

Second Nationally Determined Contribution of the United Arab Emirates

December 2020

The United Arab Emirates (UAE) submitted its first Nationally Determined Contribution (NDC) in 2015, in accordance with Decisions 1/CP.19 and 1/CP.20. With this submission, the UAE is submitting a new NDC that reflects enhanced ambition with the inclusion of an economy-wide emission reduction target, in response to guidance set forth in Article 4.4 of the Paris Agreement.

The UAE intends to reduce its greenhouse gas (GHG) emissions for the year 2030 by 23.5%, relative to the Business-As-Usual (BAU) scenario. 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 yielding co-benefits for both climate mitigation and adaptation.

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.

Emission reduction	Reduction of 23.5% in GHG emissions for the year 2030, relative to BAU. BAU scenario emissions in 2030 stand at about 310 million tonnes, assuming a moderate annual economic growth rate based on historical growth trends.
Type	Absolute, economy-wide emission reduction target relative to BAU
Scope and coverage, consistent with IPCC guidelines	Key sectors covered: Energy, Industry Processes and Product Use, Waste, Agriculture, Land Use Change & Forestry Greenhouse gases covered: Carbon Dioxide (CO ₂), Methane (CH ₄), Nitrous Oxide (N ₂ O), Perfluorocarbons (PFCs)
Timeframe and period of implementation	From the start of 2021 to the end of 2030
BAU and NDC Target scenarios	BAU scenario starts in year 2016 and takes into account mitigation measures implemented by the UAE by the end of 2016. NDC Target scenario represents a deviation from the BAU, accounting for implemented and planned mitigation measures for the period 2017-2030.

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 fulfill its NDC objectives, it may consider using voluntary cooperation under Article 6 of the Paris Agreement to partially fulfill these objectives.
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1. UAE's NATIONAL CIRCUMSTANCES AND RESPONSE TO CLIMATE CHANGE

Since the submission of its first NDC in 2015, the UAE has continued building a competitive and innovation-driven economy. While the UAE's modern and technologically-sophisticated oil and gas sector continues to play a key role in its socio-economic growth, the UAE is steadily pursuing its agenda of economic diversification, with a focus on green, low-carbon development.

During the last few 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 for the country. In 2017, the UAE adopted the National Climate Change Plan 2017-2050 which sets a framework for management of greenhouse gas (GHG) emissions, climate change adaptation, and private sector-driven innovative economic diversification. The harsh, arid environment of the UAE makes it particularly vulnerable to climate impacts, and therefore, the country is implementing a National Adaptation Program that identifies sectoral risks and defines action plans for enhancing climate resilience.

Climate and energy security considerations have also led to the adoption of UAE's National Energy Strategy 2050 which targets to increase the share of clean energy, including renewables and nuclear, to 50% of the installed power capacity mix by 2050, and reduce final energy demand by 40% by 2050. These targets are underpinned by the UAE Green Agenda 2030 that is enabling the public and private sectors to implement a shared vision of a competitive and sustainable economy.

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 the UAE's Constitution. The UAE Council on Climate Change and Environment, an inter-ministerial, 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 and the UAE Ministry of Energy and Infrastructure are two key entities engaged in the implementation of climate and sustainable energy plans. Concerted efforts are being made at the level of the UAE's seven Emirates to enhance quality of life and protect the environment.

The COVID-19 pandemic has precipitated a set of unprecedented socio-economic challenges for all countries of the world. As the UAE addresses the public health crisis and sets the economy on a path of recovery, uncertainty on the fallout of the crisis remains. It is notable that the pandemic's potential implications for economic growth and investment, and therefore emission trajectories, are not fully known and thus unaccounted for in this submission.

As a young, progressive nation, the UAE is invested in building climate action into both its near-term and long-term plans. This commitment is evidenced in UAE Vision 2021 which coincides with the country's 50th anniversary and includes 'Sustainable Environment and Infrastructure' as one of its six pillars, and in UAE's Centennial Plan 2071 which underscores sustainable development and fosters scientific innovation.

2. ECONOMIC DIVERSIFICATION INITIATIVES WITH MITIGATION CO-BENEFITS

UAE's interventions with regard to economic diversification and climate change mitigation span the breadth of sectors that characterize the UAE's economy and emissions profile, with due consideration to 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.

2.1. Power – Supply

With heavy reliance on natural gas for production of power, the UAE has built an electricity supply profile with a relatively low carbon footprint vis-à-vis supply systems dependent on other fossil fuel sources. At the same time, clean energy infrastructure assets and services are rapidly growing in the UAE, 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% included in the UAE's first NDC, 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.

The abundance of solar radiation in the UAE coupled with a conducive regulatory framework and innovative business models has led to the development of both photovoltaic and concentrated solar power projects with record-breaking low electricity prices. The UAE is also investing in nuclear energy with the development of the four-reactor Barakah nuclear power plant. Installed clean power capacity, including solar and nuclear, is on track to reach 14 gigawatts (GW) by 2030, from just above a 100 megawatts (MW) in 2015 and 2.4 GW in 2020. To date, upwards of US\$40 billion has been invested in the development of clean energy power in the UAE.

In addition to grid-based clean power, distributed electricity generation, rooftop solar photovoltaic in particular, is being promoted in the Emirate of Dubai through the adoption of a net-metering program. More than 1,350 photovoltaic installations, amounting to a total capacity of 125 MW have been connected to the grid across residential, commercial and industrial buildings. In order to facilitate grid connection of diverse sources of supply and enhance grid stability, UAE utilities have also been making advances in 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 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.

2.2. 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% for the year 2050. In support of achieving this target, the Emirates have set ambitious plans for reducing energy consumption and energy efficiency initiatives are being implemented across demand sectors.

Locally-relevant green building regulations and rating schemes for new buildings have been adopted across UAE's Emirates. These regulations have helped create a local market for sustainable building materials and technologies while increasing awareness of green building features among industry professionals. In addition, to target existing buildings, a federal-level program has been implemented to retrofit government buildings. Abu Dhabi's Building Retrofit program, similarly, targets retrofitting of government buildings and will be rolled out in due course to non-government buildings. Dubai has set a target to retrofit 30,000 buildings in the Emirate by 2030. Ras Al Khaimah's Retrofit Program aims to retrofit 3,000 buildings by 2040.

Periodic tariff reforms for residential, commercial and industrial power consumption are being introduced across Emirates to advance 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, UAE has an established Energy Efficiency Standardization and Labeling Program which covers a range of household goods and appliances including washing machines and dryers, household refrigerators, water heaters, lighting appliances and air conditioners. Given that district cooling is significantly more efficient than conventional cooling technologies, the former is being deployed in high-density areas.

2.3. Oil & Gas

In its effort to harness its rich hydrocarbon resources while capitalizing on strategic opportunities offered by technology, UAE's oil and gas industry has been at the forefront of adopting efficient and climate-friendly industry practices. In 2020, the Abu Dhabi National Oil Company (ADNOC), UAE's largest oil and gas producer, announced a target to decrease its GHG emissions intensity by 25% by 2030. This target is supported by a set of comprehensive sustainability goals including renewed ambition on resource efficiency, zero-flaring policy, and carbon capture, utilization and storage.

The UAE has developed the region's first commercial-scale network for carbon capture, use and storage. 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 for enhanced oil recovery applications. The project's current installed capacity to capture, transport and inject CO₂ is up to 800,000 tonnes per year. Building on the success of Al Reyadah, plans are underway to expand carbon capture capacity in the country.

Having adopted a zero routine flaring policy in its operations, the country's oil and gas companies are regional leaders in flaring avoidance design and operation. ADNOC has designed and operated its facilities to utilize the recovered gas in normal operations through recovery compressors or by adding value to its downstream chain. This is accomplished

by operating one of the largest gas processing plants in the world and establishing the first LNG production company in the region.

In addition, the use of state-of-the art techniques like optical imagery, infra-red capabilities and Leak Detection and Repairs (LDAR) has allowed the UAE oil and gas sector to monitor and manage fugitive emissions across the value chain, and the sector continues to build on these successes.

The UAE's oil and gas sector is also undertaking initiatives to power production facilities with cleaner energy, increase the efficiency of energy and water use, conserve freshwater resources, and recycle and re-use water.

2.4. Non-Energy Emission-Intensive Industries

UAE's key heavy industries include aluminium, iron and steel, cement and chemicals, with each pursuing relevant green industry initiatives. The aluminium industry, reliant on natural gas for the generation of electricity for manufacturing needs, has set emissions intensity targets that cover the complete range of industrial processes: power production, smelting and casting. The use of state-of-art gas turbine technology, better maintenance of plants and equipment, and operational efficiency, are yielding emission savings for the sector. A key player in the UAE's aluminium industry is Emirates Global Aluminium (EGA), one of UAE's largest companies and amongst the world's largest aluminium 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 home-grown technology in smelter expansion and retrofitting of older production lines, enabling minimization of energy consumption and GHG emissions per tonne of aluminium produced.

The cement sector, where the largest emissions come from clinker production, is shifting to alternative fuels, including refuse derived fuel, 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. Further, Emirates Steel is engaged in capture and utilization of CO₂ generated during the iron reduction process, as part of the Al Reyadah project with ADNOC.

2.5. Transport

Aimed at supporting the economy and encouraging smart mobility choices, in 2015, the UAE introduced far-reaching fuel pricing reform, linking gasoline and diesel prices to international market prices. Since then, the UAE has made further advances in supporting sustainable transport, and providing clean transport infrastructure and services. During the next decade, the UAE looks to capitalize on the opportunities being opened up by advances in electrification and automation of mobility.

According to fuel quality standards being currently implemented in the UAE, diesel consumed in the country must comply with 10 ppm sulphur 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.

As part of its shift to cleaner vehicle technologies, the UAE has taken up wide-scale conversion of conventional gasoline and diesel vehicles to Compressed Natural Gas, 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 targets a 2% share of electric and hybrid cars in Dubai's road fleet by 2030, and a 30% share in Dubai's government-procured vehicles by the same year. The country has seen a rapid expansion of charging infrastructure, and plans are afoot to further increase the number of vehicle charging stations across Emirates.

While making road transport smarter, the UAE is steadfast in its commitment to build a railway network in the country to provide faster and cleaner mobility options. The 1,200 km-long Etihad Rail network is being built in stages, with the 264 km Stage One route operational for freight movement since January 2016. A single train journey on this line removes approximately 300 trucks from the road, reducing CO₂ emissions by 70-80%. 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 UAE industrial ports and trading centers.

Further, in the Dubai Metro network, the UAE has a world-class rapid transit rail system. The Dubai Metro is now 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 increase the share of public transport in passenger journeys.

2.6. Waste Management

The UAE has been taking proactive steps for increased waste management and treatment through regulation, technology and consumer awareness. Circular economy initiatives are being implemented to transform waste from an environmental burden to an asset with economic value. A federal public-private partnership, the Circle Coalition, 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 'Scale 360' initiative of the World Economic Forum, a partnership that is focused on fast-tracking the circular economy through nationally-led innovation challenges.

Regulations and incentive programs have been put in place across Emirates for minimization of waste, and increased reuse and recycling; waste segregation, transfer and tracking; and recovery, treatment and disposal. The Emirate of Abu Dhabi has adopted the Single Use Plastic Policy 2020 that aims to make Abu Dhabi free of single-use plastic bags by end of 2021. Diversion of waste away from landfills is a key waste management objective and related federal and Emirate-level targets have been put in place. For instance, the Emirate of Sharjah has set an ambitious target to reduce waste to landfill to zero by 2021, and processing and recycling is being prioritized to enable the achievement of the target. In keeping with the approach of reducing waste diverted to landfills and deriving value from municipal solid waste, waste-to-energy projects are being developed across the UAE. The under-development Dubai Center for Waste Processing, with the capacity to process 1.9 million tonnes of municipal solid waste and an installed power capacity of 200 MW, is expected to be operational by 2024.

2.7. Water Resources Management

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 country's first NDC referenced UAE's efforts towards developing a federal framework for sustainable management of water and the country has now successfully adopted the UAE Water Security Strategy 2036. The Strategy aims to ensure continued and sustainable access to water, and addresses 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 UAE has traditionally relied on power and water co-generation plants for the production of desalinated water. 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 making efforts to expand the share of renewable energy in desalination. The country targets to increase the share of RO-based desalinated water to over 50% of the potable water supply mix by 2036. The 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, targets 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 model is a notable addition, with a planned capacity of over 1 million cubic meters of water per day by 2030.

Initiatives are also being implemented 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 water tariff reform, government authorities have been implementing awareness campaigns to push for behavioral change amongst both residential and commercial consumers.

Further, the wastewater treatment and sanitation sector in UAE has witnessed significant advances over the last few years with the expansion of wastewater treatment capacity. The use of treated water, for purposes such as irrigation and district cooling, is also steadily increasing.

2.8. Tourism & 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 in the UAE.

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 Tourism and Commerce Marketing has laid down a set of sustainability guidelines that hotels are required to comply with, along with monthly reporting of their carbon emissions; these requirements will be mandated starting July 2021.

In addition, the UAE government is working with relevant stakeholders to design eco-tourism opportunities that are centered on both conservation of nature as well as deriving value from it. A multi-phase national eco-tourism 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 a range of international events, the UAE has built world-class exhibition centers and arenas with due consideration to sustainable design and operation. In 2019, the UAE hosted the Special Olympics World Games in Abu Dhabi. In addition to offsetting the event's emissions, there were efforts made to power the Games with clean energy sources and to provide sustainable transport options.

With the UAE set to host the next World Expo in 2021, the Expo 2020 Dubai is slated to be a sustainable mega-event. Particular attention is being 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 the Expo's theme, 'Connecting Minds, Creating the Future', the Sustainability Pavilion of the Expo will showcase innovative environmental solutions. It is notable that the Expo site is being built as a smart development that will translate into sustainable legacy infrastructure for residential and commercial purposes.

3. ADAPTATION TO CLIMATE RISKS

The UAE is taking decisive action to enhance resilience given the Arabian Gulf region's vulnerability to climate change impacts. In keeping with the ambition articulated in the first NDC and the goals set by the National Climate Change Plan, the UAE has developed a Climate Adaptation Program which is geared towards increasing climate resilience by minimizing risks and improving adaptive capacity. The Program entails the following: risk and vulnerability assessment, and adoption of immediate, low-cost measures; mainstreaming of adaptation planning in development policy; 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 thus reducing disaster risk and associated loss of life, health, livelihoods and assets.

The UAE has conducted a systematic and participatory climate risk assessment as a basis for planning adaptation measures in four priority sectors: energy, infrastructure, health and 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 are being developed to respond to identified high-priority risks. Measures being implemented 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 including broader policies that may not directly target adaptation but provide enabling conditions for enhanced resilience. The UAE government is also enhancing national capacity on climate risk insurance, working closely with the private sector.

3.1. Energy

While UAE's energy sector is the single largest GHG emitter, the sector 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 with higher temperatures, there will be an increase in energy demand for cooling. The energy sector is also vulnerable to direct climate impacts such as damage to coastal power infrastructure due to sea level rise and extreme salinity episodes.

To build the energy sector's resilience in the face of climate impacts, UAE's energy regulators and utilities are factoring in climate-related impacts in their current operations and future strategies. The Dubai Electricity and Water Authority has developed a climate impact assessment model to assess 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 increase in power demand due to extreme temperatures, the UAE is expanding clean energy based installed capacity and implementing energy efficiency measures. Particular attention is being paid to increasing efficiency of cooling appliances and deploying district cooling where feasible. Green building standards, appliance labels and standards, and awareness programs, are enabling energy conservation in the residential and commercial sectors.

Modernization of existing plants and sub-stations is being undertaken. The country is focusing on the development of smart infrastructure — power plants, grids and meters; and the upgrade and modernization of existing infrastructure assets, to enhance speed of response in the face of uncertainty. Power system integration and automation is being pursued to both increase efficiency and institute smart controls. Utilities are working to utilize artificial intelligence and data analytics to enhance power system performance.

3.2. Infrastructure

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

About 85% of the country's population and more than 90% of its infrastructure is 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 UAE. 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 operation and maintenance of existing infrastructure, and design and construction of planned infrastructure, are serving as a foundation for effective adaptation plans for the UAE infrastructure sector. Across the UAE, green building design and

construction is being promoted, minimum requirements for protection of new coastal developments from sea level rise are being set, existing buildings and facilities are being refurbished, and flood monitoring and management systems are being enhanced. Public infrastructure is being continuously upgraded and enhanced to harness 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.

3.3. Public Health

The effects of climate change on human health occur in varying degrees of scale and complexity – either with direct exposure to extreme weather events or indirectly through climate change’s impact 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 UAE will face, with morbidity and/or mortality from heat stroke following close behind. Given the temperatures and humidity levels that characterize the desert climate of the country, heat stress is a concern that public health authorities are already grappling with.

The UAE is preparing to deal with climate-related health challenges, and making significant progress in taking preventive measures and providing high-quality healthcare. A mid-day 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 introduced a ‘Safety in Heat’ program that is aimed at reducing heat exposure at the workplace; concomitantly, a Thermal Work Limit heat stress index is being used to gauge suitability of working conditions.

In July 2019, the UAE National Framework for Action on Climate Change and Health 2019-2021 was launched by the UAE Ministry of Health and Prevention in partnership with the World Health Organization. The Framework sets out UAE’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 Adaptation Program while laying the ground for continued assessments and capacity building amongst relevant stakeholders. Under the Framework, a National Committee on Climate Change and Health has been established to coordinate the development of a UAE 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.

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

3.4. Environment

The UAE has been working to conserve and 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 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, and the UAE Hydrological Map Initiative is an enabler for this objective. The Initiative assesses available 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 enhance 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 UAE has taken significant steps to protect and rehabilitate reefs. Monitoring of coral reefs, deployment of artificial reefs, and rehabilitation and cultivation of reefs is being undertaken at various locations. Over 3000 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 4500 artificial reefs across 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 UAE in order to recreate natural habitats and breeding grounds for marine creatures.

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 UAE's initiatives on environment conservation and nature-based climate solutions. The National Biodiversity Strategy lays down the framework for the development of 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 legislations and guidelines; programs to plant and protect native trees; initiatives to protect terrestrial, marine and freshwater fauna; and designation of new protected areas. Currently, UAE's 49 protected areas occupy 15.5% of its total territory. The country is currently developing a smart map of UAE's natural capital and identifying biologically rich ecosystems as well as the services they provide.

4. ADAPTATION ACTIONS WITH MITIGATION CO-BENEFITS

While mitigation of emissions and adaptation to risks both remain an integral part of climate action, interventions in some sectors are yielding results for both objectives. The UAE's efforts to enhance 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.

4.1. Conservation of Blue Carbon Ecosystems

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. The UAE is recognized amongst the few countries that have, through a range of restoration and conservation efforts implemented since the 1970s, proactively expanded its mangrove forest cover. Following the success of the Abu Dhabi Blue Carbon Demonstration Project that made significant contribution 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 development of emission inventories and inform coastal management.

Annually, mangroves sequester 1,073,696 tonnes of CO₂ in the UAE. To enhance natural carbon sinks, the UAE intends to plant 30 million mangrove seedlings by 2030. Further, as part of its efforts to improve implementation of 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% of marine Blue Carbon habitats within Protected Areas.

4.2. Agriculture & Food Security

In order to address the challenges climate change poses for food production, the UAE is adopting sustainable and climate-smart agriculture methods, reducing food waste and diversifying sources of food imports. UAE's National Food Security Strategy 2051, adopted in 2018, 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.

Responding to 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 promote adoption of modern farming solutions and technologies, such as optimized greenhouse design, hydroponics and vertical agriculture. The Agriculture 4.0 initiative, set for implementation from 2020 to 2022, for example, aims 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 square meters and produce output equivalent to 3.6 million square meters of farmland, using 99% less water than regular outdoor fields.

In conjunction with technology-based enhancement in domestic agriculture, the UAE has taken a comprehensive approach to reducing 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 production practices. The UAE aims to cut food waste by half by 2030.

5. DOMESTIC ENABLERS

The UAE's climate engagements are guided and supported by cross-cutting enablers including finance, markets, technology innovation as well as public awareness and youth engagement. The UAE Green Agenda 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 entities is a key component of climate and green development initiatives in the country.

5.1. Sustainable Finance

The UAE's efforts to build a competitive, green economy have placed sustainable finance at the forefront, with the aim to effectively channel investment. At the federal level, a Sustainable Finance Framework is being developed to guide stakeholders towards mobilizing and scaling up private capital for sustainable investments. The Abu Dhabi Global Market Sustainable Finance Agenda was published in January 2019, setting a roadmap to develop a sustainable finance hub in the UAE. This was followed by the adoption of United Arab Emirates' Guiding Principles in Sustainable Finance, a voluntary framework to encourage UAE's financial firms to incorporate environmental, social and governance (ESG) considerations in their business. With the objective of instituting a dynamic sustainable finance sector in the UAE and supporting UAE's transition towards a green economy, more than 70 government and private entities have adopted the Abu Dhabi and Dubai Finance Declarations.

The country is seeing a range of green finance instruments and initiatives being developed and adopted. For example, the Dubai Green Fund established in 2016 provides loans to companies in the clean energy sector at reduced rates. Green bonds have emerged as an instrument to power sustainability projects with leading UAE corporations issuing green bonds/*sukuks*. In 2020, the Emirate of Abu Dhabi launched a Green Bond Program – a joint initiative by the Department of Energy – Abu Dhabi, Abu Dhabi Global Market and Abu Dhabi Securities Exchange, that aims to develop a transparent framework for green bonds to ensure impact and promote investor confidence.

5.2. Technology Development & Innovation

The UAE has established scientific research centers and programs focused on climate and energy innovations, and continues to test and adopt new sustainable technologies and practices.

The country has pioneered low-cost solar power in the region, and has developed knowledge and solutions which can be deployed in other countries. The Dubai Electricity and Water Authority has developed a world-class research and development center that focuses on solar testing and certification, energy efficiency and smart grids. With heightened interest in hydrogen as a fuel of the future, a public-private solar-powered electrolysis facility is being built in Dubai to test and demonstrate an integrated plant that will produce and store green hydrogen, and then deploy it for re-electrification, mobility or other industrial uses. In line with its commitment to international cooperation, the UAE is a member of Mission Innovation, an inter-governmental initiative announced at the Paris COP in 2015, wherein participating countries committed to doubling clean energy research and development by 2021.

The UAE is also leveraging artificial intelligence across vital industries to spur innovation. The National Artificial Intelligence Strategy 2031, adopted in 2017, aims to enhance productivity and performance in key economic sectors, including clean energy, water resource management and environment. In 2018, the UAE government launched the Artificial Intelligence Laboratory in collaboration with Khalifa University of Science and Technology and the International Renewable Energy Agency (IRENA). The laboratory uses artificial intelligence to optimize the use of renewables in the UAE by mapping optimal 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 advance sustainable technologies and practices, the Sustainable Bioenergy Research Consortium was established in 2011. The flagship project of the Consortium, the Seawater Energy and Agriculture System, is a first-of-its-kind research facility to grow both food (fish and shrimp) and fuel (salt-tolerant halophyte plants) using desert land irrigated by sea water. In 2019, biofuel from this facility was combined with traditional jet fuel to power the first commercial flight using locally produced halophyte-based fuel.

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

5.3. Youth & Women in Climate Action

The UAE is continuing to invest heavily in youth development and their engagement on climate issues. The government launched the Emirates Youth Climate Strategy in 2018 to develop youth capacity to meet the challenges of climate change, and promote youth participation in climate action. Youth Circle events on climate and sustainability, and eco-tourism camps, are being organized periodically. The Masdar Youth for Sustainability Platform, launched in 2020, supports the UAE's knowledge-economy transformation by enabling young people to become active environmental leaders through mentorship and engagement opportunities. Additionally, more than 180 young citizens have graduated from Dubai Electricity and Water Authority's ongoing Carbon Ambassadors Program since its inception in 2014. The Program focuses on building youth capacity on climate, sustainable energy and natural resource management.

Similarly, efforts have been made to engage women in climate decision-making and governance, and women now find high representation in the UAE climate and energy community. Amongst initiatives targeted at promoting women's participation in climate action, Mubadala's Women in Sustainability, Environment and Renewable Energy (WiSER) is building on its success in bringing together women professionals in climate, energy and sustainability, by facilitating growth for women professionals through training and networking opportunities.

6. 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 international levels. The UAE acknowledges the challenges of climate change within its own boundaries as well as the challenges being faced by fellow developing countries, some of whom are already experiencing extreme climatic conditions and events. The country, therefore, welcomes technical assistance made available to developing country parties under the Convention. The UAE supports the international community's endeavor 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 currently host to 15 CDM projects.

The UAE welcomes international cooperation in renewable energy advancement, cleaner hydrocarbons, hydrogen fuel, industrial energy efficiency, green mobility, waste management and sustainable agriculture. In furthering bilateral and multilateral collaboration on technology development and deployment, the UAE has championed infrastructure and energy projects. These efforts have been pursued through formal channels including, but not limited to, the UAE-Pacific Partnership Facility for Pacific island countries, the UAE-Caribbean Renewable Energy Fund, and the joint project facility by IRENA and Abu Dhabi Fund for Development that supports renewable energy projects in developing countries. Alongside, the UAE private sector has been investing in international renewable energy ventures. The UAE has invested in renewable energy projects with a total value of over US\$16.8 billion across 70 countries.

7. CONSIDERATION OF AMBITION & FAIRNESS

The UAE is determined to both contribute to reducing global emissions and building climate resilience. The UAE'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.

The UAE's Second NDC includes an absolute, economy-wide emissions reduction target, building upon the clean energy target included in the earlier submission. It highlights the country's plans up to 2030, with the year 2016 designated the base year given the completeness of source and sink datasets available for the year. To further clarity and transparency, the NDC includes the total BAU scenario emissions expected in the year 2030.

The country's ambition is evidenced in its commitment to an emissions pathway that aims to deliver significant emission reductions vis-à-vis BAU, over the next decade. Consideration of fairness and ambition of UAE's NDC must be informed by the definition of UAE's BAU emissions scenario which includes measures implemented up to the year

2016 thus setting a high benchmark for future action. The country's 2030 target is based on a progressive, cross-sectoral clean development effort.

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 aim to harness a wide range of technologies to support the achievement of 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. The pace of economic recovery will inform UAE's ongoing review of its climate and energy goals.

Moreover, 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 these challenges, the country is resolutely implementing measures for climate mitigation and adaptation.

The UAE's commitments are in line with the requirements set forth 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 United Nations Framework Convention on Climate Change and Article 4.1 of the Paris Agreement, the UAE will continue to explore pathways to further enhance its emission reduction objectives in line with climate science and global ambition.

8. MEASUREMENT & REPORTING OF PROGRESS ON NDC IMPLEMENTATION

The UAE maintains and periodically updates its GHG Emissions Inventory, accounting for emission sources and sinks. It domestically tracks sectoral mitigation efforts and their impacts in accordance with defined monitoring and evaluation requirements.

The UAE acknowledges the significance of developing a framework for Monitoring, Reporting and Verification that tracks the mitigation outcomes of policies and initiatives reflected in this NDC. Periodic reviews will be undertaken to ensure initiatives' alignment with national development priorities and global climate goals.