



UNITED ARAB EMIRATES
MINISTRY OF CLIMATE CHANGE
& ENVIRONMENT

A Bridge to Greater Climate Ambition

Updated Second Nationally Determined
Contribution of the United Arab Emirates

2022

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DISCLAIMER:

The Glasgow Climate Pact requests that all Parties revisit and strengthen their NDC targets by the end of 2022. The UAE is answering that call with this updated second NDC, which the country views as a bridge to greater climate ambition. In that context, the UAE will be launching its net zero pathway by COP27 – a process that will inform and enable more ambitious economy-wide emission reduction targets ahead. As a result, the UAE plans to release its LTS and an enhanced NDC ahead of COP28, which will be underpinned by an absolute emission reduction target relative to a 2019 baseline.

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1. Introduction

The Paris Agreement calls for stepping up climate ambition in order to keep the increase in global average temperature to well below 2°C, and to pursue efforts to limit the temperature rise to 1.5°C. The Agreement set up a clear mechanism to enhance ambition over time by requesting the parties to share Nationally Determined Contributions (NDCs) every five years to reflect their highest possible ambitions. The NDCs are therefore an essential component of the Paris Agreement and the main climate change policy framework for parties to the United Nations Framework Convention on Climate Change (UNFCCC).

Hence, this submission communicates the United Arab Emirates' (UAE's) updated second NDC to the UNFCCC in line with Article 4 of the Paris Agreement.

In this updated NDC, the UAE is raising its 2030 target with greater ambition – 31% compared to business as usual (BAU) for the year 2030. The country has also announced its intention to achieve net-zero emissions by 2050.



Information to facilitate clarity, transparency, and understanding:

In line with Article 4, Paragraph 8 of the Paris Agreement and Decision 4/CMA.1, the UAE submits the following ICTU.

Information necessary to facilitate clarity, transparency, and understanding (ICTU) guidance	
Quantified information on the reference point	Reduction of 31% in GHG emissions, measured in CO ₂ eq, relative to BAU in 2030. BAU scenario emissions in 2030 are projected to be about 301.2 million tons, assuming a moderate annual linear sector specific growth rate in line with projected economic growth, national circumstance and historical trends. The BAU scenario includes all mitigation measures implemented prior to and during 2016.
Type	Economy-wide emission reduction target relative to BAU.
Scope and coverage, consistent with IPCC guidelines	2006 IPCC Guidelines for National Greenhouse Gas Inventories. The sectors being covered include energy (including electricity generation, transport, oil and gas), industrial processes, agriculture, and waste. The GHG emission inventory also includes land use, land use changes, and forestry. Greenhouse gases covered include carbon dioxide (CO ₂), methane (CH ₄), nitrous oxide (N ₂ O), and perfluorocarbons (PFCs). Emissions of sulfur hexafluoride (SF ₆) and hydrofluorocarbons (HFCs) have not been covered under the reporting framework due to limited data. Moreover, it is estimated that these emissions are insignificant ¹ .
Timeframe and period of implementation	Commencing from 2017 to the end of 2030.
Assumptions and methodological approaches	The GHG emission reduction is estimated by forecasting the country's emissions by 2030 using 2016 as the reference point for the BAU scenario, and quantifying the difference in emissions in comparison to the projected 2030 mitigation targets. The forecast assumes a moderate annual economic growth rate based on historical trends. The NDC makes use of the global warming potentials (GWP) in line with the IPCC 4th Assessment, an update from the use of the 2nd Assessment values in the previous version of the NDCs. For mangrove plantation initiatives, the growth cycle of the mangroves has been updated to a 12-year timeframe, which has shifted the sequestration potential for the mangroves to take effect post-2030. The assessment is implemented using the Low Emissions Analysis Platform (LEAP), an emission-modeling tool built on an energy-based modeling framework and expanded to support the analysis of emission reductions in all sectors.

Planning process	Three-tier planning and endorsement governance structure following international best practice has been used to develop the NDC. This includes: 1. An interministerial national climate change council that aims to strengthen climate ambition and foster sustainable measures (policies, actions, etc.) across all sectors with a focus on climate change. The council includes representatives of the UAE federal government and local emirates, as well as an advisory private sector working group. 2. A robust consultation process with relevant stakeholders. This involves obtaining data on GHG inventory, consolidation, and mitigation and adaptation measures. It further includes a multi-stakeholder engagement and refinement process to ensure accuracy and validity of data. 3. An endorsement by the UAE cabinet.
How the Party considers that its NDC is fair and ambitious in light of its national circumstances	The UAE's NDC significantly strengthens the country's previous contribution towards GHG emission reduction, raising the target from 23.5% to 31% by 2030 relative to BAU, ensuring an acceleration of the transition to green economy while maintaining sustainable balanced economic growth. The UAE plans to diversify its economy and adopt a knowledge-based approach to catalyze meeting its development targets.
How the NDC contributes towards achieving the objectives of the Convention as set out in its Article 2	The UAE's NDC represents a step forward towards achieving the UAE Net Zero by 2050 Strategic Initiative.
The intention to use voluntary cooperation under Article 6 of the Paris Agreement, if applicable	While the UAE intends to primarily rely on domestic efforts to achieve its NDC objectives, it may consider using voluntary cooperation under Article 6 of the Paris Agreement to partially fulfil these commitments.

¹ Although the UAE has the flexibility (as a non-Annex I country) to report emissions of the F gases including HFCs and SF₆ as closed / controlled systems are adapted nationally, the ongoing national MRV system will incorporate the reporting requirements..

2. Executive Summary

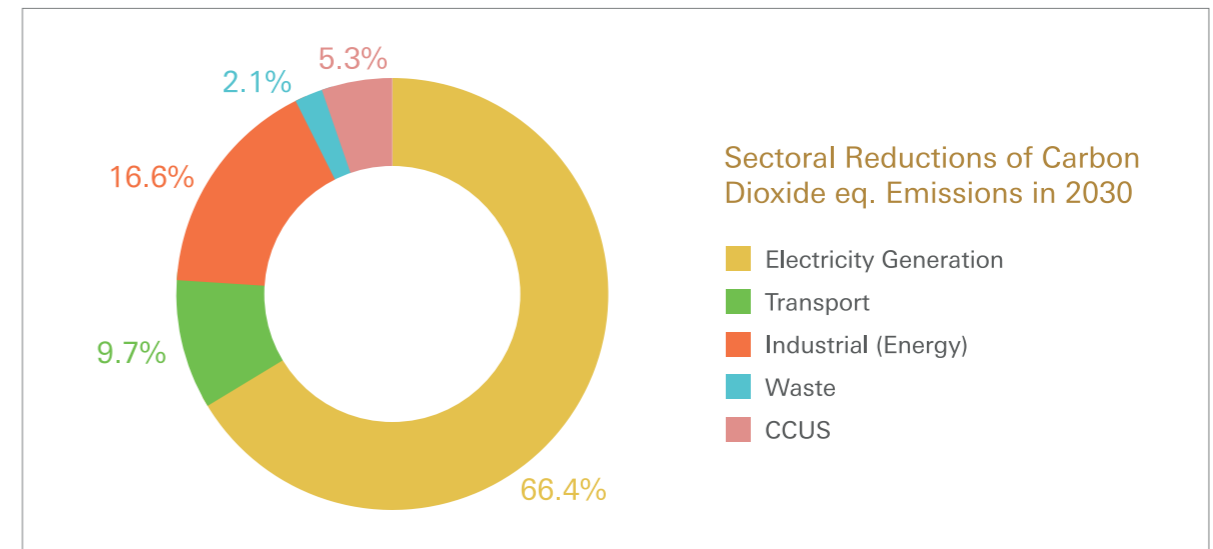
The United Arab Emirates (UAE) submitted its first Nationally Determined Contribution (NDC) in 2015 and its second NDC in 2020. This submission, which follows an inclusive and consultative process, is an update to the country's second NDC that reflects an enhanced ambition in line with the international call for a review of NDCs that demonstrates higher ambition. The UAE stands firm in its commitment to the Paris Agreement, and is determined to pursue climate mitigation and adaptation objectives in line with its national circumstances and capabilities. The country continues to engage youth in its climate action and reaffirms its commitment to gender equality in climate-decision making.

The UAE is submitting this update to its second NDC in response to the invitation from COP26 to parties to revisit and strengthen 2030 targets. This update focuses on stepping up mitigation action, setting a target of reducing greenhouse gas (GHG) emissions by 31% by 2030 in comparison with the 2030 business as usual (BAU) scenario. This represents a strengthening from the target of 23.5%, set by the NDCs submitted in 2020 – an additional 7.5% reduction, which demonstrates renewed progress towards a highest possible ambition in line with the UAE Net Zero by 2050 Strategic Initiative.

Importantly, the UAE will seek to continue building its climate ambition

towards 2023 and beyond. In this context, the country plans to launch its net zero pathway by COP27, which is set to inform higher economy-wide emission reduction targets and enhanced adaptation and resiliency efforts. These will be included in the third NDC or LTS by the first quarter of 2023, and as a result, the UAE resolves to accelerate its low-carbon growth and help facilitate the implementation of the Paris Agreement.

Consistent with the approach adopted under Article 4.7 of the Paris Agreement, the UAE's climate ambition is underpinned by the country's steady economic diversification, which is generating added climate mitigation and adaptation benefits. The NDC takes the form of an economy-wide target covering all major sectors contributing to emissions of carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), and perfluorocarbons (PFCs). It will limit emissions in 2030 to 208 million metric tons of CO₂ eq., a reduction of 93.2 million metric tons of CO₂ eq. compared to the BAU reference scenario of 301.2 million metric tons of CO₂ eq. With an increasingly decarbonized power sector, the highest contributions to this reduction are projected to come from the electricity generation sector (66.4%). This is followed by industry (16.6%), transport (9.7%), carbon capture, utilization, and storage (5.3%), and waste (2.1%).



The most significant contributions relative to the BAU scenario come from the following sectors:

- Electricity Generation: 54% reduction in total emissions of electricity generation activities by 2030 due to the use of clean and alternative energy.
- Transport: 14% reduction in total emissions from the transport sector by 2030 primarily due to enhanced vehicle standards in road transport.
- Industry (Demand for Energy): 19% reduction in total emissions from industrial energy production by 2030 with the implementation of the National Water and Energy Demand Management Programme and efficiency improvements.
- Waste: 26% reduction in emissions by 2030 through a reduction in municipal solid waste generation per capita and initiatives aimed at diverting waste away from landfills.

- Carbon Capture, Utilization, and Storage (CCUS): 35x increase in CCUS activities by 2030.
- Carbon Sequestration: Planting of 100 million mangrove seedlings by 2030. The sequestration activities will begin to take effect post-2030.

Some methodological changes, in particular the use of a higher global warming potential for methane in line with the IPCC 4th Assessment Report, have led to projected emissions from methane, especially in the waste and agriculture sectors, being higher than in the previous version of the NDCs when presented in terms of CO₂ equivalent.

Thus, a revised second NDCs has been prepared in collaboration with the relevant stakeholders.

Other components of the second NDCs, submitted in 2020, remain relevant in conjunction with the updates prepared, including adaptation action with mitigation co-benefits and engagement of youth and women in climate action.

3. DELIVERING NET ZERO IN THE UAE'S NATIONAL CIRCUMSTANCES

As the UAE drives low-carbon progress towards its midcentury strategic goal of reaching net zero emissions, it continues to build a competitive and innovation-driven economy. While its modern and technologically sophisticated oil and gas sector continues to play a key role in its socio-economic growth, the country is steadily pursuing its agenda of economic diversification with a focus on green, low-carbon development.

In recent years, the UAE has taken decisive action to mitigate climate change and adapt to its imminent impacts, setting a long-term climate and energy policy pathway. Building on the ambition reflected in its second NDC, and notwithstanding the uncertainties of trends in global trade and finance, the country announced the launch of the UAE Net Zero by 2050 Strategic Initiative in 2021, embarking on a path towards net-zero emissions by 2050. The Initiative aligns with the Paris Agreement, which calls on countries to implement long-term emission reduction strategies with the aim of achieving global net-zero GHG emissions in the second half of this century. Earlier, in 2017, the UAE adopted the National Climate Change Plan 2017-2050, laying down a framework for management of GHG emissions, climate change adaptation, and private sector-driven innovative economic diversification. The country's harsh, arid environment makes it particularly vulnerable to climate impacts, and the UAE therefore launched the National Climate Change Adaptation

Program that identifies sectoral risks and defines action plans for strengthening climate resilience.

Climate and energy security considerations have also led to the adoption of the National Energy Strategy 2050, which targets an increase in the share of clean energy, including renewables and nuclear, to 50% of the installed power capacity mix by 2050, and a reduction of final energy demand by 40% by 2050 relative to BAU in 2050. These targets are underpinned by the UAE Green Agenda 2015-2030 that enables the public and private sectors to translate a shared vision of a competitive and sustainable economy into reality. Currently, the UAE is home to the world's largest single-site solar plant (1.2GW) and has secured the world's lowest solar tariff. The UAE is also home to the Arab World's first civilian nuclear energy plant (5.6GW) that is the largest single source of clean electricity in the UAE and Arab World, and will generate 25% of the UAE's total electricity demand by 2025 with zero carbon emissions to rapidly decarbonize the UAE power sector.

As a federation of seven emirates, the UAE develops and implements its climate and energy policies with the engagement of a range of actors in line with the legal and executive jurisdictions and roles laid down in its Constitution. The UAE Council on Climate Change and Environment, an interministerial, inter-emirate governance body, ensures alignment across federal and emirate-level policies and interventions.

At the federal level, the UAE Ministry of Climate Change and Environment (MOCCA) and the UAE Ministry of Energy and Infrastructure (MOEI) are the two key entities engaged in the execution of climate and sustainable energy plans. Concerted efforts are being made by the individual emirates to enhance quality of life and protect the environment.

As a young, progressive nation, the UAE

actively engages its youth in climate action and integrates gender in its climate-related planning, policy, and measures. The country is invested in placing climate mitigation and adaptation efforts into both its near-term and long-term plans – a commitment evidenced by the UAE Centennial 2071 that prioritizes sustainable development and fosters scientific innovation.



4. DEVELOPMENT OF THE UAE'S NET ZERO STRATEGY

The development of the UAE Net Zero by 2050 Strategy is a national strategic initiative to achieve net-zero emissions by 2050. The Strategy covers the entire UAE economy and brings into focus five sectors:

1. power and water
2. industry (including oil and gas)
3. transport
4. buildings
5. waste, agriculture, forestry, & land use

The process will comprise two steps. First, an emission baseline for each sector will be modelled considering existing firm and published targets in the UAE. Second, pathways to reach net-zero emissions in 2050 will be modelled considering techno-economic measures. These pathways will be assessed for cost effectiveness

and socio-economic adequacy. The analysis will use specialized modeling tools and the most recent available data to ensure a robust and consistent outcome. Furthermore, relevant industry and emirate representatives will be involved through a regular stakeholder engagement process, i.e., through sector-specific National Dialogues for Climate Ambition (NDCA), hosted by MOCCA.

The initiative will result in a clear technology and investment roadmap from today to 2050 with interim emission reduction targets per sector updated every five years, allowing for increasing ambition in the UAE's climate action. It will be accompanied by a full set of enablers, including policy framework and investment requirements.



5. ECONOMIC DIVERSIFICATION INITIATIVES WITH MITIGATION CO-BENEFITS

The UAE's interventions with regard to economic diversification and climate change mitigation span the breadth of sectors that characterize the country's economy and emission profile, with due consideration for sectoral activities of greater economic significance and those with the highest emissions. These measures often also contribute to reduction in pollutant emissions, thus improving air quality and public health.



Power – Supply

At the center of the UAE's climate action is the ongoing energy transition, which is ensuring a sustainable, affordable and reliable supply of energy. This includes a decarbonization of the UAE's power sector. With heavy reliance on natural gas for power generation, the UAE has built an electricity supply profile with a relatively low carbon footprint. This decarbonization is poised to continue, with clean energy infrastructure assets and services rapidly growing, enhancing the country's energy supply security and decreasing the environmental impact of the energy sector. Building on the 2021 clean energy target of 24% (installed capacity), the National Energy Strategy 2050 sets a longer-term pathway for the power sector. The Strategy envisages a 50% share of clean energy (renewables and nuclear) in the installed power capacity mix by 2050.

Driving innovation and low-cost technology solutions remain core to the UAE's mitigation efforts in electricity production. For example, the abundance of sunlight in the UAE, coupled with a conducive regulatory framework and innovative business models, has led to the development of photovoltaic (PV) and concentrated solar power (CSP) projects with record-breaking low electricity prices. The UAE is also investing in nuclear energy with the construction of the four-reactors Barakah Nuclear Energy Plant. With nuclear energy's unique combination of producing dispatchable, baseload power 24/7 with zero carbon emissions, the Barakah plant is rapidly decarbonizing the UAE power sector. Moreover, it is providing a strong foundation to balance intermittency of renewables. This reinforces a domestic energy supply characterized by sustainability, affordability, and security during a global energy crisis. The Barakah plant, which at present is generating 2.8GW of baseload electricity, will generate 5.6GW of electricity by 2025, preventing the release of 22.4 million tons of carbon emissions annually throughout its minimum 60 years of operations and will contribute to 25% of the UAE's committed emissions reductions by 2030. There remain significant opportunities to use nuclear energy in the UAE for hydrogen generation, and to add further capacity through additional large-scale units and/or Small Modular Reactors

(SMRs), subject to government direction. Action in these areas can spur additional decarbonization in hard-to-abate sectors such as heavy industry.

Installed clean power capacity, including solar and nuclear, is on track to reach 14 GW by 2030, from just above 100 MW in 2015 and 2.4 GW in 2020. To date, the country has invested upwards of US\$40 billion in clean energy. Solar power is also poised to increase to over 9 GW in installed capacity by 2030, yielding a large shift from reliance on fossil-derived fuels in conjunction with the added nuclear capacity. One waste-to-energy plant has also been launched, with three others in the works. These plants will provide a combined capacity of 300 MW, in addition to reducing the impact of waste on the environment and human health. The UAE is developing clean energy solutions following a phased approach, with a gradual rise in the use of solar PV power, CSP, nuclear energy, and clean hydrogen. The planned share in the total installed capacity by 2030 is set to 30%, with a 50% transition to clean energy by 2050.

In addition to grid-based clean power, the emirate of Dubai is promoting distributed electricity generation, in particular rooftop solar PV, through the adoption of a net-metering program. More than 1,350 PV installations with a total capacity of 125 MW have been connected to the grid across residential, commercial, and industrial buildings. Innovation advances are also taking place with growing energy storage assets in the country. In order to facilitate grid connection of diverse sources of supply and enhance grid stability, UAE utilities have also been

making advances in the deployment of energy storage technologies. The emirate of Abu Dhabi is home to the world's largest virtual battery plant with a capacity of 108 MW. The batteries are distributed across 10 sites but can be controlled as a single plant, securing supply for emergencies and allowing for peak shaving. A 250 MW pumped-storage hydropower (PSH) project is also being developed in the Hatta mountains in Dubai, wherein water will be pumped to an upper reservoir when surplus solar power is available; the stored water will then be used to generate electricity to meet demand during evening peak hours or when needed.

Moreover, EGA, TAQA, Dubai Holding and EWEC announced a major initiative earlier this year that would unlock significant further development of solar power generation capacity in Abu Dhabi, progress power asset and generation optimization, and decarbonize EGA's aluminum production. The power generated from the EGA assets would be supplied to the grid under a long-term power purchase agreement with dispatch of the assets through EWEC's load dispatch center.

TAQA's operating company, TRANSCO, would connect the power assets to the grid, as well as investing in developing the interconnections to upgrade the network to include new substations and strengthening connectivity in the UAE. The new steady power demand from EGA increases the predictability of the overall power system, and advances EWEC's development of new solar energy projects. The scale of the expansion as a direct result of this initiative is expected to

be greater than the current total installed solar generation capacity in the United Arab Emirates.

EGA would utilize this additional solar power once it is developed, which would enable EGA to vastly increase the proportion of its production that is solar aluminum. EGA would also have access to clean power from existing solar power generation assets, and the Barakah nuclear power plant for other low carbon aluminum products.

In line with its commitment to clean energy generation, the UAE announced in 2022 that the Hassyan Power Complex, originally designed to operate on coal, would now run on natural gas. The plant specifications also require the facility to be constructed carbon capture-ready, meaning that the installation of carbon capture equipment in the future should not require any modification to the plant or hinder the facility's use. This adaptability in favor of sustainable technologies and practices aligns with the overarching goal of carbon neutrality.



Power – Demand

The UAE is taking steps to increase the efficiency of energy consumption through regulatory measures, pricing signals, as well as technology deployment. The country has set a federal target to reduce energy consumption by 40% by 2050. In support of achieving this target, the UAE has developed ambitious plans for reducing energy consumption, and energy efficiency initiatives are being implemented across demand sectors.

The National Water and Energy Demand Side Management Programme has been launched to boost the efficiency of the four main water and energy-consuming sectors in the country: industry, built environment, transport and agriculture.

Locally relevant green building regulations and rating schemes for new buildings have been adopted across the UAE's emirates. These regulations have helped create a local market for sustainable building materials and technologies while raising awareness about green building features among industry professionals. In addition, a federal-level program has been implemented to retrofit existing government buildings with target of 2000 buildings by 2050. Similarly, Abu Dhabi's Building Retrofit Programme targets retrofitting of government buildings and will be rolled out in due course to non-government buildings. Abu Dhabi Energy Services (ADES) is planning to retrofit more than 30 buildings to reduce energy and water consumption by 20-30%. The measures will cover controlling the efficient operations of buildings through motion and room temperature sensors, enhancing capital equipment through upgrading chillers with new compressors, and replacing a range of fixtures, e.g., with LED lighting. The costs will be repaid through reduced utility bills, which represents a progressive approach to financing retrofits. Dubai has set a target to retrofit 30,000 buildings in the emirate by 2030. Ras Al Khaimah's Building Retrofits Program aims to retrofit 3,000 buildings by 2040. Further, greater support for renewable energy in the built environment is being made available through driving the penetration of Distributed Renewable

Resources Generators (DRRG), a national initiative utilizing solar rooftop and solar water heating systems.

Periodic tariff reforms for residential, commercial, and industrial power consumption are being introduced across the UAE to promote cost-reflective pricing and encourage energy conservation. Utilities and regulatory bodies are driving a further shift in energy consumption behavior through education and awareness programs. Standards and labels being a proven enabler of demand management and informed consumer choices, the UAE has an established Energy Efficiency Standardization and Labeling Program, which covers a range of household goods and appliances, including washing machines and dryers, refrigerators, water heaters, lighting fixtures, and air conditioners. Given that district cooling is significantly more efficient than conventional cooling technologies, it is being deployed in high-density areas.



Oil and Gas

As a responsible provider of reliable, affordable and low carbon energy to meet global demand, the UAE's oil and gas industry has been at the forefront of adopting efficient and climate-friendly industry practices. In 2020, Abu Dhabi National Oil Company (ADNOC), the country's largest oil and gas producer, announced a target to decrease its GHG emission intensity by 25% by 2030. This target is supported by a set of comprehensive sustainability goals,

including renewed ambition on resource efficiency, zero routine flaring policy, and Carbon Capture Utilization and Storage (CCUS), in addition to new investments in clean renewable energy.

Low Carbon Oil and Gas

UAE's Murban crude oil is less than half of the global industry average carbon-intensity. As the world transitions to a low-carbon energy system, natural gas is playing an important role. Natural gas burns with far less carbon emissions than other fossil fuels, and it helps to enable more use of renewable energy sources by mitigating their intermittency and reliability challenges. ADNOC is growing its natural gas position to meet global energy demand and displace higher carbon alternatives, while still achieving our emission intensity reduction target. ADNOC's new LNG production facilities will be designed to significantly reduce greenhouse gas emissions, with features including electric drives for the liquefaction compressors.

Commitment to decrease GHG emissions intensity

The UAE has developed the region's first commercial-scale CCUS network. Inaugurated in 2016, the Al Reyadah project captures CO₂ at an Emirates Steel facility, and compresses, dehydrates, and transports it through a pipeline for injection into oil wells. The project's current installed capacity to capture, transport, and inject CO₂ is 800,000 tons per year. With expansion plans put in place by ADNOC, carbon capture capacity in the country will increase by six-fold by 2030 with up to 5 million tons of CO₂ per year.

Having adopted a zero routine flaring policy in their operations, the UAE's oil and gas companies are regional leaders in flaring avoidance design and operation. ADNOC has designed its facilities to utilize the recovered gas in normal operations through recovery compressors or by adding value to its downstream chain. To accomplish this, ADNOC operates one of the largest gas-processing plants in the world and has established the first LNG production company in the region. This has resulted in 89% reduction in flaring since the company's inception.

ADNOC further plans to shift towards electrification of offshore oil and gas production, to be powered by the grid. ADNOC is the first major oil and gas company to decarbonize its imported power at scale. This was facilitated by the Clean Energy Agreement, replacing existing and future industrial load power across ADNOC (imported power) with power from clean sources, such as nuclear and solar.

In addition, the use of state-of-the-art techniques, like optical imagery, infrared capabilities, and leak detection and repair (LDAR), has allowed to monitor and manage fugitive emissions across the value chain, and the sector continues to build on these achievements. Most recently ADNOC has piloted technologies such as satellite monitoring and deployment of drone-mounted sensors to enhance monitoring of methane emissions.

In 2020, ADNOC signed up to the Oil and Gas Methane Partnership 2.0 (OGMP 2.0) to collaborate with industry peers on improving industry standards

for reporting methane emissions and ultimately development of effective policies and interventions to tackle methane emissions.

Investments in Renewables and Blue Hydrogen

ADNOC is expanding its partnership and co-investments to establish mutually beneficial, pioneering partnerships in new energies and low-carbon technologies that support its sustainability ambitions.

In 2021 ADNOC joined with two partners, Taqa and Mubadala, to combine their renewables and green hydrogen operations into the Abu Dhabi Future Energy Co. (Masdar), with plans to boost solar capacity from 23 GW to more than 50 GW by 2030.

ADNOC is also investing in the development of blue and green hydrogen value chains to accelerate its leadership in emerging low-carbon fuel value chains and delivery of the UAE's Hydrogen Leadership Roadmap, positioning the country as a competitive exporter of clean hydrogen. The company plans to build a world-scale blue ammonia project with an annual capacity of 1 million tonnes per year. In August 2021, the company has sold its first demonstration cargo of blue ammonia to customers in Japan.



Non-Energy Emission-Intensive Industries

The UAE's key heavy industries include aluminum, iron and steel, cement, and chemicals, with each pursuing relevant green industry initiatives. The aluminum

sector, reliant on natural gas for the generation of electricity for manufacturing needs, has set emission intensity targets that cover the complete range of industrial processes: power production, smelting, and casting. The use of state-of-the-art gas turbine technology, improved maintenance of plants and equipment, and operational efficiency are yielding emission savings for the sector. A key player in the UAE's aluminum industry is Emirates Global Aluminium (EGA), one of the country's largest companies and one of the world's largest aluminum producers. In 2019, EGA's carbon intensity associated with smelting was 38% lower than the global industry average, while its PFC emissions were more than 91% below the global industry average. EGA has a strong track record of in-house research and development. The company has been using homegrown technology in smelter expansion and retrofitting of older production lines, minimizing energy consumption and GHG emissions per ton of aluminum produced. EGA's energy consumption reduction efforts transcend technology optimization. With respect to process emissions, the company has committed to design and material improvements for smelting pot lining, baking trays, and the firing system for anode baking trays.

The cement sector, where the most emissions come from clinker production, is shifting to alternative fuels, including refuse-derived fuel (RDF), for powering furnaces and generators.

In the steel industry, technology interventions are being made to increase efficiency of energy use in reheating of steel billets, heating of metal scrap in

electric arc furnaces, as well as casting. In addition, Emirates Steel has begun the implementation of a two-phase green hydrogen project, with Phase 1 scheduled for completion by 2026. This is a monumental step towards decarbonization of industry and highlights the UAE's leading role in the global shift to green solutions.

Notably, the UAE's Operation 300Bn strategy, launched in 2021, focuses on creating a conducive environment for industries of the future, including hydrogen. The strategy seeks to develop the country's industrial sector, raising its contribution to the GDP to AED300 billion (US\$81.69 billion) by 2031. It aligns with national goals and international commitments related to advancing sustainable economic growth, deploying clean energy solutions, driving industrial innovation, and promoting responsible consumption and production. As an enabler of Operation 300Bn, Emirates Development Bank (EDB) has allocated a portfolio of AED30 billion (US\$8.17 billion) to support priority industrial sectors over a period of five years. The diverse set of priority sectors includes renewable energy equipment and technology, energy infrastructure, water desalination, and agriculture.



Transport

With the aim of supporting the economy and encouraging smart mobility choices, in 2015, the UAE initiated a far-reaching fuel pricing reform, linking gasoline and diesel prices to international market prices. Since then, the country has made

further progress in supporting sustainable transport, and providing clean transport infrastructure and services. During the next decade, the UAE looks to capitalize on the opportunities being presented by advances in electrification and automation of mobility.

According to the UAE's fuel quality standards, diesel consumed in the country must comply with 10 ppm sulfur content and Euro 5 standards. In terms of technology standards, new motor vehicles in the UAE are compliant with Euro 4 emission performance standards, and a gradual move to Euro 5/6 is planned. Standards for electric, hydrogen, and autonomous vehicles are under development. With the application of vehicle standards, the country intends to gradually boost overall fleet efficiency and prevent less efficient vehicles from entering the country. This further extends to the introduction of a labeling scheme and awareness campaigns to promote total cost of ownership (TCO) approach to capitalize on the benefits of improved fuel efficiency. The UAE is also working to incorporate a regulation that encourages the import of hydrogen vehicles, poised to stimulate the use of clean modes of transport.

As part of its shift to cleaner vehicle technologies, the country has taken up wide-scale conversion of conventional gasoline and diesel vehicles to compressed natural gas (CNG) with a particular focus on taxis, buses, government vehicles, and commercial vehicles. In addition, regulations and incentive schemes have been put in place to power a larger share of road transport with electricity. The Dubai Green Mobility Strategy 2030

targets a 30% share of electric and hybrid cars among Dubai's government-procured vehicles by the same year. In 2016, the UAE set a 10% penetration target for electric and hybrid cars in the government fleet by 2021. To support this target, the government introduced 10% annual purchase/lease of hybrids and EVs in its fleet to drive the market shift. In line with the transition to EV technologies, the country has seen a rapid expansion of charging infrastructure, and plans to further increase the number of vehicle charging stations nationwide. Under the National DSM – transport, green mobility initiative works in developing the EV charger's roadmap followed by building a national network of EV chargers to support the owners of EV.

While making road transport smarter, the UAE is steadfast in its commitment to building a railway network to provide faster and cleaner mobility options. The 1,200 km-long Etihad Rail is being built in stages, with the 264 km Stage One route operational for freight movement since January 2016. A single train trip on this line removes approximately 300 trips of fleet of vehicles from the road, leading to reduction by 70-80% of CO₂e emissions.

Stage Two of Etihad Rail is slated to begin operations in 2023 and will extend over 605 km. On completion, the network will link all major industrial ports and trading hubs in the country. This will also help boost youth empowerment, expanding transportation access and facilitating access to jobs, livelihoods, and educational opportunities.

Further, the UAE has a world-class rapid transit rail system in Dubai Metro, which

is complemented by a short-range tram network, providing sustainable transport options to residents and tourists alike. Further expansion of the metro network is underway. Complemented by bus service enhancements, this will raise the share of public transport in passenger journeys both inter- and intra-emirate.



Waste Management

The UAE has been taking proactive steps to increase waste management and treatment through regulation, technology, and consumer awareness. Circular economy initiatives are being rolled out to transform waste from an environmental burden into an asset with economic value. Accordingly, in January 2021 the UAE became the first country in the region to launch their Circular Economy Policy 2031. The policy sets out the UAE's ambition to transform its economy from a linear into circular economy. By becoming a Circular Economy, the UAE aims to optimize its use of resources, "design out" waste and pollution and preserve and enhance nature. To spearhead the transformation to a Circular Economy, the UAE policy identified four priority sectors for transformation: Manufacturing, Infrastructure, Transportation and Food. In order to support the adoption and the successful implementation of the circular economy policy, the UAE Circular Economy Council was established in 2021. The council shall oversee the implementation of the initiatives and policies to transit to a circular economy. The UAE Circular Economy Council consists of 17 representatives from the

federal and local governmental entities, the private sector and the international organizations.

Recently, the council has approved 22 policies to accelerate and consolidate the national efforts in the circular economy agenda. The policies will contribute to addressing most of the challenges raised by the private sector to optimize their operation and adopt circularity as means to sustaining their businesses and further improving them. The policies will focus on turning waste into feeding stocks for sustainable industries and reducing pollution, holistic assessment of the lifecycle of the used material, and regenerating more functionalities for the different materials used in the production process.

Moreover, the Coalition of Innovation in Recycling towards a Closed-Loop Economy (Coalition CIRCLE), a public-private partnership established in 2019, is working to develop a circular economy model to combat the issue of plastic and packaging waste pollution in the country. The UAE was also amongst the first signatories to the Scale360° initiative of the World Economic Forum (WEF) that is focused on fast-tracking the implementation of a circular economy through nationally led innovation challenges.

Regulations and incentive programs have been introduced across the country to minimize waste, and promote reuse and recycling; waste segregation, transfer, and tracking; and recovery, treatment, and disposal. This is supported by a targeted reduction in waste generation from 2 kg per capita/day to 1.2 kg per capita/day. In

2020, Abu Dhabi adopted the Single-Use Plastic Policy with the aim of making the emirate free of single-use plastic bags. Diversion of waste away from landfills is a key waste management objective, and relevant federal and emirate-level targets have been put in place. In keeping with the approach of reducing waste sent to landfills and deriving value from municipal solid waste, waste-to-energy projects are in the works across the UAE. In May 2022, the Sharjah Waste-to-Energy plant was inaugurated. The facility diverts 300,000 tons per year of non-recyclable waste away from landfill and produces 30 MW of low-carbon energy: enough to supply electricity to about 28,000 homes in the country, and provide 45 million cubic meters of natural gas each year. Moreover, the under-development Dubai Waste Management Centre (DWMC) with the capacity to process 1.9 million tons of municipal solid waste and an installed power capacity of 200 MW, is expected to be operational by 2024.



Water Resources Management

Given the scarcity of fresh water in the UAE and the country's reliance on producing water through energy-intensive desalination processes, the management of water resources is of particular policy importance.

The UAE is following an integrated water management approach that is geared towards prudent use of water, and minimization of environmental and social risks. The UAE's first NDC referenced its efforts to develop a federal framework

for sustainable management of water. The country has adopted the UAE Water Security Strategy 2036 that aims to ensure continued and sustainable access to water, and covers all components of the water supply chain: supply, demand, and emergency preparedness. The strategy's objectives are to reduce potable water consumption by 20% and increase reuse of treated water to 95% by 2036.

With limited freshwater resources, desalination is the largest source of potable water in the UAE. The country has traditionally relied on power and water co-generation plants for the production of desalinated water. Between 2010 and 2019, the GDP grew faster than water consumption supplied by utilities, and consequently, the productivity of water, measured as the value of GDP created per cubic meter of water supplied by utilities, rose by 31% from US\$186 (in constant 2010 prices) to US\$243 (2010 prices).

In line with Abu Dhabi National Energy Company, PJSC (TAQA) 2030 strategic plan, aims to expand highly efficient reverse osmosis technologies to make up two-thirds of its desalination capacity by 2030; where the projects totaling 200 MIGD are already under construction.

Moreover, the decoupling of water consumption from economic and population growth in the UAE suggests that water use in the country has become more circular, particularly since 2015. While the productivity/efficiency of water use in the industrial sector of the UAE fell 20% between 2012 and 2018, the productivity/efficiency of water use in the agricultural sector and municipal sector showed an increase (46% and 4%

respectively).

In order to reduce the environmental impact of desalination, and to address inefficiencies in co-generation due to operational attributes and seasonal variation in demand for power and water, the UAE is developing and scaling up independent water projects based on reverse osmosis (RO) technology and expanding the share of renewable energy in desalination. The country targets a rise in the share of RO-based desalinated water to over 50% of the potable water supply mix by 2036. The Al Taweelah RO-based desalination plant in Abu Dhabi, expected to be operational by 2022 with a maximum production capacity of 909,200 cubic meters of water per day, seeks to utilize the lowest amount of energy per volume unit of desalinated water produced. Amongst Dubai's RO plants, the Hassyan Sea Water RO Plant, based on the Independent Water Producer (IWP) model, is a notable addition with a planned capacity of over 1 million cubic meters of water per day by 2030.

Moreover, efforts are being made to reduce water losses and lower the consumption of water. Along with promulgation of green building and product standards, building retrofit initiatives, and introduction of a water tariff reform, government authorities have been implementing awareness campaigns to push for behavioral change amongst residential as well as commercial consumers.

Furthermore, the wastewater treatment and sanitation sector in the UAE has witnessed significant advances over the last few years with the expansion

of wastewater treatment capacity. For instance, In July 2021 TAQA awarded AED 900 million in projects to further expand their recycled water distribution program to include commercial and agricultural operations, with the goal to achieve 85 MIGD of recycled water distribution capacity. In partnership with Environment Agency Abu Dhabi (EAD), TAQA are developing a network in the Liwa region to supply recycled water to more than 4,000 farms. As well as in January 2020, TAQA completed the extension of their recycled water network to include Saadiyat island in Abu Dhabi to supply the island with 4.4 MIGD of recycled water for landscaping irrigation, further reducing the reliance on desalinated water.



Tourism and Mega-Events

The UAE receives a large number of business and leisure travelers every year. The country also hosts a range of international events, including sporting events, exhibitions, and conferences. As tourism opportunities grow, mitigation of emissions, building of resilience to climate impacts, and promotion of sustainable tourism practices are central to the sector's development.

Through standards, technical guidelines, and capacity-building programs, hotels in the UAE are being encouraged to reduce their operations' impact on the environment. Dubai's Department of Economy and Tourism (DET) has laid down a set of sustainability guidelines that hotels are required to comply with, along with monthly reporting of their carbon emissions.

In addition, the UAE government is working with relevant stakeholders to design ecotourism experiences that are centered around conserving nature as well as deriving value from it. A multi-phase national ecotourism program, 'The UAE's Natural Wonders,' was launched in 2018 to raise awareness about the country's nature reserves and protected areas.

To cater to international events, the UAE has built world-class exhibition centers and arenas with due consideration for sustainable design and operation. In 2019, Abu Dhabi provided the venue for the Special Olympics World Games. In addition to offsetting the event's emissions, efforts were made to power the Games with clean energy sources and to provide sustainable transport options.

The UAE also hosted Expo 2020 Dubai in 2021-2022. Its organization was geared towards delivering a sustainable mega-event. Particular attention was paid to sourcing of clean energy,

water conservation, effective waste management, and use of sustainable building materials in accordance with green design. In line with Expo's theme, 'Connecting Minds, Creating the Future', its Sustainability Pavilion showcased innovative environmental solutions. It is notable that the Expo site has been built as a smart development that will translate into sustainable legacy infrastructure for residential and commercial purposes. The site after the event closure will transform into Expo City Dubai, a smart and sustainable city serving as an integrated mixed-use community. It will fulfil Expo's founding vision to be an innovation-driven business ecosystem to connect, create, and embrace technology and digital innovation to support growth. Expo City Dubai will repurpose 80% of Expo's built environment.

The UAE intends to leverage this vast experience as it prepares to host COP28 in 2023, placing sustainability leadership and inclusivity at the center of the event and its Presidency.



6. ADAPTATION TO CLIMATE RISKS

In line with Article 7 of the Paris Agreement and the Global Goal on Adaptation, the UAE is taking decisive action to enhance its resilience, given the Arabian Gulf region's vulnerability to climate change impacts. In keeping with the ambition articulated in its first NDC and the goals set by the National Climate Change Plan of the UAE 2017-2050, the country has developed the National Climate Change Adaptation Program. The program is geared towards increasing climate resilience by minimizing risks and improving adaptive capacity, particularly among vulnerable groups, such as women, the elderly, persons living with disabilities, and young people who will inherit the increasing impacts of climate change. The Program entails the following:

- risk and vulnerability assessment, and adoption of immediate low-cost measures;
- mainstreaming of adaptation planning in development policies; and
- monitoring and evaluation to ensure implementation of evidence-based adaptation measures.

The UAE acknowledges the importance of integrating its adaptation plans and activities with the Sendai Framework for Disaster Risk Reduction 2015-2030, thus reducing disaster risk and associated loss of life, health, livelihoods, and assets.

The country has conducted a systematic and participatory climate risk assessment as a basis for planning adaptation measures in four priority sectors: energy, infrastructure, health, and the environment. The climate risk assessment

framework followed identifies potential sectoral impacts of climate change, evaluates impacts for their expected magnitude and likelihood, assesses and prioritizes risks, and accordingly identifies adaptation measures. For each sector, in addition to measures being currently implemented, actionable adaptation plans in line with the national adaptation plan (NAP) requirements, are being developed to respond to identified high-priority risks. Measures being adopted and planned include physical safeguards, such as engineered structures, technology systems, and ecosystem-based assets; risk management initiatives, covering regulations, financial mechanisms, and early warning systems; knowledge development, including data collection, research, and capacity-building; and enablers, such as broader policies that may not directly target adaptation but provide enabling conditions for strengthening resilience. The UAE government is also enhancing national capacities in climate risk insurance, working closely with the private sector.

As such TAQA is contributing to UAE demand side management and Energy rationalization strategy 2030 through ADES, our wholly owned Super ESCO and subsidiary of the Group, and our distribution companies ADDC and AADC. Multiple initiatives on energy and water efficiency, building retrofits and cooling efficiency have been launched with a portfolio of planned initiatives also developed. By 2030, ADES aims to save 2.7 terawatt hours of electricity and nine million cubic meters of water.



Energy

While the UAE's energy sector is the single largest GHG emitter, it is itself significantly impacted by climate change. The sector's assets and activities face threats from supply and consumption changes as well as extreme weather events. Some impacts that pose a high level of risk given their magnitude and likelihood include energy efficiency losses in power plants when temperatures exceed standard design criteria, reduced power output due to warmer cooling water in plants, and deterioration of power facilities leading to reduced reliability and increased maintenance costs. It is also expected that higher temperatures will result in a higher energy demand for cooling. In addition, the energy sector is vulnerable to direct climate impacts, such as damage to coastal power infrastructure due to sea level rise and extreme salinity episodes.

To build the sector's resilience, the UAE's energy regulators and utilities are factoring in climate-related impacts in their current operations and future strategies. Dubai Electricity and Water Authority (DEWA) has developed a climate impact assessment model to evaluate the physical and financial impact of climate change on its assets and operations, and has built a climate resilience plan. In order to address potential rise in power demand due to extreme temperatures, the country is expanding clean energy-based installed capacity and implementing energy efficiency measures. Particular attention is being paid to increasing

the efficiency of cooling appliances and deploying district cooling where feasible. Green building standards, appliance labels and standards, and awareness programs promote energy conservation in the residential and commercial sectors.

Modernization of existing plants and substations is being undertaken. The UAE is focusing on the development of smart infrastructure – power plants, grids, and meters – and the upgrade and modernization of existing infrastructure assets to accelerate response in the face of uncertainty. Power system integration and automation is being pursued to boost efficiency and institute smart controls. Utilities are working to leverage artificial intelligence and data analytics to enhance power system performance.



Infrastructure

The UAE's infrastructure, comprising buildings, transport links, water supply, sanitation and waste management facilities, and coastal and offshore infrastructure, is an essential enabler of economic development. Considering infrastructure's long service lifespan, significant economic value, and importance for community life, the country is preparing for the unavoidable impacts of climate change on the infrastructure life cycle – design, location, construction, operation, and maintenance – in order to build long-term socio-economic resilience.

About 85% of the UAE's population and more than 90% of its infrastructure are located in low-lying coastal areas. Damage

to coastal and offshore infrastructure due to rising temperatures and changes in seawater acidity and salinity is, therefore, of particular policy and planning relevance for the country. Other critical impacts include but are not limited to increased infrastructure maintenance costs, loss of business opportunities due to transport disruptions, and reduced reliability of buildings and transport infrastructure.

Supplemented by coastal zoning and monitoring, urban masterplans that lay guidelines for the operation and maintenance of existing infrastructure, and the design and construction of planned infrastructure serve as a foundation for effective adaptation plans for the UAE infrastructure sector. Across the country, green building design and construction is being promoted, existing buildings and facilities are being refurbished, and flood monitoring and management systems are being enhanced. Public infrastructure is being continuously upgraded to harness the benefits of new technologies and practices. Fog detection and warning systems are in use, and efforts are being made to incorporate climate-induced hazards in road safety plans.

Even while the UAE climate-proofs its infrastructure and communities, relevant contingency and disaster response plans are being put in place to ensure preparedness for emergencies and to maintain continued access to infrastructure services. Response plans are designed in conjunction with women, youth, and at-risk groups, and reflect the needs of all individuals.



Health

The impacts of climate change on human health vary in scale and complexity – either with direct exposure to extreme weather events or indirectly through the impacts of climate change on air quality and water supply. According to the national climate risk assessment undertaken by the UAE, reduced productivity of outdoor workers due to heat stress is a high-magnitude, highly likely impact that the country will face, with morbidity and/or mortality from heat stroke following closely behind. Given the temperatures and humidity levels that characterize the UAE's desert climate, heat stress is a concern that public health authorities are already grappling with.

The country is preparing to deal with climate-related health challenges, and making significant progress in taking preventive measures and providing high-quality healthcare. A midday break has been stipulated for all outdoor laborers during peak summer. The measure has been introduced to reduce heat exhaustion, heat stress, heat stroke, and related illnesses. The Abu Dhabi government has also rolled out a 'Safety in Heat' program that aims to limit heat exposure in the workplace; concomitantly, a Thermal Work Limit (TWL) heat stress index is being used to gauge the suitability of working conditions.

In July 2019, the UAE Ministry of Health and Prevention in partnership with the World Health Organization (WHO) launched the UAE National Framework for Action on Climate Change and

Health 2019-2021 that sets out the country's strategic response to public health challenges posed by climate change. It considers high-priority risks that emerged from the risk assessment exercise undertaken as part of the National Climate Change Adaptation Program while laying the ground for continued assessments and capacity-building amongst relevant stakeholders. Under the Framework, the UAE National Committee on Climate Change and Health has been founded to coordinate the development of a nationwide policy and action plan on health and climate change, and to steer the design and implementation of the country's public health response to climate change. Modalities are also being established for effective coordination between public health and climate stakeholders, and to train health personnel to deal with risks posed by climate change, particularly as it relates to vulnerable groups, such as the elderly, pregnant women, and those highly exposed.

In addition, the UAE is proactively enhancing regulations and policies concerned with key environmental health services and determinants, including water and air quality, food systems, and waste management, to protect public health while fighting climate change. The country will strengthen surveillance of infectious diseases and their link to climate- and environment-related factors amidst the COVID-19 pandemic.



Environment

The UAE has been working to protect its

natural heritage through the promulgation of relevant environmental regulations, development of protected areas, and promotion of sustainable best practices in economic activities reliant on the environment (such as fishing and farming). As climate pressures mount, the country is invested in enhancing its understanding of how climate change is affecting the availability of natural resources, such as freshwater, and threatening species and their habitats, while addressing these risks with the engagement of relevant stakeholders.

Conserving and sustainably utilizing groundwater resources and aquifers is a key policy objective of the UAE. As an enabler of this objective, the UAE Hydrological Map initiative assesses the suitability of the country's surface water and groundwater resources for the construction of dams and water facilities. Rainwater harvesting in dams, along with artificial injection technology, is being used to boost available water resources. Increased frequency of coral bleaching events, and loss of coastal and terrestrial wetlands as well as associated biodiversity and ecosystem services have been identified as high-risk climate impacts on the UAE's environment. Given the vulnerability of coral reefs to climate impacts, the country has taken significant steps to protect and restore them. Monitoring of coral reefs, deployment of artificial reefs, and rehabilitation and cultivation of reefs is being undertaken at various locations. More than 3,000 coral fragments have been transplanted, and it is expected that over 10,000 more will be transplanted in the next 10 years. The Fujairah Cultured Coral Reef Gardens project was initiated in 2019 and targets

the cultivation of 1.5 million coral reef colonies over five years. The UAE has deployed 4,500 artificial reefs across its marine and coastal zones, and these are being monitored for improved marine life and fish stocks. Additionally, natural rock barriers are being installed in coastal areas across the country in order to recreate natural habitats and breeding grounds for marine species. Taken together, the UAE's efforts to protect and restore coral reefs has the potential to provide jobs and reinforce livelihoods to young people, while helping ensure access to this innovative and emerging sector. The National Biodiversity Strategy and the National Strategy for Coastal and Marine Environment, along with the UAE's international commitments on environment, have been guiding the country's initiatives in environmental conservation and nature-based climate solutions. The National Biodiversity Strategy lays down the framework for establishing a network of protected and effectively managed ecosystems, taking into account the linking of important areas of biodiversity and ecosystem services. This has entailed biodiversity surveys; issuance of relevant legislation and guidelines; programs to plant and protect native trees; initiatives to protect terrestrial, marine, and freshwater fauna; and designation of new protected areas. Currently, the UAE's 49 protected areas occupy 15.5% of its total territory. The country is developing the UAE Smart Map of Natural Capital to identify biologically rich ecosystems as well as the services they provide.



7. ADAPTATION ACTIONS WITH MITIGATION CO-BENEFITS

While mitigation of emissions and adaptation to impacts remain an integral part of climate action, interventions in some sectors are yielding results for both objectives. The UAE's efforts to boost its adaptive capacity through coastal ecosystems management, and food and agriculture policies are leading to mitigation benefits as well. These dual benefits only underscore the importance of the country's initiatives in these areas of socio-economic and environmental significance.



Conservation of Blue Carbon Ecosystems

The UAE's coastal ecosystems, such as mangroves, salt marshes, and seagrass beds, provide a range of ecosystem services. In the context of climate change, these ecosystems serve both adaptation and mitigation needs. Owing to a range of restoration and conservation efforts implemented since the 1970s, the UAE is amongst the few countries that have proactively expanded their mangrove forest cover. Following the success of the Abu Dhabi Blue Carbon Demonstration Project that has significantly contributed to the understanding of blue carbon stocks in the UAE, the value of these stocks has been incorporated into federal and emirate-level policies. The UAE government is undertaking further field research to determine mangrove soil carbon sequestration rates using

radiometric dating techniques. The findings will aid the development of emission inventories and inform coastal management.

To enhance its natural carbon sinks, the UAE has taken an active role in restoring the ecosystems through planting native trees, such as mangroves, which sequester 1,073,696 metric tons of CO₂ in the country annually. During the 26th UN Climate Change Conference (COP26) in Glasgow, the UAE announced its ambition to plant 100 million mangrove seedlings by 2030, significantly increasing the target of 30 million seedlings set in 2020.

Further, as part of its efforts to improve in-situ conservation and to build a network of protected areas between 2021 and 2025, the emirate of Abu Dhabi targets the inclusion of a minimum of 20% marine blue carbon habitats within protected areas.

On a global level, the UAE is working on the Mangrove Alliance for Climate (MAC) that seeks to leverage a vast collective of expertise and resources to scale up and accelerate mangrove conservation, restoration, and resilience. Specifically, the members commit to plant, rehabilitate, and restore mangroves within their countries and to support other members in doing the same.



Agriculture and Food Security

In order to tackle the challenges climate change poses for food production, the UAE is adopting sustainable and controlled-environment agricultural systems, reducing food waste, and diversifying sources of food imports. The country's National Food Security Strategy 2051, launched in 2018, was determined based on (3) main criteria: consumption rate, production capacity, and nutritional values of the main nutrients, including specialized foods. The basket included (24) main foods within the plant, livestock and grain food groups. The strategy aims to ensure access to safe and sufficient food all year round, prioritizing sustainable agricultural and consumption practices, and thus promoting resilience, productivity, soil and water conservation, food diversification, and food waste reduction. Therefore, to achieve those objectives the UAE Cabinet approved an effective food security governance model by establishment of the Emirates Food Security Council which is playing a major role to ensure the implementation of the National Food Security Strategy 2051 and proposes regulations, legislation and policies to enhance food security in the UAE.

The role of innovation in climate-smart agriculture and food systems has become paramount in the country. For example, to address the water-energy-food nexus that characterizes the desert environment of the Arabian Gulf region, the UAE government is working closely with research institutes and

farmers to drive the adoption of modern farming solutions and technologies, such as optimized greenhouse design, hydroponics, and vertical agriculture. For example, the Agriculture 4.0 initiative, being implemented from 2020 to 2022, seeks to upgrade traditional farms with technology-enabled operating models that optimize production while abiding by the water budget set by the UAE Water Strategy 2036.

Through public-private partnerships, the UAE has invested in several vertical farming projects. One prominent example is the world's largest vertical farming facility being built by Emirates Flight Catering and Crop One, which will cover 12,077 sq m and produce output equivalent to 3.6 million sq m of farmland using 99% less water than regular outdoor fields.

The UAE has also committed to financing climate action in agriculture and food security efforts. As part of its leadership of the Agriculture Innovation Mission for Climate (AIM for Climate) – a global initiative led by the UAE and the US with the support of over 140 government and non-government partners – the UAE has joined in a collective pledge to target USD 8 billion in investments in climate-smart agriculture and food systems by COP27.

Furthermore, In May 2020, His Highness Sheikh Mohamed bin Zayed Al Nahyan, Crown Prince of Abu Dhabi and Deputy Supreme Commander of the UAE Armed Forces (at the time), outlined his vision for enhancing food security and promoting a culture of rationalization and sustainable practices in food production and consumption. This vision sowed the

seeds for the National Food Loss and Waste Initiative (Ne'ma).

Ne'ma, the National Food Loss and Waste Initiative, is a collaboration between the Ministry of Climate Change and Environment, Emirates Foundation and the Abu Dhabi Crown Prince Court, represents a major milestone in the UAE's commitment to tackle food loss and waste, and to develop a strategic system aimed at intensifying efforts to achieve the goals of the UAE National Food Security Strategy in reducing food loss and waste by 50% by 2030, in line with the United Nations Sustainable Development Goal #12.3. The Ne'ma initiative will align and gather the efforts of government entities, the private sector, NGOs and communities across the nation under a shared umbrella, to collectively address food loss and waste in the UAE, whether at farms, manufacturers, distributors, retailers, restaurants or households

In conjunction with technology-based enhancement in domestic agriculture, the country has taken a comprehensive approach to combating food waste by engaging local residents, government organizations, and businesses in initiatives to reduce and encourage treatment of food waste. The nationwide Food Waste Pledge, launched in 2018, encourages the UAE's hospitality sector to adopt efficient food management practices. The country aspires to cut food waste by half by 2030.



8. DOMESTIC ENABLERS

The UAE's climate engagements are guided and supported by cross-cutting enablers, including finance, technology innovation as well as public awareness and youth engagement. The UAE Green Agenda 2015-2030 sets a sustainable growth pathway for the country to become a global hub for the low-carbon green economy, and serves as an overarching framework that promotes green industries and jobs as well as green finance. Capacity-building across public and private sector entities is a key component of climate and green development initiatives in the UAE.



Sustainable Finance

The UAE's efforts to build a competitive green economy have placed sustainable finance at the forefront with the aim of effectively channeling investment. At the federal level, the UAE Sustainable Finance Framework 2021-2031 was launched in 2021 to guide stakeholders towards mobilizing and scaling up private capital for sustainable investments. The Framework was developed through strong stakeholder collaboration, with insights gathered from leading financial institutions and relevant public sector entities to inform on the areas of intervention which require the most attention. Also, in the same year, the country witnessed the issuance of the High-Level Statement on Sustainable Finance, detailing the commitment of the UAE Sustainable Finance Working Group to achieving the country's sustainability

objectives and the recently announced net-zero emissions goal. The statement outlines three key deliverables: a targeted study aimed at encouraging consistent environmental, social, and governance (ESG) corporate disclosure standards across the UAE, examining how to strengthen good corporate governance by the country's companies, and, crucially, developing a UAE taxonomy of sustainable activities, which constitutes a major milestone in defining the path for economic transition to sustainable development.

The Abu Dhabi Global Market (ADGM) Sustainable Finance Agenda was published in January 2019, setting a roadmap for establishing a sustainable finance hub in the UAE. This was followed by the launch of the UAE Guiding Principles on Sustainable Finance, a voluntary framework to encourage the country's financial firms to incorporate ESG considerations in their business. With the objective of building a dynamic sustainable finance sector in the UAE and supporting the country's transition towards a green economy, more than 70 government and private sector entities have adopted the Abu Dhabi and Dubai Sustainable Finance Declarations. The UAE is seeing a range of green finance instruments and initiatives being developed and implemented. For example, Dubai Green Fund (DGF), established in 2016, provides loans to companies in the clean energy sector at reduced rates. Green bonds/sukuk issued by leading UAE corporations have emerged as instruments for financing

sustainability projects. In 2020, the emirate of Abu Dhabi introduced the Green Bond Programme, a joint initiative by the Abu Dhabi Department of Energy (DoE), ADGM, and Abu Dhabi Securities Exchange (ADX) that seeks to develop a transparent framework for green bonds to ensure impact and boost investor confidence.

Earlier in 2022, TAQA announced the successful pricing of green senior secured bonds for an aggregate principal amount of US\$700.8 million (AED 2.6 billion) by Sweihan PV Power Company PJSC (SPPC).



Technology Development & Innovation

The UAE has established scientific research centers and programs targeting climate and energy innovation, and continues to test and adopt new sustainable technologies and practices. These initiatives are envisioned as a tool for youth empowerment, supporting employment opportunities and facilitating access to new and innovative low-carbon technologies and sectors.

The country has pioneered low-cost solar power in the region, and has developed knowledge and solutions which can be deployed in other countries. DEWA has founded a world-class research and development center that focuses on solar testing and certification, energy efficiency, and smart grids. In line with its commitment to international cooperation, the UAE is a member of Mission Innovation, an intergovernmental initiative announced at COP21 in Paris

in 2015, wherein participating countries committed to doubling clean energy research and development by 2021.

With heightened interest in hydrogen as a fuel of the future, a public-private solar-powered electrolysis facility has been built in Dubai to test and demonstrate an integrated plant that produces and stores green hydrogen, and then deploys it for re-electrification, mobility, or other industrial uses. In May 2021, the US\$14-million green hydrogen plant was inaugurated at Dubai's Mohammed bin Rashid Al Maktoum Solar Park. Daylight solar power from the Park enables the pilot project to produce about 20.5 kg/h of hydrogen at 1.25 MWe of peak power. In order to advance hydrogen production and use, a number of initiatives have been announced by the UAE government. The Abu Dhabi Hydrogen Alliance, established in 2021, is working to consolidate the country's reputation as a reliable global exporter of clean hydrogen. The Alliance members include Mubadala Investment Company, ADNOC, ADQ, DOE and the UAE Ministry of Energy and Infrastructure. In the same year, the UAE announced the launch of the UAE Hydrogen Leadership Roadmap, a comprehensive national blueprint to support domestic low-carbon industries, contribute to the net-zero emissions ambition, and position the country as a competitive exporter of clean hydrogen.

The country is also leveraging artificial intelligence across vital industries to spur innovation. The UAE National Strategy for Artificial Intelligence 2031, adopted in 2017, aims to boost productivity and performance in key economic sectors, including clean energy, water resource

management, and the environment. In 2018, the UAE government set up the Artificial Intelligence Laboratory in collaboration with Khalifa University and the International Renewable Energy Agency (IRENA). The laboratory uses artificial intelligence to optimize the use of renewables in the UAE by mapping prime solar power locations across the country, in addition to tracking air pollutants and monitoring water quality.

In keeping with the aviation industry's commitment to advancing sustainable technologies and practices, the Sustainable Bioenergy Research Consortium (SBRC) was founded in 2011. The flagship project of the Consortium, the Seawater Energy and Agriculture System (SEAS), is a first-of-its-kind research facility to produce both food (fish and shrimp) and fuel (salt-tolerant halophyte plants) using desert land irrigated by seawater. In 2019, biofuel from this facility was combined with traditional jet fuel to power the first commercial flight using locally produced halophyte-based fuel.

Overarching strategies that advance research and innovation have been put in place. The vision of the UAE's Fourth Industrial Revolution (4IR) Strategy is to position the country as a leading global hub and an open lab for 4IR applications. Amongst the six strategic pillars of the Strategy is 'The Experience of the Future', which aspires to establish the UAE as a global hub for smart cities with improved environmental sustainability and enhanced quality of life. One of the pillar's strategic areas is NextGen Mobility that reflects the country's ambition to become the world's testing ground for

autonomous and sustainable mobility with the aim of leading innovation in transportation. Further, the UAE is implementing the Science, Technology and Innovation Policy and the National Strategy for Advanced Innovation that seek to build the country's credentials as a knowledge and innovation powerhouse.

To enable the development of innovative solutions that drive the UAE's green transition, the country has launched several programs that support local and international entrepreneurs and innovators. These include the Mohammed Bin Rashid Innovation Fund (MBRIF), focused on technology and business innovation; the Climate Innovations Exchange (CLIX) for sourcing and funding of climate solutions and technologies; and the Solar Decathlon Middle East (SDME) that targets innovation in the field of sustainable solar homes.



Youth and Women in Climate Action

Inclusivity and empowerment are woven throughout the entirety of the UAE's approach to climate change and sustainable energy, with a particular focus on strengthening the participation of women and young people. The country has continued to invest heavily in youth development and engagement on climate issues. The government introduced the Emirates Youth Climate Strategy in 2018 to build youth capacities to meet the challenges of climate change and promote youth participation in climate action and domestic decision-making. Several youth councils have been established to consult

with youth on policies and legislation, including the UAE National Climate Change Plan and Nationally Determined Contributions. The Youth Circles initiative, governed by the Emirates Youth Council, inspires youth-centric dialogue and holds events across a variety of areas, including sustainable development and climate change, enabling young people to share innovative solutions. Furthermore, in 2016, the UAE appointed its first Minister of State for Youth Affairs, who was the youngest member of the cabinet and the youngest minister in the world.

Masdar's Youth 4 Sustainability (Y4S) platform, launched in 2020, supports the country's transition to a knowledge economy by enabling young people to become active environmental leaders through mentorship and engagement opportunities. Additionally, more than 180 young citizens have graduated from DEWA's ongoing Carbon Ambassadors Programme since its inception in 2014. The program focuses on educating youth on climate, sustainable energy, and natural resource management.

Under the guidance of the UAE leadership, the Arab Youth Center (AYC) was established to harness and invest in youth's energy as a valuable resource and asset. In 2021, the Center founded the Arab Youth Council for Climate Change (AYCCC) as a dedicated platform to enable Arab youth climate advocates to contribute to the global fight against climate change. The Council aspires to bridge the gap between young people and policy-making bodies by ensuring youth representation at regional and global engagements and events. The Council

also seeks to equip young Arabs with the necessary tools and skills required to face the challenges posed by the climate crisis.

Established in 2008, the Zayed Sustainability Prize are an annual series of global awards with a prize pool of \$3 million, which recognizes and rewards the achievements of those who are driving impactful, innovative and inspiring sustainability solutions across five distinct categories: Health, Food, Energy, Water and Global High Schools.

Gender equality is firmly embedded in the UAE's response to climate change. The country maintains its commitment to female education, which is evidenced by the fact that over 50% of the UAE's university graduates are women, including in climate-related fields. Similarly, efforts have been made to engage women in climate decision-making and governance, and women now enjoy strong representation in the UAE climate and energy community, including in the leadership teams of the UAE Ministry of Climate Change and Environment and the UAE Office of the Special Envoy for Climate Change. There also exists a 50-50 quota in the Federal National Council, with 1/3 women in the cabinet. Moreover, the UAE has a board representation quota in place to advance gender equality in businesses.

Amongst initiatives aimed at promoting women's involvement in climate action, Mubadala's Women in Sustainability, Environment and Renewable Energy (WiSER) brings together female professionals in climate, energy, and sustainability to support their growth

through training and networking opportunities. Concerning its foreign aid, the UAE also utilizes a gender market for its climate aid, as well as all international aid more broadly.

Looking ahead, the UAE will continue to seek ways to strengthen its commitment to engaging women in the country's efforts on climate change mitigation and adaptation. This may include performing gender impact analyses for climate policies, gender responsive climate finance, sex-disaggregation of climate-related data (e.g., on public climate spending and access to finance), or maintaining quotas for UNFCCC delegations.



9. MEANS OF IMPLEMENTATION

The Paris Agreement lays down provisions to facilitate capacity-building and technology transfer as well as access to climate finance at national, regional, and global levels. The UAE acknowledges the challenges of climate change within its own boundaries as well as the challenges being faced by fellow developing nations, some of which are already experiencing extreme climatic conditions and events. The UAE therefore welcomes technical assistance made available to developing country parties under the UN Framework Convention on Climate Change (UNFCCC). The UAE actively participates in the international community's endeavors to transfer and widely deploy advanced technologies crucial to reduce GHG emissions and increase adaptive capacity in developing countries.

In order to promote a shared international effort guided by Article 6 of the Paris Agreement and related modalities, the UAE supports the development and operationalization of market mechanisms aimed at emission reductions. The Kyoto Protocol's Clean Development Mechanism (CDM) has been a driver of sustainability projects in the UAE, with the country having engaged in the implementation of 15 CDM projects. As the UAE's engagements with the global carbon market multiply, the country has also announced the establishment of a fully regulated carbon trading exchange and clearing house. ADGM, the international financial center in Abu Dhabi, is working in partnership with AirCarbon Exchange (ACX) to launch the trading platform in 2022.

The UAE welcomes international cooperation in renewable energy, cleaner hydrocarbons, hydrogen fuel, industrial energy efficiency, green mobility, waste management, and sustainable agriculture. In advancing bilateral and multilateral collaboration in technology development and deployment, the country has championed infrastructure and energy projects worldwide. These efforts have been pursued through formal channels, including but not limited to the UAE-Pacific Partnership Fund (PPF), the UAE-Caribbean Renewable Energy Fund (CREF), and the IRENA/Abu Dhabi Fund for Development (ADFD) Project Facility that supports renewable energy projects in developing countries. In addition, the UAE's private sector has been investing in international renewables ventures. The UAE has supported renewable energy projects with a total value of over US\$16.8 billion across 70 countries.

Further, in 2021, the UAE and IRENA set up the Energy Transition Accelerator Financing (ETAF) platform, a global climate finance facility to advance and accelerate the transition to renewable energy in developing countries. Contributing towards the platform's goal of securing a minimum of US\$1 billion in funding, the UAE has committed US\$400 million.

In addition to international engagements on clean energy, the UAE is spearheading international investment in climate-resilient and sustainable agriculture. The Agriculture Innovation Mission for Climate (AIM for Climate), the joint UAE-US initiative launched at COP26 in

Glasgow, is supported by over 200 government and non-government partners. AIM for Climate has mobilized US\$4 billion of increased investment in climate-resilient and smart agriculture, including a US\$1 billion contribution from the UAE.



10. CONSIDERATION OF AMBITION AND FAIRNESS

The UAE is determined to contribute to reducing global emissions as well as building climate resilience. The country's climate initiatives are informed by its development and economic diversification agenda as well as its commitment to the pursuit of the 2030 Agenda for Sustainable Development and the goals of the Paris Agreement.

This update to the UAE's second NDC includes an absolute, economy-wide emission reduction target, reflecting progressively higher ambition than the second NDC submission of 2020. It highlights the country's plans up to 2030, with 2016 designated as the base year given the completeness of source and sink datasets available for the year. For further clarity and transparency, the NDC includes the total BAU scenario emissions expected in the year 2030.

The UAE's ambition is evidenced in its commitment to a pathway that aims to deliver significant emission reductions vis-à-vis BAU over the next decade. Consideration of fairness and ambition of the country's NDC must be informed by the definition of its BAU emissions scenario, which includes measures implemented up to 2016, thus setting a high benchmark for future action. The UAE's 2030 target is based on a progressive, cross-sectoral clean development effort that is geared towards achieving net-zero emissions in 2050.

The UAE's status as an economy that is developing and diversifying its sources

of revenue presents unique opportunities and challenges. The country's plans seek to harness a wide range of technologies to support its goals. This will call for increased investments in technology development and deployment, regulatory changes, and capacity-building across sectors. It is notable that despite the far-reaching socio-economic impacts of the COVID-19 crisis, the UAE is committing itself to an ambitious climate mitigation and adaptation pathway.

Moreover, the UAE's desert climate, marked by high temperatures and humidity, poses distinct constraints for both mitigation and adaptation. Energy consumption for cooling remains a significant contributor to emissions, and high temperatures place people, ecosystems, and infrastructure close to heat thresholds. Despite challenges, the country is resolutely implementing climate mitigation and adaptation measures.

The UAE's commitments are in line with the requirements stipulated in Articles 4.3 and 4.4 of the Paris Agreement and Decision 1/CP.21. To the extent relevant, this submission takes into account guidance set forth in Decision 4/CMA.1. In keeping with Article 2 of the UNFCCC and Article 4.1 of the Paris Agreement, the country will continue to explore pathways to further enhance its emission reduction objectives in line with climate science and global ambition.

11. MEASUREMENT AND REPORTING OF PROGRESS ON NDC IMPLEMENTATION

The UAE maintains and periodically updates its GHG Emissions Inventory, accounting for emission sources and sinks. It tracks domestic sectoral mitigation efforts and their impacts in accordance with defined monitoring and evaluation requirements. Periodic reviews are being undertaken to ensure initiatives' alignment with national development priorities and global climate goals.

The UAE acknowledges the significance of establishing a monitoring, reporting,

and verification (MRV) framework that tracks the mitigation outcomes of policies and initiatives reflected in this NDC. The country has set up a comprehensive MRV system covering all relevant air pollutant emissions. This system supports the tracking and achievement of domestic emission targets, in addition to providing crucial information for the UAE to meet its reporting obligations under the Enhanced Transparency Framework of the Paris Agreement.



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For further information or feedback:

Ministry of Climate Change & Environment

PO Box 1509, Dubai, United Arab Emirates

Email: info@moccae.gov.ae

www.moccae.gov.ae

