integrated Resource Planning process with a goal of doubling its generation and transmission capacity by 2030. Australia is developing the Snowy Hydro Project, which, at 2,000MW, will be one of the largest pumped hydroelectric storage projects in the world. Colombia is developing a large hydroelectric project that is expected to produce up to 17 per cent of the country's energy needs, but that effort is hindered by construction delays.

In its eighth licensing round for oil and gas exploration in the North Sea, Denmark received five new applications, but owing to political pressure relating to GHGs, Denmark has put this licensing round on hold indefinitely.

III NUCLEAR POWER GENERATION

Nine years after the Fukushima disaster, Japan has stopped operations at all but nine of its 48 nuclear power stations, and 11 nuclear power stations are in the process of being reviewed for restart under Japan's new stringent safety standards. Germany continues efforts to phase out all nuclear generation by 2022, and Belgium's nuclear plants have often been offline for maintenance for technical issues in the past few years. France was seeking to eliminate nuclear generation by 2025 but has extended that date to 2035. South Korea has continued its efforts to phase out nuclear power (replacing nuclear plants with new renewable facilities over time). South Africa's nuclear ambitions appear to be on hold at least until 2030.

However, the phasing out of nuclear energy is not universal. The United Arab Emirates' new 5,600MW Barakh nuclear power station is almost complete and one of its units is already operational. When all units are on-line, Barakh will supply 25 per cent of the emirates' electrical needs. Poland still intends to explore the development of nuclear power in the future. In the United States, even though the early retirement of certain nuclear plants has been driven by cost and power market considerations (rather than safety concerns), some states have passed legislation to subsidise nuclear energy to allow owners to continue to operate through zero emissions credit programmes, including Illinois, New York, New Jersey and Ohio, with similar legislation being considered in Pennsylvania.

IV LIBERALISATION OF THE ENERGY SECTOR

We have seen significant energy sector regulatory reforms in many countries. The European Union has sought to continue efforts to centralise the regulation of the EU energy sector. France has taken significant steps towards further liberalisation of its energy sector. Japan has fully liberalised its electricity and gas sectors and is encouraging market entry. Australia has opened access to transmission through regulatory reforms to encourage entry into the generation market and is undertaking significant energy market reforms to send more accurate price signals to market participants. Brazil continues its efforts to implement net metering regulations this year. China has reduced subsidies for renewable energy, prices transmission and distribution rates based upon a cost-plus regulatory methodology, and has implemented a market-priced mechanism for pricing coal-based generation. The United Kingdom has implemented a competitive tender process for the development of offshore transmission. In the United States, while states have continued to subsidise nuclear and renewable generation, the Federal Energy Regulatory Commission has permitted regional markets to implement minimum offer price rules to combat buyer-side mitigation in an effort to maintain competitive capacity markets.

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

David L Schwartz
Latham & Watkins LLP
Washington, DC
May 2020

Chapter 24

UNITED ARAB EMIRATES

Masood Afridi and Adite Aloke[1]

I OVERVIEW

The United Arab Emirates (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 size (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 (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. This chapter focuses on the UAE's federal laws and policies relating to the energy sector with a particular focus on the regulation of the electricity sectors in the emirates of Abu Dhabi and Dubai.

The powers of the federal and the emirate governments are enumerated in the State Constitution of 1971. 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, to some extent Sharjah, and more recently the northern emirate of Ras Al Khaimah, 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.

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 gross domestic product to approximately 36 per cent.

II REGULATION

i The regulators

Federal

The Federal Ministry of Energy and Industry (the Ministry of Energy) is the primary regulator at the federal level and is 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. However, the Ministry of Energy 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.

1 Masood Afridi is a partner and Adite Aloke is a senior associate at Afridi & Angell.

The Federal Electricity and Water Authority (FEWA) 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 works in conjunction with FEWA to implement the federal government's electricity policy in the northern emirates.

Abu Dhabi

Abu Dhabi's electricity sector is regulated by the Department of Energy (DOE) and the UAE Water and Electricity Company (EWEC). The DOE is responsible, *inter alia,* for controlling, supervising and organising the energy sector in Abu Dhabi and for issuing licences to entities engaged in the energy sector.[2] EWEC is the sole provider of water and electricity in Abu Dhabi and is empowered to contract with all entities licensed to produce and distribute water and electricity in Abu Dhabi.

Dubai

The main authorities regulating the electricity sector in Dubai are the Dubai Electricity and Water Authority (DEWA), the Dubai Supreme Council of Energy (DSCE) and the Dubai Regulation and Supervision Bureau (RSB Dubai).

The DSCE is the primary regulator of the energy sector in Dubai and regulates the exploration, production, storage, transmission and distribution of petroleum products (natural gas, liquid petroleum, petroleum gases, crude oil) and electricity. The DSCE also proposes any and all initiatives relating to the energy sector, which includes privatising 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).

RSB Dubai is authorised to regulate the electricity sector subject to the supervision of the DSCE. RSB Dubai is mainly responsible for regulating, licensing and supervising the electricity generating service providers, facilities and properties. It also determines and establishes standards and controls for electricity generation in the emirate and proposes legislation governing the electricity sector in Dubai.

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.

Northern emirates

The main regulator in Sharjah is the Sharjah Electricity and Water Authority (SEWA). 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.

FEWA is responsible for the generation, transmission and distribution of electricity in the other northern emirates of Ajman, Ras Al Khaimah, Fujairah and Umm al-Quwain.

2 The term 'energy sector' covers all activities, works and services related to the following: (1) production, treatment, storage, transportation, distribution, supply, sale and purchase of gas, oil and derivatives thereof; (2) generation, storage, transportation, distribution, supply, sale and purchase of electricity of all kinds (clean, renewable, traditional); (3) production, treatment, desalination, storage, transportation, distribution, supply, sale and purchase of water; (4) collection, treatment and disposal of sewage and waste water, and the recycling of treated waste water; and (5) production, storage, distribution and supply of refrigerated liquid for central refrigeration applications.

The Ras Al Khaimah Electricity and Water Authority (RAKEWA) is tasked with the regulation, management, operation and maintenance of power stations, water desalination plants, electricity distribution and transport networks in Ras Al Khaimah. RAKEWA is also responsible for controlling prices of electricity and water in the emirate. Despite the establishment of RAKEWA, FEWA continues to own, manage and operate the electricity resources situated in the emirate and is the *de facto* authority on the ground. It is unclear whether RAKEWA will replace FEWA in Ras Al Khaimah or if the two authorities will operate jointly in the emirate.

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.

iii Ownership and market access restrictions

Under Federal Law No. 2 of 2015 on Commercial Companies (the Companies Law),[3] foreigners are permitted to own up to a maximum of 49 per cent of a UAE company (other than in the free zones) and the majority 51 per cent is required to be owned by UAE nationals. The power sector is no exception to this requirement. While Federal Law No. 19 of 2018 on Foreign Direct Investment (the FDI Law) was promulgated[4] to allow 100 per cent foreign ownership of companies in certain sectors in the UAE, subject to approval of the UAE Cabinet, the FDI Law sets out a Negative List of 13 sectors in which existing laws and restrictions will continue to apply and majority foreign ownership will not be permitted. This includes water and electricity services.

Although the UAE free zones allow for 100 per cent foreign ownership, the free zone companies are not allowed to conduct business outside the free zones and within onshore UAE. To date, there are no power generation, transmission or distribution companies in any of the free zones in the UAE.

UAE's electricity laws themselves do not impose any specific ownership restriction on foreign investors in the UAE, nor do they necessarily require government participation in the sector.

Abu Dhabi

Project companies are usually structured as joint stock companies incorporated in Abu Dhabi. As a matter of policy, although two or more foreign joint venture partners are permitted to own up to 40 per cent of a project company, the DOE ensures that a foreign entity does not own more than 25 per cent of the market by capacity. The most common ownership structure is one in which the DOE incorporates an intermediate holding company to own a 60 per cent stake, which in turn is held by the DOE (10 per cent) and the Abu Dhabi National

3 Federal Law No. 2 of 2015 on Commercial Companies abrogated Federal Law No. 8 of 1984 (as amended).

4 Issued on 23 September 2018.

Energy Company PJSC, also known as TAQA (90 per cent).[5] A few project companies have other ownership structures. Recently, project companies have also been structured as limited liability companies.

Dubai

Under the Dubai Electricity Privatisation Law, DEWA is authorised to establish project companies, by itself or in collaboration with third parties, for the generation of electricity. Dubai Law No. 22 of 2015 on Regulating Partnerships between the Public and Private Sectors in Dubai, which was enacted in 2015, governs the regulatory framework of public-private partnerships in Dubai. The aim of this Law is to encourage private-sector participation in the development of projects. It sets out, *inter alia*, the terms of partnerships between the public and private sectors and conditions for approval of prospective projects.

To date, several independent power projects (IPPs) have been launched in Dubai in which, typically, DEWA has 51 per cent ownership of the project company and the remainder is owned by one or more private sector entities.

Northern emirates

FEWA is authorised under the FEWA Law to establish private power generation plants in the northern emirates. While in the past most projects in these emirates were primarily owned in the public sector, of late there has been a move towards public private partnerships and a number of projects presently being developed in these emirates are partly owned by one or more private sector entities.

In Sharjah, typically the government of Sharjah (directly or indirectly) would co-own projects with one or more private sector entities. Government sector ownership in Sharjah has been as low as 25 per cent in certain projects.

iv Transfers of control and assignments

Any transfer of control or assignment of an interest in an independent water and power producer (IWPP) requires the consent of the relevant regulator.

Under the relevant electricity laws in Abu Dhabi, a licence may not be transferred unless there is specific permission. Prior consent of the DOE is required for any transfer (including the creation of security over assets of the licence holder) and the consent may be subject to such conditions as the DOE may consider appropriate.

In Dubai , licensed entities are not permitted to transfer or assign their licences without the prior approval of the RSB Dubai. In addition, licensed entities may not dispose of, sell, lease or otherwise transfer, including granting a security interest over, their main assets without prior approval from the RSB Dubai. 'Main assets' are those movable 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 and joint stock companies.

5 Delmon, Jeffrey and Rigby Delmon, Victoria, *International Project Finance and PPPs: A Legal Guide to Key Growth Markets* (2012), Chapter 16, p. 26. Abu Dhabi National Energy Company PJSC (known as TAQA), in which the Department of Energy [DOE] (formerly ADWEA) owns a 74.05 per cent ownership stake, was established under Abu Dhabi Decree No. 16 of 2005 and serves as ADWEA's (now the DOE's) investment arm in the emirate and abroad. Other Abu Dhabi government entities own a further 1.16 per cent of TAQA, with the total government shareholding being 75.21 per cent. The remaining 24.79 per cent of TAQA is owned privately.

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

TRANSCO operates Abu Dhabi's transmission networks. It supplies electricity from the generation companies to the two distribution companies of Abu Dhabi, each of which was previously wholly owned by ADWEA, and now by the DOE. These are:

a Abu Dhabi Distribution Company (ADDC), which operates in the city of Abu Dhabi and the western region of the emirate; and

b Al Ain Distribution Company (AADC), which operates in Al Ain city and the surrounding areas.

In response to power shortages faced in the northern emirates, TRANSCO became involved in the planning, development and operation of electricity transmission networks in the northern region. 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. DEWA's transmission and distribution network is constantly being expanded as new real estate and industrial projects are set up across Dubai.

During the past few years, DEWA has further enhanced the electricity transmission networks of the emirate. This includes DEWA's announcements in 2017 to build 97 new 132/11kV substations and three new 400kV substations by 2020. DEWA is also currently building three new 132/11kV substations with 45 kilometres of high voltage (132kV) cables for the World Expo 2020.

Northern emirates

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

The northern emirates have been suffering insufficient power and electricity generation. For this reason and because of increased demand for electricity, FEWA has announced a number of new projects to expand and improve its electricity network.

In Sharjah, SEWA is the sole purchaser of electricity and presently owns all the generation, transmission and distribution capacity of the emirate. Because of the increased demands in electricity and energy, SEWA has recently embarked on improving and expanding its electricity transmission and distribution network on a large scale.

Emirates National Grid

A project was launched by the Ministry of Energy in 2001 with the purpose of enhancing integration between the various electricity and water authorities in the UAE, and to connect and enable sharing of power between the seven emirates. Each of the electricity and water authorities contributed proportionately to the capital investment required to build the Emirates National Grid (ENG). The ENG is owned by those authorities in the following proportions:

a DOE (formerly 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 mid 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.

On account of its larger production capacity and extensive distribution network, ADWEA (now the DOE) 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. Renewable energy sources such as solar and nuclear power will increasingly contribute to the ENG. Currently, the solar power is transmitted to the ENG from Shams 1 solar power plant and plans are under way for nuclear energy and further solar power to be transmitted from the Barakah nuclear energy power plant and photovoltaic panels respectively.

The Gulf Cooperation Council Grid

The UAE is also connected to the rest of the Gulf Cooperation Council (GCC) through the GCC Grid, through which it can trade electricity with the other GCC countries. Ideas have been put forward to expand power grids to Egypt and European networks (through Turkey) and trade energy beyond the GCC region. Recently, GCC has announced that it plans to build power lines to Iraq and connect it to the GCC grid. An initial supply of 400kW of power to Iraq is expected.

ii Transmission/transportation and distribution access

Abu Dhabi

Although the electricity laws in Abu Dhabi contemplate 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

EWEC (formerly Abu Dhabi Water and Electricity Company (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 EWEC 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 EWEC for its generation costs (in turn paid by EWEC 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, 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; and

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 the components in points (a) to (d) and subtracting the government subsidy.

The rates charged by the state-owned power companies (EWEC, TRANSCO, ADDC and AADC) are subject to government control, exercised via the DOE. The DOE sets the revenue targets, 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 DOE. This calculation requires an estimation of the costs for procuring and dispatching electricity generation to meet the forecast demand. As of 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 estimated to indicate the short-term marginal costs (excluding backup 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 backup 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 during the period of peak demand (i.e., 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 (and going forward, EWEC). These PWPAs are discussed further in Section IV.iii.

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 the DOE 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 in 2015 with the introduction of a slab tariff scheme and an increase of between 40 and 60 per cent in the applicable rates. The rates as published on the ADDC website for 2018 (revised rates have not been published) are divided according to consumer categories as follows:

a UAE nationals (flats): 6.7 fils per kWh up to 30kWh per day, 7.5 fils thereafter;
b UAE nationals (villas): 6.7 fils per kWh up to 400kWh per day, 7.5 fils thereafter;
c non-UAE nationals (flats): 26.8 fils per kWh up to 20kWh per day, 30.5 fils thereafter;
d non-UAE nationals (villas): 26.8 fils per kWh up to 200kWh per day, 30.5 fils thereafter;
e industrial establishments (below 1MW): 28.6 fils per kWh;
f industrial establishments (above 1MW): 27.0 fils per kWh during off-peak hours, 36.6 fils per kWh during peak hours;
g commercial establishments: 20 fils per kWh;
h governmental offices: 29.4 fils per kWh; and
i farms and ranches: 4.5 fils per kWh.

With effect from 1 January 2018, value added tax (VAT) at the rate of 5 per cent has been implemented in the UAE pursuant to Federal Law No. 8 of 2017 (the VAT Law). Under the VAT Law, the 5 per cent VAT is payable by consumers on their electricity and water consumption. However, VAT is not applicable in respect of the municipality fee levied by the power companies in the respective emirates.

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 Dubai Law No. 19 of 2019 (the DSCE Law), the electricity prices have been determined by the DSCE and DEWA now sets its prices in accordance with the DSCE's directives. The DSCE Law empowers the DSCE to impose a 'definite tariff based on cost when necessary'. The DSCE is also authorised to approve fees and tariffs on the services offered to the public by energy service providers (i.e., the power generation, transmission and distribution companies).

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 'fuel price difference' to the electricity tariffs charged to consumers. The consumers are divided into three categories: (1) industrial; (2) residential; and (3) commercial. UAE nationals are subject to tariff rates equal to roughly one-third of the rate applied to other residential consumers.

Since 2011, DEWA has increased electricity rates and pursuant to the Dubai Tariff Decision, introduced a variable fuel surcharge to 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 per kWh. Since the introduction of the VAT Law, 5 per cent VAT is payable on the consumption of electricity and water in Dubai. As mentioned previously, VAT is not applicable in respect of the housing fees, sewerage fees and irrigation fees that DEWA collects on behalf of the Dubai municipality. Knowledge fees and innovation fees are also exempted from VAT.[6]

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 acts as the single point of sale in its respective area of operation.

Contracts for power generation are awarded on the basis of a competitive bidding process, administered by the DOE in Abu Dhabi, DEWA in Dubai, SEWA in Sharjah and FEWA in the northern emirates.

ii Energy market rules and regulation

In Abu Dhabi, EWEC is required to contract with power producers for the purchase of all production capacity from licensed operators in the emirate. The DOE 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 the company are privately owned; and

c the DOE 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 (and now the DOE) in Abu Dhabi and all existing producers in the emirate are required to sell their production exclusively to EWEC.

Similarly, power producers in Dubai are obliged 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.

iii Contracts for sale of energy

EWEC pays the generation companies the tariff agreed under the PWPAs. A PWPA serves both as a grant of concession and an offtake agreement.[7]

6 See https://www.dewa.gov.ae/en/customer/services/consumption-services/value-added-tax-or-vat.

7 Jeffrey Delmon and Victoria Rigby Delmon, *International Project Finance and PPPs: A Legal Guide to Key Growth Markets* (2012), p. 26.

A PWPA usually has a term of about 20 to 25 years from the commencement of commercial operations. Payments to IWPPs by EWEC (formerly 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.

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 EWEC is required to procure and supply fuel to the electricity producers under the Abu Dhabi Electricity Laws. EWEC 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 backup fuel. According to the standard PWPAs, generation companies must have sufficient backup fuel to enable 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.

EWEC is required by the standard PWPAs to pay certain other supplementary payments to the IWPPs, such as start-up, shut-down and backup 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.

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, as part of its Energy Strategy 2050, it aims to increase the contribution of clean energy in the total energy mix from 25 per cent to 50 per cent by 2050 and to reduce the carbon footprint of power generation by 70 per cent.

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 established Masdar[8] to spearhead the emirate's renewable energy initiative. Masdar City, a project 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.

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

Masdar currently produces 17,500MWh of electricity annually, at its solar photovoltaic power plant in Masdar City for the supply of clean power to the project. It has also launched a carbon capture and storage project in the UAE.

Dubai

The DSCE developed the Dubai Integrated Energy Strategy 2030 and Dubai Clean Energy Strategy 2050[9] to enable Dubai to become a global centre for clean energy and green economy. In line with these strategies, Dubai aims to diversify its energy sources so that, by 2030, it can fulfil 25 per cent of its energy demand from solar energy, 7 per cent from nuclear energy, 7 per cent from clean coal and 61 per cent from natural gas. By 2050, Dubai aims to fulfil 75 per cent of its energy demands from renewable energy sources.

As part of these strategies, in January 2012, Sheikh Mohammad Bin Rashid Al Maktoum, the Ruler of Dubai, launched the Solar Park, which is expected to have a total installed capacity of 5,000MW by 2030. The project is being implemented by the DSCE in Dubai and managed and operated by DEWA.

In 2013, DEWA and DSCE established Etihad Energy Service Company (Etihad ESCO), which will serve, notably, to retrofit existing buildings and lower the water and energy consumption of those buildings.

DEWA has launched the Shams Dubai Initiative, which aims to encourage energy efficiency by equipping residential and commercial buildings with solar panels and connecting the panels to DEWA's electricity grid. In 2014, in line with this initiative, 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 to encourage the generation of electricity using solar panels. This Resolution enables DEWA consumers to supply power to DEWA's grid by connecting their solar panels. The power supplied to DEWA can then be adjusted against the consumer's electricity bill.

In 2015, Dubai established the Dubai Green Fund, worth US$27 billion, which provides easy loans to investors in the clean energy sector. DEWA will provide the seed capital for this Fund, with additional investment from the private sector, international banks and large investment companies.

Currently, DEWA is working to develop an Innovation Centre to raise awareness of sustainability while enhancing national capabilities and increasing competitiveness. The Innovation Centre will be equipped with the latest clean and renewable energy technologies, and will serve as a museum and exhibition on solar energy. The Centre will also feature two solar testing facilities, one specialising in testing solar photovoltaic panels, and the other focusing on concentrated solar power. The Centre is currently testing 30 photovoltaic panel types from global specialist manufacturers.

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

9 The Dubai Clean Energy Strategy 2050 was announced by the Dubai Supreme Council of Energy as part of its participation in the World Future Energy Summit held in Abu Dhabi in January 2017. The intention of the Dubai Clean Energy Strategy 2050 is that 7 per cent of Dubai's total power output will come from clean energy by 2020, 25 per cent by 2030 and 75 per cent by 2050.

Northern emirates

Several initiatives are under consideration in the northern emirates, such as smart meters and solar plants. Furthermore, Sharjah launched SEWA 2020 Vision in 2016 to enhance power efficiency in sustainable development. The aim was to reduce power and water use by at least 30 per cent by the end of 2020. To achieve this vision, SEWA launched various projects, including setting up the first electric-vehicle charging station, completing a solar-powered road lighting project in Al Saja'a and Al Barashi, and replacing the current electrical infrastructure with modern facilities to save energy, such as a smart metering system and networks.

Nuclear energy

The UAE is a 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), the International Convention for the Suppression of the Acts of Nuclear Terrorism 2005 (signed in 2008). The UAE has also signed the International Atomic Energy Agency (IAEA) Comprehensive Safeguards Agreement, the IAEA Amendment to the Convention on the Physical Protection of Nuclear Protection of Nuclear Material and Nuclear Facilities, and the IAEA Additional Protocol to Safeguards Agreement.

The UAE aims to produce a significant part (approximately 9 per cent) of its electricity from nuclear technology. A nuclear policy was released in 2008, since when the UAE has 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 France (2008), Korea (2009), the United States (2009), the United Kingdom (2010), Australia (2012), Canada (2012), Russia (2012), Argentina (2013) and Japan (2013) for the development of peaceful use of nuclear energy.

The Federal Authority for Nuclear Regulation (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. It 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 the 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 programme 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 Barakah Nuclear Energy Plant (Barakah), in Abu Dhabi. The Emirates Nuclear Energy Corporation, an Abu Dhabi government-owned company, is constructing Barakah, which will have a total capacity of 5,600MW. The project consists of the construction and installation of four 1,400MW reactors. In February 2020, the FANR granted Unit 1 of the Barakah plant a licence to operate. Once the four reactors are online, the facility will deliver up to a quarter of the UAE's electricity needs.

ii Energy efficiency and conservation

The UAE has one of the highest rates of electricity consumption per capita. This high use 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 use 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 the construction of energy-efficient buildings in the emirate under the Estidama initiative. As 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). Masdar City, the eco-city project in Abu Dhabi, plans to expand its community and target a four-pearl Estidama rating to set an example as the leading energy efficient community.

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 RSB Dubai has licensed nine energy service companies to retrofit more than 30,000 buildings in the emirate to make them more energy efficient. In 2015, the Emirates Green Building Council issued technical guidelines for retrofitting existing buildings.

In 2016, Dubai and Sharjah launched projects to replace current infrastructure with energy efficient facilities. Both emirates have since been replacing street lights with LED lights. In Dubai, existing buildings have been retrofitted by Etihad ESCO while Sharjah has been replacing and renovating its cables and meters.

In 2016, SEWA created a unit called the Conservation Department with a target to help people conserve 30 per cent of their utility bills over five years by adopting best practices in their use of electricity, water and gas.[10] The Green Building Committee of the Ajman Municipality and Planning Department was also formed to support energy conservation efforts.

To attract foreign private investment in the sector, Dubai has created a free zone dedicated to the 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. In 2015, EnPark combined with another free zone, Dubiotech, to create Dubai Science Park.

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 2016 from 6.28 per cent in 2001 and 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 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 and the DOE also have slab tariffs in place for the northern emirates and Abu Dhabi respectively.

10 See, e.g., 'Is your UAE utility bill too high? Reduce it by up to 30%', *Emirates 24/7* (26 July 2016), at https://www.emirates247.com/business/energy/is-your-uae-utility-bill-too-high-reduce-it-by-up-to-30-2016-07-26-1.636801.

In October 2018, FEWA signed a memorandum of understanding with Honeywell to drive sustainable development and green economy initiatives in the UAE's northern emirates. Under this collaboration, FEWA will focus, among other things, on driving significant energy savings (between 10 and 30 per cent) across a range of public sector buildings by adopting advanced energy efficiency technologies.[11]

In 2019, Abu Dhabi announced a new strategy aimed at reducing electricity consumption by 22 per cent and water consumption by 32 per cent by 2030. The core programmes under this strategy, known as Abu Dhabi Demand Side Management and Energy Rationalization Strategy 2030, include building retrofits, demand response, efficient water use and reuse, building regulations, street lighting, district cooling, standards and labels, energy storage, rebates and awareness.

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, more than 30 research projects are currently under way, covering solar beam down, innovation ecosystems, smart grids and aviation biofuels. In addition, according to its website, a number of patents are already pending registration.

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

In 2015, Masdar launched Masdar Solar Hub, a solar testing and research and development hub for photovoltaic and solar thermal technology. In the same year, DEWA Innovation Centre, which consists of a laboratory for research and development in clean energy, was inaugurated.

Once completed, the Solar Park is expected to include, *inter alia*, (1) a centre for innovation equipped with the latest renewable energy technologies, a research and development centre to conduct tests in relation to social and industrial needs for renewable energy, (2) two test technologies for photovoltaic panels and concentrated solar power, (3) a solar testing facility and (4) a training centre and special conference centre for the exchange of information.

In 2018, DEWA signed a memorandum of understanding with Siemens to initiate a pilot project for the region's first solar-driven hydrogen electrolysis facility at DEWA's outdoor testing facilities at the Solar Park in Dubai. In January 2019, DEWA and Siemens signed a further memorandum of understanding to cooperate in research and development, exchange expertise and know-how, as well as building national capacities in energy technologies. The focus will be to pursue joint research and development activities in energy technologies, including smart grids, the integration of renewable energy and distributed generation in the

11 'FEWA to drive green economy initiatives in Northern Emirates', Emirates News Agency (29 October 2018), at www.wam.ae/en/details/1395302716788.

electricity grid, energy storage systems, the internet of things, using artificial intelligence in energy production unit, 3D printing and additive manufacturing, robotics, cybersecurity, robotics and smart buildings, as well as building national capacities in the energy sector.[12]

VI THE YEAR IN REVIEW

During 2019, an increased number of private sector companies made deals with the electricity and water authorities in the emirates of Dubai, Abu Dhabi, Fujairah and Umm al-Quwain for breakthrough projects. This is in line with UAE's goal of diversifying economic revenues and boosting the economy after the fall in oil prices in 2014. Of particular interest is the contribution of the private sector in the renewable energy sector. Currently, the UAE has the lowest cost of producing solar power in the world, which can largely be attributed to the collaborations between the UAE government and private companies. The contribution of the northern emirates in the energy sector has also increased as a result of more activity in terms of new projects and smart grids during 2019.

Renewable energy has a major role in the energy sector as projects are increasingly aiming at harnessing the natural resources of the UAE, particularly solar power because of its geographical location. The different phases of the Mohammed bin Rashid Al Maktoum Solar Park are on track and the aim is for it to be home to projects generating up to 5,000MW by 2030. This is in line with the Dubai Clean Energy Strategy 2050.

The UAE has been at the centre of innovation and technology and is now using technology in the power sector. This is evident from several collaborations and memoranda of understanding signed by the federal government and the government of Dubai with innovation companies dealing in technologies such as the internet of things, artificial intelligence and blockchain applications in the power sector for smart energy management.

VII CONCLUSIONS AND OUTLOOK

The UAE is geared up for and appears to be on track to meet its Energy Strategy 2050, which was launched in 2017. Backed by impressive technology, it is well equipped to meet the ever-increasing energy demands and create smart and efficient energy production and use. Energy efficiency is also a top item on the agenda.

In addition to the focus on the energy sector at home, the UAE is also collaborating with and investing in other countries. Masdar has been deploying renewable energy technologies in a number of other countries, including Jordan, Afghanistan and Mauritania. The International Renewable Energy Agency and the Abu Dhabi Fund for Development have collaborated to support renewable energy projects in Rwanda, the Marshall Islands and the Caribbean. The UAE's efforts are designed to enhance its global leadership position via renewable energy diplomacy that will support access to affordable and sustainable sources of power for millions of people in developing countries around the world.[13]

12 'DEWA and Siemens sign MoU to cooperate in R&D in energy technologies', Government of Dubai (15 January 2019), at https://www.dewa.gov.ae/en/about-dewa/news-and-media/press-and-news/latest-news/2019/01/dewa-and-siemens-sign-mou-to-cooperate-in-rd-in-energy-technologies.

13 Mustafa Alrawi, 'UAE's commitment to renewable energy can enhance its global leadership role', The National (17 September 2018), at https://www.thenational.ae/business/energy/uae-s-commitment-to-renewable-energy-can-enhance-its-global-leadership-role-1.771107.

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 front runner in Pakistan's energy sector and has participated in the development of numerous thermal and hydroelectric 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 more than US$4 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.

ADITE ALOKE

Afridi & Angell

Adite Aloke is a senior associate at Afridi & Angell. Her practice focuses on energy and infrastructure and project finance. She has extensive experience in advising on the development of renewable energy projects in India and on public-private partnerships. Ms Aloke was an associate with a leading law firm in India prior to joining Afridi & Angell in 2013. She spent two years at Afridi & Angell then rejoined the firm in 2016 after working with another leading law firm in India. Ms Aloke holds an LLB from Amity Law School, Guru Gobind Singh Indraprastha University, in India (2009). Adite is dual-qualified in India and England.

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@afridi-angell.com
aaloke@afridi-angell.com
www.afridi-angell.com

an LBR business

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