

THE ENERGY
REGULATION
AND MARKETS
REVIEW

ELEVENTH EDITION

Editor
David L Schwartz

THE LAWREVIEWS

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PREFACE

In our 11th year of writing and publishing *The Energy Regulation and Markets Review*, the most pressing global concerns are inflation, supply chain concerns, the Ukraine war and continuing effects from the covid-19 pandemic. Accordingly, many of our contributing authors have emphasised concerns associated with the effects of these crises on infrastructure development, commodity purchases and energy demand. We have also seen industry and regional specific changes that have added uncertainties to global energy policies. For example, oil and gas prices have spiked sharply (offering a dramatic contrast to historically low prices just two years before). While pricing changes may be a boon for sellers and their exporting countries, that has created uncertainty for countries that are highly dependent upon oil and gas consumption and imports, particularly imports from Russia, which is now subject to certain embargoes following the initiation of trade sanctions earlier this year arising from Russia's invasion of Ukraine. Additionally, the United Kingdom continues to experience uncertainties resulting from its transition out of the European Union (a process known as Brexit), particularly regarding the future of its energy policies to reduce greenhouse gases and its coordination and cooperation with the European Union. The Biden administration has continued to reassure US allies and historical trading partners that it remains committed to the 2015 Paris Agreement, notwithstanding the Trump administration's previous withdrawal. And the memory of 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

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, the Biden administration has continued to commit to the fight against climate change, despite the previous administration's support for fossil fuels. While coal and other aged fossil fuel plants continue to retire at an unprecedented rate (primarily because of the economics of those facilities), the Texas winter storm in February 2021 and recent dramatic increases in oil and gas prices have raised questions about whether renewable resources alone will be sufficient for long-term reliability. The US Federal Energy Regulatory Commission issued a report recommending reliability improvements to prevent rolling blackouts resulting from severe storms. Many states have continued to award procurements of thousands of megawatts of new offshore wind development projects on the east coast and, in May 2021, the US Bureau of Ocean Energy Management granted its first approval for the Vineyard Wind offshore project. The Federal Energy Regulatory Commission has continued

to struggle with whether and how to impose regulatory restrictions on the ability of states to subsidise renewable energy projects in light of their adverse impacts on competitive market prices.

Despite Brexit, the United Kingdom's renewable energy targets have continued to meet or 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. France has recently updated its national policy priorities with respect to climate change to include low-carbon hydrogen resources as well as power plants equipped with pumped storage, and provided a new certification process for biogas. 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, and has recently created a new Ministry of Ecological Transition to assist with the fight against climate change. To reduce reliance on Russian oil and gas, Belgium seeks to triple its offshore wind capacity to 5.8GW by 2030. Portugal is retiring coal generation and replacing it with renewable and hydrogen generation resources. Greece is decommissioning some of its old lignite plants and has begun implementation of a 'just transition' plan. Poland has been struggling to meet the EU renewable energy targets but has plans to develop significant offshore wind generation.

China continues to have ambitious renewable energy goals, aiming for an emissions peak by 2030, carbon neutrality by 2060 and a goal of 15 per cent of generation supplied by non-fossil fuel generation. There remains significant debate in Australia regarding the role of gas and coal in the energy landscape, which has led to a patchwork of national and state policies that point to continued uncertainty regarding Australia's commitment to carbon reduction. Malaysia continues its efforts to encourage greater entry into the renewable energy market and has goals to reach 31 per cent renewable generation by 2025 and 40 per cent by 2035, which reflects an increase in renewables of 15 per cent over previous targets.

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 recently launched an ambitious initiative to fund and supply clean electricity to almost 100 million people in Africa by 2035. In Brazil, hydroelectric resources constitute more than half of its installed generation capacity, and efforts continue to increase wind and solar generation as the cost of renewable generation has decreased.

II INFRASTRUCTURE DEVELOPMENT

The multiple crises so far this year (inflation, the war in Ukraine, supply chain issues and the continued covid-19 pandemic) have increased prices and slowed infrastructure development for many countries, particularly those in which a reliable energy supply remains the primary concern, regardless of fuel source. Even the United States is no exception, as controversy remains over the Dakota Access Pipeline, development and approvals for which have continued to stall, and the Biden administration revoked the Keystone XL Pipeline's presidential permit in January 2021, regardless of the recent dramatic increases in oil prices. The European Union has recognised the need to secure a diverse energy supply, particularly in view of Russia's invasion of Ukraine and the desire to reduce reliance on Russian oil and gas. Belgium is expected to increase investment not only in renewable generation but also in hydrogen and geothermal energy to combat reliance upon Russian oil and gas. Portugal is also seeking to expand the development of green hydrogen as an alternative fuel source, including development of the Sines project, which is intended to replace in part the capacity

lost following the retirement of coal generation. Furthermore, and unsurprisingly, Russia is expected to experience a significant downturn in foreign investment in its energy sector as a result of sanctions imposed by the United States, the European Union, the United Kingdom and many European states. Lebanon has developed a plan to reform its electricity sector to increase installed capacity so that electricity can be provided for up to 20 hours per day. Nigeria has only 12,000MW of installed generation capacity, which is insufficient to meet its needs, and is looking to the gas sector in the country to supply sufficient fuel to support additional generation resource development.

III NUCLEAR POWER GENERATION

Ten years after the Fukushima disaster, there is a struggle between efforts to limit reliance upon nuclear energy and the emissions reductions and fuel diversity benefits nuclear power offers. Because of the Ukraine war and the need for fuel diversity, and the importance of nuclear power for fighting climate change, Belgium has extended the economic lifetime of two nuclear power plants until 2035. France had previously sought to eliminate nuclear generation by 2025 but has extended that date. South Korea has continued its efforts to phase out nuclear power (replacing nuclear plants with new renewable facilities over time). However, the United Arab Emirates' new 5,600MW Barakah nuclear power station is almost complete and one of its units is already operational. When all units are online, Barakah will supply 25 per cent of the emirates' electrical needs. Poland still intends to explore the development of up to six new nuclear power units in the future, with a target date for the first unit in 2033. In the United States, although 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.

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, albeit without the full participation of the United Kingdom. Belgium, Portugal, Greece and France (among others) have each taken significant steps towards further liberalisation of the energy sector. Australia has opened access to transmission through regulatory reforms to ensure timely transmission investment and encourage market entry, and continues to engage in significant changes in the regulation of the energy market. Brazil has recently implemented net metering regulations and is now implementing distributed generation regulations. China has reduced subsidies for renewable energy and has implemented a market-price mechanism for pricing coal-based generation. The United Kingdom has continued to implement a competitive tender process for the development of offshore transmission. In the United States, while states have continued to subsidise renewable generation (particularly significant new subsidies for offshore wind development in the Northeast), the Federal Energy Regulatory

Commission has continued to struggle between deference to states in making procurement decisions and protections against adverse impacts on competition by implementing minimum offer price rules to combat buyer-side mitigation 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 11th edition of *The Energy Regulation and Markets Review*.

David L Schwartz

Latham & Watkins LLP

Washington, DC

May 2022

UNITED ARAB EMIRATES

Masood Afridi and Adite Alope¹

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 powers of the federal and the emirate governments are enumerated in the UAE Constitution. While the UAE Constitution gives the federal government exclusive legislative and executive jurisdiction over electricity services in the UAE, 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. 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.

II REGULATION

i The regulators

Federal

The Federal Ministry of Energy and Infrastructure (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.

The newly established Etihad Water and Electricity (EWE) (which replaces the Federal Electricity and Water Authority (FEWA)) is the dominant participant in the northern emirates and engages in all segments of the market, including generation, transmission and distribution.² The Ministry of Energy works in conjunction with EWE (and formerly 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 for, inter alia, controlling, supervising and organising the energy sector in Abu Dhabi and for issuing licences to

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

² <https://etihadwe.ae/en/About/Pages/About-Etihad-WE.aspx>.

entities engaged in the energy sector.³ 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 and electricity. The DSCE also proposes any and all initiatives relating to the energy sector, which includes privatising its electricity assets.

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.

As with the other emirates, the main participant 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, Water and Gas Authority (SEWGA) (formerly the Sharjah Electricity and Water Authority (SEWA)).⁴ As with the other emirates, SEWGA (formerly SEWA) is responsible for the generation, transmission and distribution of electricity in Sharjah. SEWGA (formerly SEWA) is authorised to determine electricity prices and connection fees, which are subject to approval by the Ruler of Sharjah.

EWE (formerly 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.

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

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

3 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.

4 Pursuant to Sharjah Emiri Decree No. 30 of 2020, Sharjah Electricity and Water Authority's name was amended to Sharjah Electricity, Water and Gas Authority.

Under Federal Law No. 32 of 2021 on Commercial Companies (the Companies Law), 100 per cent foreign ownership is permitted in various sectors. However, the energy and power sector are currently excluded from the purview of the Companies Law and the 100 per cent foreign ownership benefit.

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 or within onshore UAE. To date, there are no power generation, transmission or distribution companies in any of the free zones in the UAE.

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 such as the DOE in Abu Dhabi and RSB Dubai in Dubai.

III TRANSMISSION/TRANSPORTATION AND DISTRIBUTION SERVICES

i Vertical integration and unbundling

The electricity transmission and distribution networks in the UAE are wholly 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 is wholly owned by the DOE.

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.

Northern emirates

EWE (formerly 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. SEWGA (formerly SEWA) is the sole purchaser of electricity and presently owns all the generation, transmission and distribution capacity in Sharjah.

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

In Dubai, only a licensed entity is permitted to sell electricity to DEWA.

iii Rates

Abu Dhabi

The following components make up the electricity tariff in Abu Dhabi:

- a* the bulk supply tariff, which is the charge paid by the distribution companies to EWEC for its generation costs (in turn paid by EWEC to power producers);
- b* the transmission use of system charge, which is paid by the distribution companies to TRANSCO for use of its transmission network;
- c* the distribution use of system charge, which is the fee that the distribution companies (such as state-owned power companies ADDC and AADC) charge for use of their distribution network;
- d* the sales cost or the cost incurred by the distribution companies for serving customers for meter reading and billing; and
- e* the 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.

Dubai

The electricity tariff in Dubai comprises electricity consumption charges, fuel surcharges and meter charges. The fuel surcharge component requires consumers to pay for any fuel cost increase using 2010 fuel prices as the benchmark, thereby passing on the risk of international fuel price fluctuations to the consumer. With effect from 1 January 2018, value added tax (VAT) at the rate of 5 per cent was 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 each emirate.

iv Security and technology restrictions

The UAE's National Cybersecurity Strategy was announced in 2019 by the Telecommunications Regulatory Authority. The strategy is based on five pillars and 60 initiatives aiming to mobilise the whole cybersecurity ecosystem in the UAE. It aims, inter alia, to establish a robust 'National Cyber Incident Response Plan' to enable a swift and coordinated response to cyber incidents in the UAE. The plan is to streamline cybersecurity incident detection

and reporting, establishing a standardised severity assessment matrix to mobilise the required support and building world-class capabilities to respond to all types of cyber incidents. Protecting critical assets in the energy sector is a key focus under the strategy.⁵

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 particular 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, SEWGA (formerly SEWA) in Sharjah and EWE (formerly 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 'bypass sales' from power producers directly to eligible consumers, subject to meeting certain criteria, but to date no bypass sales have been allowed in Abu Dhabi. Similarly, all power producers in Dubai, the northern emirates and Sharjah are required to sell the power generated exclusively to DEWA, EWE (formerly FEWA) and SEWGA (formerly SEWA) respectively.

iii Contracts for sale of energy

The UAE has a single buyer market where all the electricity generated in Abu Dhabi, Dubai, Sharjah and the northern emirates is exclusively sold to EWEC, DEWA, SEWGA (formerly SEWA) and EWE (formerly FEWA) respectively under long-term power purchase agreements (PPAs).

A PPA usually has a term of about 20 to 25 years from the commencement of commercial operations and uses a two-part tariff structure for payments to IWPPs. The capacity (or availability) payments cover the fixed costs of the plant comprising of debt repayments, return on capital, depreciation and fixed operating and maintenance (O&M) costs, to be paid against the declared availability of power, irrespective of whether and how much the plant produces. The second component of the tariff allows for the recovery of variable O&M costs and fuel costs (where applicable), payable only for the electricity produced by the plant. Various payment rates are subject to annual indexation against US and UAE inflation or the dollar–dirham exchange rate.⁶

iv Market developments

The Ministry of Energy, in partnership with Khalifa University and the International Renewable Energy Agency, has launched the National Integrated Energy Model. The model supports the formulation of the future role of energy in the UAE and provides a road map for the next 50 years in the energy sector according to the governmental vision

5 <https://u.ae/en/about-the-uae/strategies-initiatives-and-awards/federal-governments-strategies-and-plans/national-cybersecurity-strategy-2019>.

6 <https://www.kapsarc.org/file-download.php?i=27972>.

of a new phase of energy sustainability. It also provides a common framework that brings stakeholders together and gives definition to the UAE's efforts to maximise benefits in this sector by developing strategies and foundations for the work required during the next phase of the National Energy Strategy 2050.⁷ The Minister of Energy is also creating a national guide covering smart industries and smart buildings employing modern and innovative technologies, and describing materials, specifications and design guides for the construction processes involved. The guide will include benchmarking to qualify contractors' capabilities and to enhance cooperation between architects, designers and contractors to improve overall results in construction projects. The guide will propose developing construction indices and working towards a unified smart-building index, in addition to a national index for smart constructions and building information modelling.⁸

V RENEWABLE ENERGY AND CONSERVATION

i Development of renewable energy

In 2017, the UAE launched its Energy Strategy 2050, which 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 Masdar⁹ 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.

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 2050¹⁰ 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

7 <https://wam.ae/en/details/1395302914826>.

8 See 'The Ministry Of Energy And Infrastructure Creates A National Guide For Smart Buildings To Employ Innovative Technologies' (26 February 2021), at <https://www.moei.gov.ae/en/media-centre/news.aspx#page=14>.

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

10 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.

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 Mohammed bin Rashid Al Maktoum Solar Park (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.

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.

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.

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.

Nuclear energy

The UAE aims to produce a significant amount (approximately 9 per cent) of its electricity from nuclear technology. A nuclear policy was published in 2008 following the UAE's decision to promulgate a regulatory framework for the development of nuclear energy in the country.

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. 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.

Abu Dhabi has a mandatory rating system for the construction of energy-efficient buildings in the emirate under the Estidama initiative. 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).

Abu Dhabi also issues different 'bands' based on energy consumption for residents. Residents consuming energy within their daily allowance receive a lower tariff and those whose consumption goes beyond their 'ideal average' receive higher tariffs.

In Dubai, all new buildings constructed (including changes or additions to existing buildings) in the emirate are required to comply with the Green Buildings Regulations to encourage sustainable building practices. Similarly, the technical guidelines issued by the Emirates Green Building Council must be complied with for retrofitting existing buildings in Dubai.

In 2019, Ras Al Khaimah launched its own regulations, the Barjeel Green Building Regulations. During the same year, the Ministry of Infrastructure Development mandated its Green Building Guidelines for Federal Buildings in the UAE. In addition, Sharjah Municipality released its first green building guidelines to be piloted in Sharjah.¹¹

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

iii Technological developments

In 2019, DEWA announced its strategy to provide state-of-the-art infrastructure to manage all facilities and services through smart and connected systems that use technologies of the fourth industrial revolution, including artificial intelligence (AI), unmanned aerial vehicles, energy storage, blockchain technology and the internet of things (IoT). This supports DEWA's vision of becoming a leading and innovative sustainable corporation. The smart grid is a key component of DEWA's strategy to develop an advanced infrastructure for Smart Dubai's initiative to transform Dubai into the smartest and happiest city in the world. The smart grid includes programmes with investments of up to 7 billion dirhams that will be completed in the short, medium and long term until 2035.

DEWA is also collaborating with a number of leading international universities and research centres with respect to renewable energy, smart networks, energy efficiency and storage, and data analysis. DEWA's Research and Development Centre (the R&D Centre) at the Solar Park concentrates on four major operational areas: electricity generation from solar energy, integration of smart grids, energy efficiency, and water. The R&D Centre's projects and programmes include internal labs to study and test system reliability, and external field testing of new technologies and equipment, including performance, reliability

11 https://emiratesgbc.org/wp-content/uploads/2020/09/UAE-Brief_NewTemplate_electronic_final.pdf.

of solar photovoltaic panels and removal of dust. The R&D Centre cooperates with many entities, including the National Renewable Energy Laboratory of the US Department of Energy and the Spanish National Renewable Energy Centre, as well as the United Arab Emirates University and Khalifa University on joint research and studies in renewable and alternative energy.¹²

VI THE YEAR IN REVIEW

The year 2021 has without a doubt been a challenging year because of the continuing covid-19 pandemic, now in its third year of existence. This has produced a domino effect, resulting in a reduction in investments, relative delays in projects and a cascade of other obstructions confronting the energy sector in the UAE. However, the focus of the UAE has remained on its strength in mass generating electricity from renewable energy sources. In this regard, the Abu Dhabi government successfully awarded a 2GW solar power project in the Al Dhafra region of Abu Dhabi. This project has been applauded for having the world's lowest electricity generation tariff, at 1.35 cents/kWh.¹³

In line with the UAE's shift towards renewable energy, Expo 2020 was built with recyclable materials and clean energy by incorporating photovoltaic panels in all major pavilions, with a major focus on reducing carbon emissions. Expo 2020 also sported a net-zero energy building in Terra – the Sustainability Pavilion.

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 Solar Park are on track and the aim is for it to host projects generating up to 5,000MW by 2030. Furthermore, DEWA recorded a world record of US\$2.99 cents/kWh for the independent power producer bid during Phase 3 of this project and US\$1.6953 cents/kWh during Phase 5. This is in line with the Dubai Clean Energy Strategy 2050.

The UAE has long been at the centre of technological developments and is now using innovative technology in the power sector, which was reflected in its overall ranking at 33 on the World Energy Council's Energy Trilemma Index in 2021. This is also evident from the several collaborations and memoranda of understanding signed by the federal government and the government of Dubai with innovatory companies developing technologies such as the IoT, AI 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 deliver its Energy Strategy 2050, which was launched in 2017. Backed by impressive technology, the country is well equipped to meet ever increasing energy demands and to create smart and efficient energy production and use. Energy efficiency remains very much at the top of the UAE's energy 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

12 <https://www.dewa.gov.ac/en/about-us/media-publications/latest-news/2019/09/dewas-experience-in-smart-grids-and-connecting-solar-panels-on-buildings>.

13 <https://www.bu.edu/ise/2020/09/24/how-did-the-uae-manage-its-renewable-energy-investments-during-covid>.

technologies in a number of other countries, including Jordan, Afghanistan and Mauritania. In an attempt to provide clean, renewable energy sources for all, the UAE also launched the Etihad 7 initiative. Etihad 7 is aimed at funding and supplying clean electricity to nearly 100 million people in Africa by 2035.

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.¹⁴

¹⁴ 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>.

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