



UNITED ARAB EMIRATES  
MINISTRY OF CLIMATE CHANGE  
& ENVIRONMENT

# UAE State of Green Economy Report 4<sup>th</sup> Edition

2021

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## Foreword

The year 2020 ushered us in unprecedented times as we simultaneously confront the problems brought by the COVID-19 pandemic, global recession, and climate change. These triple challenges threaten the economic, social, and environmental pillars of sustainable development, and may reverse our hard-won development gains. As the Minister of Climate Change and Environment, I believe, with utmost optimism, that transforming this crisis into opportunity makes greening the economy even more necessary; integrating post-pandemic green growth efforts into our national development strategy can enable us to achieve a sustainable, just, and resilient recovery.

While the UAE is already setting the bar high through its excellent response to the pandemic, the long road ahead offers even bigger opportunities to come out stronger from the crisis. In this regard, the UAE government announced a long-term recovery package to accelerate the convergence of green economy and digital economy. With this direction, I am confident that the UAE is on the right track towards building back better.

Supporting the momentum for a green recovery, the fourth edition of the UAE State of Green Economy Report – developed in collaboration with the Global Green Growth Institute (GGGI) – is released at an opportune time when greening the economy becomes more urgent and expedient from a post-pandemic development standpoint. Building on the publications of the previous years, the report documents some of the recent milestones in the UAE's green growth initiatives involving the federal government, the seven emirates, private sector, and civil society. One unique feature of this edition is a comprehensive chapter on climate change adaptation, which represents the UAE's fervent commitment to achieve climate resilience and honor the Paris Agreement. Furthermore, to continue the tradition of the past editions, this report contains a chapter focused on reporting the progress of implementing the UAE Green Agenda, several years after its launch in 2015. The report also reveals the UAE's increasing role in the international stage by helping foster global cooperation for the green economy transition. Lastly, the final chapter presents how the UAE is keeping track of its green key performance indicators in line with the UAE Vision 2021 and the Sustainable Development Goals (SDGs). Overall, I hope that this output will further strengthen the solid case for the UAE's green economy transformation in the post-pandemic era.

Despite the challenging times, the UAE never runs out of remarkable achievements to celebrate. On top of the UAE's outstanding response to the public health crisis, we have successfully sent our first astronaut to space, launched our historic mission to Mars, started operating the first nuclear power plant in the Arab world, and restructured our Cabinet to streamline governance and decision making. Even the pandemic itself has taught us valuable lessons that may reshape how we live our lives and how we interact with the environment. It can help improve air quality, reduce carbon footprint, and generate new business opportunities. I hope that the success stories showcased in this report will also add to the dose of "good news" as we need more beacons of hope in these troubled times.

**H.E. Dr. Abdullah Belhaif Al Nuaimi**  
Minister of Climate Change and Environment  
United Arab Emirates



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## Chapter 1. Climate Adaptation for a Resilient Economy

In the past decades, the UAE has been making strides in achieving its development goals. To sustain progress, the UAE Vision 2021 elaborates more comprehensive development targets. Climate change and its impacts, however, represent a new, yet significant challenge to economic development in the UAE and all over the world. The country's desert environment is projected to experience even higher temperature and humidity, uneven rainfall, higher sea levels, and more frequent extreme events. Considering the effects of climate change on the nation's public health, infrastructure, and natural resources, it is imperative to minimize the risks and losses and unlock the potential opportunities.

Against this backdrop, the Ministry of Climate Change and Environment (MOCCA) launched the National Climate Change Adaptation Program to improve the country's resilience to the impacts of climate change. Through this pioneer initiative at the national scale, MOCCA mobilized different stakeholders from federal and emirate-level agencies, private sector, and civil society to work together in identifying, assessing, and prioritizing the most urgent risks to four key sectors that are deemed most vulnerable to climate impacts: public health, energy, infrastructure, and the environment. Drawing from the outcomes and lessons of this experience, more sectors will be covered in the long term.

This chapter outlines the progress achieved thus far in implementing the UAE's adaptation program, focusing on the results of the sectoral risk assessments. The findings will provide the empirical basis for adaptation actions based on evidence-based, participatory, and expert-guided approach to resilience planning.

### 1.1. Climate Trends in the UAE

The UAE lies in a hyper-arid region characterized by hot temperature and low rainfall. The country has two distinct seasons: hot summer and warm winter, separated by two transitional periods. According to the UAE Fourth National Communication Report, the average temperatures are: 23 - 30°C during winter (December to March); 27 - 32°C in the first transitional period (April to May); 33 - 36°C during summer (June to September); and 25 - 29°C in the second transitional period (October to November).

In more extreme cases, summers are very hot with temperatures rising to about 48°C in coastal cities and humidity levels reaching as high as 90%. Projections by the Abu Dhabi Global Environmental Data Initiative (AGEDI) show that temperature will increase by an average of 2 - 3°C in summer by 2060-2079. Moreover, humidity changes will be greater in summer than in winter, and are about 10% greater over the Arabian Gulf, and higher across most of the UAE.

As a desert country, the UAE experiences erratic and irregular rainfall pattern. AGEDI's projections show that rainfall is expected to increase in most areas of the UAE and the Hajar Mountain. The increase will be mostly in summer, with 50 - 100% in some areas in Dubai, Sharjah, and the Northern Emirates; and 25% in surrounding region. Studies have also predicted an increasing risk for "grey swan" (high impact) cyclones in the UAE, with low likelihood but potentially high impact. The UAE also experiences frequent dust and sandstorms, particularly during the dry summer months.

In 2019, MOCCA collaborated with the UAE University to carry out a comprehensive review of the current status of climate change modelling in the country and the region. The review highlighted the relative scarcity of climate modelling research for the Gulf region and stressed the need for well-coordinated efforts on climate modelling to reduce uncertainties and enhance the accuracy of future projections. New research areas are also worth exploring such as incorporating the impacts of dust storms and air pollutants into the climate models.

## 1.2. Addressing Climate Change Impacts & Opportunities for a Resilient Economy

The Paris Agreement highlights the importance of “enhancing adaptive capacity, strengthening resilience, and reducing vulnerability to climate change” to help achieve sustainable development. It echoes the need for adaptation actions that are country-driven, participatory, and based on best available science. Furthermore, responding to climate change has become a key component of the Sustainable Development Goals (SDG) through SDG 13 (climate action). The United Nations also noted that addressing climate change can help meet multiple SDG targets on poverty, food security, women empowerment, access to clean water, inequality, land and ecosystems, and peace and security, among others.

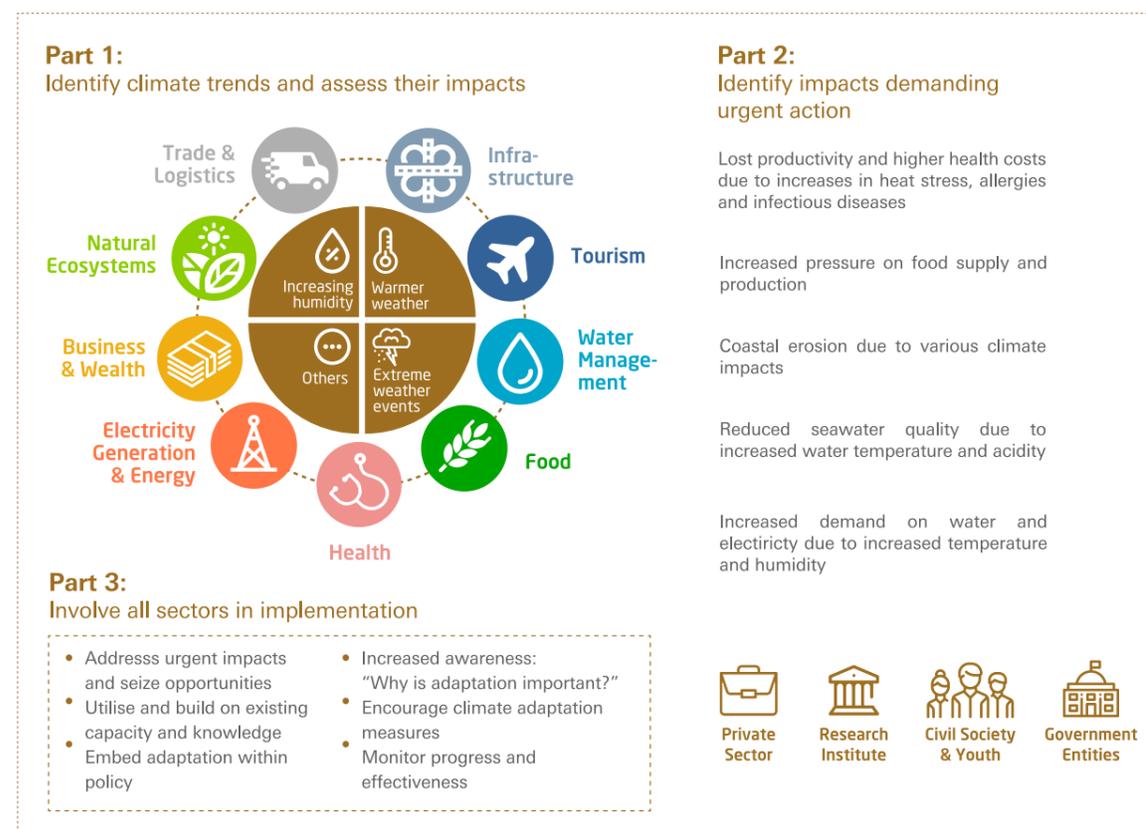
The UAE’s National Climate Change Plan 2017 - 2050 highlights the importance of transforming climate risks into opportunities for a more sustainable and climate-resilient development. Increasing climate resilience is fundamental to achieving the UAE Vision 2021 by ensuring that the harmful effects of climate change and natural disasters will not undermine the delivery of fundamental public services and disrupt business operations. Furthermore, investments on clean technology, renewable energy, and green jobs can serve as new engines of growth, thus contributing to the UAE’s economic diversification efforts. Adaptation measures can also enhance overall quality of life and well-being by protecting public health from climate-related threats and enhancing the coping capacity of natural ecosystems from both natural and anthropogenic stressors.



## 1.3. The National Climate Change Adaptation Program

Recognizing the necessity and urgency of addressing the climate challenge and seizing the potential opportunities, the UAE adopts a proactive approach toward climate

resilience through the National Climate Change Adaptation Program. Launched in 2017, this program aims to identify climate trends, assess climate risks that demand urgent action, and involve all stakeholder groups in the risk assessment process and implementation of adaptation measures.



Components of the UAE’s Adaptation Program  
Source: MOCCA

The Adaptation Program supports the achievement of the following short-term and long-term adaptation targets of the Climate Plan: (1) by 2020, climate change risk assessments are performed and immediate measures are put in place; (2) by 2025, adaptation planning is mainstreamed in development policy; and (3) by 2030 - 2050, continuous monitoring and evaluation is conducted to ensure evidence-based adaptation measures. While the Climate Plan provides a solid legal framework to

institutionalize climate resilience, the Adaptation Program will outline the priorities for climate change adaptation based on objective understanding of risks in the UAE. The program takes stock of the existing adaptation actions in various sectors, and identifies gaps on policy, governance, and local capacity. By addressing these gaps, the UAE can exploit the opportunities and potential benefits from climate change.

*“The UAE has made significant progress in combating climate change impacts through our revolutionary national programs, such as the launch of the National Climate Change Plan 2050 and the National Climate Adaptation Program, which aim to strengthen our national capacities to withstand the climate challenges and transform them into opportunities that ensure long-term economic growth.”*

**H.E. Dr. Abdullah Belhaif Al Nuaimi**  
Minister of Climate Change and Environment



### Flashback: Survival strategies in the desert from the UAE's early settlers

The Bedouins' resourcefulness enabled them to not just survive but even thrive in a harsh climate. They have overcome the challenges brought by the hyper arid landscape of the desert through simple yet effective adaptation measures.

As nomads, Bedouins built large tents that they can easily erect and dismantle; this also protected them from abrupt weather changes. They also designed their clothes in a way that suited the harsh natural conditions. Wearing white robes, or kandoras, provided cooling through convection. The head cover was also a good shield from sunburn and sandstorms.

Adaptation strategies in the dunes include the role of one of the most iconic figures in the Arab world: the camel. Bedouins used the camel's physiological endurance from the unforgiving heat. As part of the Arab's cultural heritage, camels are the Bedouins' "best friend" for thousands of years; camels made the nomadic lifestyle possible as they can carry heavy loads for prolonged period without food and water.

As Bedouins moved from one place to another, they travelled at night with the camels using the stars as compass. They sought shade on top of dunes to catch passing winds. They persistently looked for oasis to get water through their ability to read subtle signs about where water can be found. History is thus rife with the Bedouins' fight for survival in the desert, leaving a legacy of innovation and creativity in the traditional knowledge on adaptation.



### 1.4 Climate Risk Assessment: The First Step to Adaptation

To carry out climate risk assessment for the UAE, MOCCA developed a framework for undertaking risk assessment on a national scale. The framework incorporates features from global practices as well as the national standard for risk assessment of occupational health and safety of the National Crisis Emergency and Disasters Management Authority (NCEMA). The rapid assessments covering four sectors were completed in early 2019 in collaboration with the Global Green Growth Institute (GGGI). This schedule adhered to the timeline of the Climate Plan, which requires the completion of climate risk assessment by 2020.

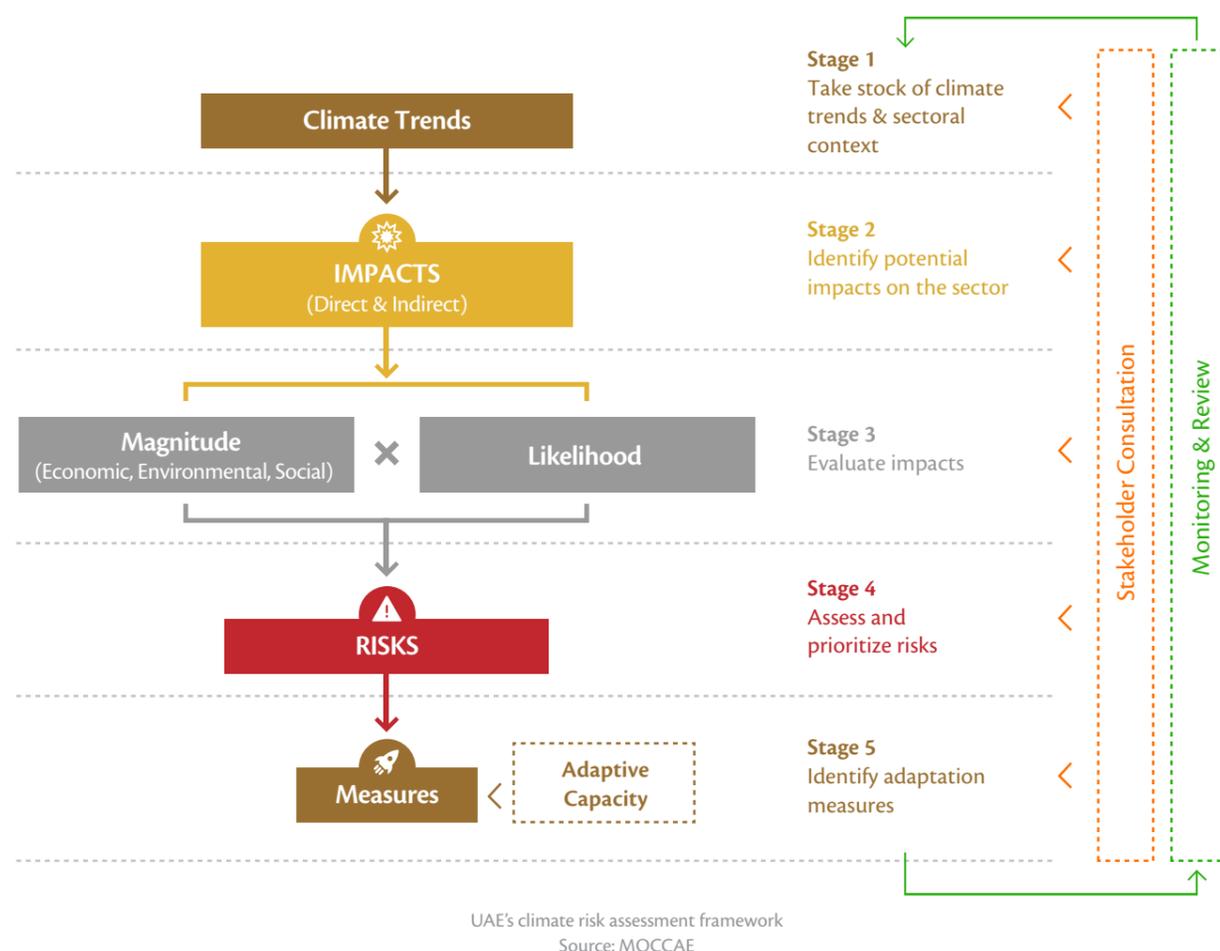
**The risk assessment process is composed of five stages:**

1. Take stock of climate trends and sectoral context: This stage involved an examination of historical patterns and latest projections on key climate variables such as temperature, humidity, precipitation, sea level rise, drought, and extreme events; and how such trends are affecting and will affect the UAE's development sectors.
2. Identify potential impacts on the sector: Based on available evidence, the scale and complexity of

impacts were examined, including the direct and indirect impacts to the sector. An initial list of potential global impacts relevant to the sector was developed, which was then tailored to the UAE by selecting only the most relevant impacts using available data at the national and local level.

3. Evaluate impacts: The assessment characterized the magnitude of impacts in three dimensions – economic, social, and environmental – using a five-point scale. The likelihood was also assessed in line with global practices.
4. Assess and prioritize risks: The scores of magnitude and likelihood were combined based on equal weights to compare and rank the risks using a "risk matrix." The final risk classification – also classified using five-point scale – determined the scale of responses needed to address the priority risks.
5. Identify adaptation measures: Before identifying measures to address the priority risks, a stocktaking of existing efforts related to adaptation was conducted to build on the current institutional capacity of the UAE. Based on the identified gaps, the analysis elaborated a set of additional measures required to address and manage the risks.





The national climate change risk assessment was completed in 2019 covering four key sectors: health, energy, infrastructure, and the environment. These components are examined through the lens of climate change, specifically the impacts of different climate variables on the sector and the potential measures to

address them. It should be noted that adaptation cuts across multiple sectors and that an adaptation measure implemented in one sector may have far-reaching effects in another sector. Thus, a holistic approach to risk analysis is critical for a robust assessment.

Scope of the UAE's 4 key sectors covered in climate risk assessment	
Sector	Coverage
Health	Medical symptoms, diseases, injuries, and human deaths
Energy	Generation, transmission, distribution, and end use of electricity and heat
Infrastructure	Structural elements of transportation, buildings, water supply, sanitation and waste management, and coastal and offshore infrastructure
Environment	Terrestrial, coastal, ocean, and freshwater ecosystems, with associated ecosystem services and local food production.

Source: MOCCA

### 1.4.1. Climate Risks to Public Health

The World Health Organization (WHO) considers climate change as the greatest threat to global health in the 21st century due to its significant effects on air quality, water supply, food security, and other key determinants of health. Scientific evidences show the strong link between climate change and several illnesses such as heat stroke and heat stress, cardiovascular and respiratory diseases, and vector-borne diseases. Climate-related factors can also affect labor productivity; according to a 2019 report by the International Labor Organization (ILO), heat stress may reduce total working hours by 2.2% and global GDP by USD 2,400 billion in 2030.

The UAE has been providing high-quality health care service, where the UAE Vision 2021 highlights world-class health care as a national agenda and includes key performance indicators on health priorities such as cardiovascular diseases, diabetes, obesity, and cancer, among others. There is great emphasis on improving the health care system's capacity to cope with epidemics and other risks, which include climate-related threats. Thus,

the UAE recognizes the paramount value of preventing climate change from affecting people's health and undermining the achievement of the UAE's health objectives.

MOCCA mobilized health authorities at the federal and emirate level, relevant government agencies, private health care providers, academia, and civil society for a stakeholder consultation workshop on climate risk assessment for the public health sector. The workshop provided an interactive platform for the participants to exchange ideas and views on the most urgent risks posed by climate change to the UAE's public health. MOCCA also invited guest experts to share international best practices and expert perspective.

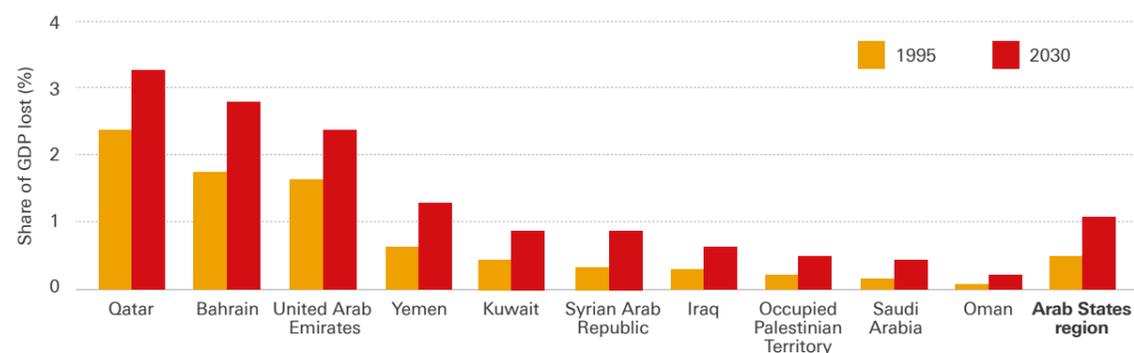
Among the risks identified, the risk related to reduced labor productivity due to heat stress presents the highest threat. Its socioeconomic impacts are deemed significant due to a large number of laborers, specifically construction workers affected by extreme heat. The most vulnerable groups include millions of outdoor workers from the construction and building sector.

Climate risks to the UAE's public health sector	
Risk Level	Impact
High	Reduced labor productivity due to heat stress
Medium	Mortality or morbidity due to heat stroke
Low	Morbidity due to undernutrition
	Damage to health infrastructure due to extreme events
	Disruption in providing access to health care services due to natural disasters
Very low	Mortality or morbidity from the aggravation of cardiovascular diseases
	Mortality or morbidity from the aggravation of respiratory diseases
	Mortality or morbidity due to a rise in vector-borne diseases
	Mortality or morbidity due to diseases from food and/or water contamination

Source: MOCCA

Another pressing health risk – mortality or morbidity due to heat stroke – is also related to heat. Heat-related health hazards hence require more in-depth assessment to implement the proper and well-targeted control measures to minimize the risk. Furthermore, heat-related illnesses in the UAE are more commonly understood within the umbrella of environmental health and

occupational safety; hence, incorporating climate change dimensions will help develop more holistic solutions to the problem. While the rest of the health risks identified are considered “low,” regular monitoring is still highly recommended to determine changes in the situation that may affect the risk level, thus preventing any potential escalation of risks.



Percentage of GDP lost to heat stress under a 1.5°C global warming scenario in 10 Arab countries  
Source: ILO

### Relevant adaptation initiatives on heat-related health hazards

The UAE’s hyper-arid environment brings health challenges associated with extreme heat. While its residents consider hot weather as normal, more extreme temperatures are expected in the future. In response, the following initiatives present concrete steps from the public and private sector to cope with the heat.

**Mid-day Break Policy:** As per the Ministerial Order No. 401 of 2015, this policy requires that no laborer shall be present at the working site between 12:30-15:00. This program supports the UAE Labor Law (Federal Law No. 8 of 1980), which states that employers have a legal responsibility to protect the health of their workers. The law imposes fines and penalties for excessive working hours, and lack of humane environment for working under harsh weather.

**Cooling vest for outdoor workers:** This technology called Core Body Cooling Vest (CAERvest) can reduce body temperature from 42°C to 37°C in just half an hour during extreme heat. It has saved the lives of laborers in Dubai when it was used for workers suffering from heat stroke at construction sites during the peak of summer. There are plans to equip ambulances with this innovative vest.



The impacts of climate change on public health in the UAE cannot be overlooked as it will continue to affect people’s health, productivity, and well-being. Proactive interventions are thus necessary, which include tapping advanced technologies to protect workers from heat-related hazards, enhancing surveillance of heat-related illnesses, and building capacity on heat stress management. Better understanding of the linkage between climate change and public health by exploring public health adaptation research alongside improved knowledge sharing and training will help facilitate the mainstreaming of health adaptation in development policies in the long term.

*“The right to health is a key human right, as outlined in the preamble to the Paris Agreement. Climate change impacts all aspects of human health and well-being, including air quality, food security, access to clean water, and healthcare infrastructure. This is why in the UAE, we undertook an assessment of the climate risks to human health as part of the National Adaptation Program. [...] We are also continuing to systematically assess risks and identify mitigation and adaptation measures.”*

**H.E. Dr. Abdullah Belhaif Al Nuaimi**  
Minister of Climate Change and Environment

### 1.4.2. Climate Risks to Energy

In the context of climate change, energy is often viewed from a mitigation perspective since the sector is a major source of greenhouse gases. However, the energy system itself – from power generation, transmission, distribution, and end use – also faces high vulnerability to climate risks. For example, the United States government estimated that 2012 Hurricane Sandy caused USD 30-50 billion in damage and losses in large part due to power outages. Considering the immense impact of extreme events on the energy sector, the International Energy Agency (IEA) highlighted the importance of identifying and assessing how climate impacts can disrupt supply, alter demand, and damage energy infrastructure.

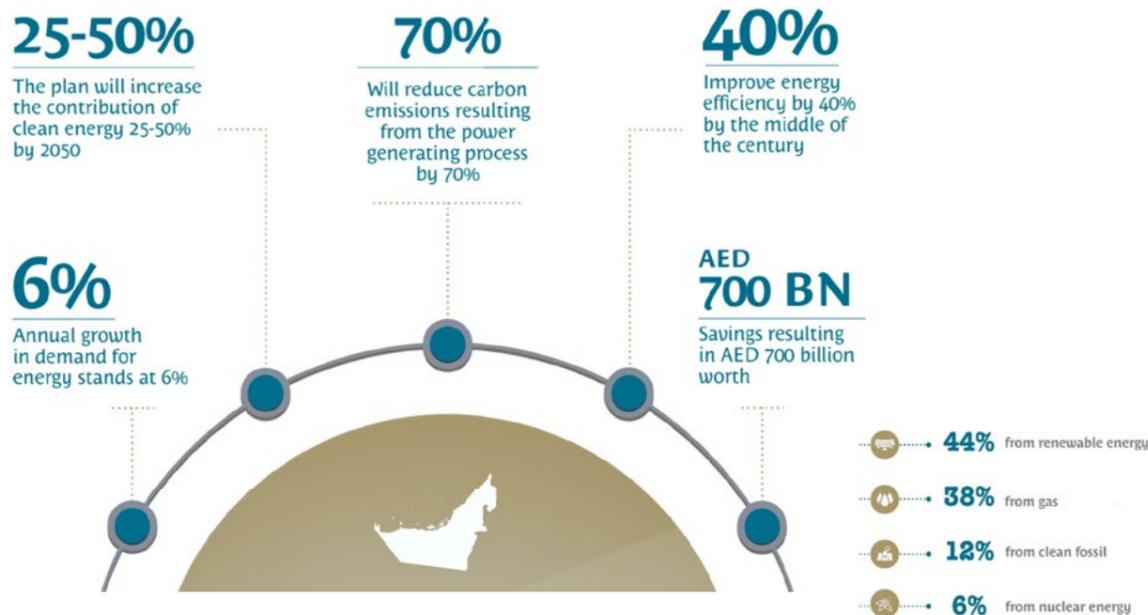
The UAE plays a key role in the global energy market as a major oil producer and at the same time, it is also investing heavily on clean and renewable energy as part of its energy diversification efforts and in preparation for the post-oil era. As such, the UAE Energy Strategy 2050 aims to increase the contribution of clean energy (including nuclear) in the total energy capacity to 50% by 2050. One of the most recent achievements is the start of commercial operation of Noor Abu Dhabi, the world’s largest single solar project at 1.2 GW capacity. Furthermore, a tender has been issued for the fifth phase of the Mohammed bin Rashid Al Maktoum Solar Park in Dubai, which will involve the installation of photovoltaic solar panels with a capacity of 900MW. The UAE has also started the operation of its first nuclear power plant. As the UAE continues to invest on diversifying its energy sources, the country needs to ensure that climate change factors will not adversely affect the performance of energy assets and hamper the achievement of energy security goals.

To tackle the effects of climate change on the UAE’s energy sector, MOCCA completed a stakeholder engagement workshop, convening representatives from energy authorities, utility providers, oil companies, and consultancy firms, and among others. The workshop aimed to inform stakeholders of the initial risk assessment results and gain insights on their understanding and readiness on climate change adaptation. Guest experts were also invited to facilitate the discussion and share technical input. The workshop led to the validation of

assessment results and identification of priority risks in the energy sector.

Among the risks identified, the most urgent are: energy efficiency losses of power plants; reduced power output due to warmer cooling water; and deterioration of power facilities. The socioeconomic impacts of efficiency losses are significant due to the increasing energy demand in the UAE. Due to its hot climate, cooling remains the biggest driver of energy consumption in the UAE and the

projected increase in future temperature alongside population growth means even higher demand for cooling. The rise in temperature will also impact coastal and marine areas, which are the sources of water for cooling for many of the power plants. Likewise, the likelihood of deteriorating power facilities, especially the aging ones, is almost certain since climate-induced events have been observed to have affected the performance of power facilities, as confirmed by stakeholders.



UAE Federal Energy Strategy 2050  
Source: Ministry of Energy and Infrastructure

Climate risks to the UAE's energy sector	
Risk Level	Impact
High	Energy efficiency losses of power plants when the temperature exceeds standard design criteria
	Reduced power output due to warmer cooling water
	Deterioration of power facilities, leading to reduced reliability and increased maintenance cost
Medium	Damage to coastal power infrastructure caused by sea level rise
	Damage and destabilization of energy production infrastructure due to storms and flooding
	Increased energy demand for cooling purposes due to global warming
	Increased energy demand for agriculture due to energy-intensive methods
Low	Increased incidents of power outages due to damage caused by high-impact storms and flooding
	Reduced solar power output caused by increased cloudiness and humidity
	Potential dispersion of radioactive material during extreme events

Source: MOCCA

Most of the climate risks to the energy sector are rated as "medium." These include the increasing vulnerability of power infrastructure located in the coastal areas from sea level rise, increasing impacts of extreme events on energy production processes, rising energy demand due to a combination of climatic and human-induced factors, and increased incidents of power outages due to damage to power plants and infrastructure caused by extreme events, among others. Monitoring how these risks might change over time is critical to prevent potential exacerbation of impacts.

### Relevant resilience initiatives on energy efficiency

Energy efficiency efforts in the UAE are often seen as a mitigation effort alone. However, amid the increasing

vulnerability of the power system to the impacts of climate change, understanding how energy efficiency contributes to adaptation is also important. The examples below show the synergy between mitigation and adaptation efforts through energy efficiency initiatives.

**Energy conservation campaign:** In June 2019, the Emirates Central Cooling Systems Corporation (Empower) launched its summer campaign, "Switch to 24 C and save more," which encouraged customers to reduce their cooling consumption to reduce cost and save energy. A similar campaign was launched in 2018, which led to savings of 1,160 MW or AED 3 billion. This initiative can prevent the future occurrence of power disruptions and outages due to overconsumption.

**DEWA's substation expansion and modernization:** In May 2018, the Dubai Electricity and Water Authority



(DEWA) added 15 substations (132/11 kV) in several areas including the Expo 2020 sites in support of Dubai's efforts to meet increasing energy demand. Many of its substations have undergone massive automation to improve energy efficiency, reduce losses in power transmission and distribution networks, and increase resilience to climate change. It also adheres to international standards for smart electronic devices.

Addressing the risks of climate change to the energy system requires proactive interventions targeting the supply and demand side. The concept of stationarity – which implies that the statistics for past occurrences define the statistics for the future – is no longer a viable design and planning paradigm for energy resilience. It is imperative to integrate the latest and most reliable climate projections in the design standards of power facilities, which entail anticipating the changes in various climate parameters including extreme events. Strengthening smart energy systems will also help manage power load and demand. Tackling the demand side requires consistent efforts in influencing consumer behaviour and achieve energy savings. In the long term, mainstreaming both mitigation and adaptation in energy policy is critical to achieve climate resilience.

### 1.4.3. Climate Risks to Infrastructure

The World Bank considers infrastructure as the lifeline to health, education, and jobs, thus highlighting the

importance of resilient assets for a strong economy. The infrastructure system encompasses a complex network of structures and facilities that provide a wide range of services such as transportation, aviation, energy, housing, telecommunications, and others. Its components are becoming more interconnected such that the disruptions or failure in one network can affect the performance of others. One of the most visible impacts of climate change is on infrastructure – either through direct damage to assets or service disruptions – and these are likely to accelerate in the coming decades. Given the huge capital outlay and long service lifetime of infrastructure investments, the economic cost of climate change on these assets can be significant.

The UAE has invested heavily in building world-class infrastructure, which enabled the growth of other sectors and industries. As part of the UAE Vision 2021, the government emphasizes the importance of creating and maintaining a “sustainable environment & infrastructure.” To meet this goal, the UAE has set key performance indicators (KPIs) covering the quality of its port and air transport infrastructure, logistics performance, and telecommunication and information technology. Meeting these targets would require taking into account climate change factors in all stages of the infrastructure cycle – from planning and construction to operation, maintenance, and asset disposal.



Recognizing the potential risks of climate change on the UAE's infrastructure system, MOCCA engaged multiple stakeholders from federal and emirate entities on infrastructure, consultancy companies, universities, research think tanks, etc. on a two-day consultation workshop. The event aimed to share the preliminary risk assessment results to stakeholders and obtain their feedback accordingly. The workshop also invited external experts to learn about global practices on infrastructure resilience and the relevant lessons for the UAE.

The stakeholders identified a range of interrelated risks on infrastructure. Among such risks, four major risks are the most urgent priorities: damage to coastal and offshore infrastructure; increased infrastructure maintenance costs; loss of business opportunities due to transport

disruptions; and reduced reliability of transport infrastructure and buildings. The impacts of damage to coastal and offshore infrastructure are expected to be significant since most of the population and the infrastructure in the UAE are close to the sea. The high maintenance cost is particularly evident in old fragile infrastructure not built to withstand more extreme climate parameters. The impacts of transport disruptions on business operations can be immense given the UAE's status as a global aviation and trade hub. Extreme events have also affected the reliability of transport infrastructure and buildings, especially when extreme fog, dust, and sandstorms reduce road visibility leading to prolonged traffic and accidents, or when building materials are not resilient enough to tolerate extreme heat leading to fire hazards.

Climate risks to the UAE's infrastructure sector	
Risk Level	Impact
High	Damage to coastal and offshore infrastructure
	Increased infrastructure maintenance costs
	Loss of business opportunities due to transport disruptions
	Reduced reliability of transport infrastructure and buildings
Medium	Damage to and deterioration of transportation infrastructure
	Damage and/or disruptions in water, sanitation, and waste facilities
	Damage to and deterioration of building infrastructure
	Increased frequency and severity of hazard to infrastructure
	Displacement of the population residing within the coastline
Low	Increased flooding in urban areas resulting from decreased holding capacity of drainage
	Decreased access to services and economic opportunities
	Decreased available space for infrastructural development due to shoreline retreat

Source: MOCCA

The other less urgent risks may be relatively acceptable in the short term but still require further assessment and monitoring to minimize the potential impacts. For instance, extreme rain and storms may cause flooding that can push the holding capacity of the drainage system in the UAE, which are not designed to prepare for extreme

flooding since it rarely rains in the desert. Such natural shocks can affect other related facilities such as sanitation and waste. Weak sanitation systems can lead to the outbreak of water-borne diseases. In worse-case scenario, extreme events and sea level rise may displace some of the population living near the coasts.

### Relevant resilience initiatives on green infrastructure

Despite its high-quality infrastructure, the UAE continues to explore new engineering and architecture practices that incorporate both mitigation and adaptation across all stages of the infrastructure cycle. The following initiatives are concrete examples to date.

**Expo 2020 Green Plans:** The UAE strives to deliver the greenest Expo ever by putting sustainability at the heart of the project's planning and design. Considering the UAE's hot climate, it optimizes the use of green landscapes and energy consumption through eco-friendly technology and design in infrastructure and buildings to reduce energy demand, use renewable sources, and facilitate reuse and recycling of resources including a rainwater drainage.



DEWA Sustainable Building, Al Quoz, Dubai, United Arab Emirates

**Green Buildings:** The Green Building Council (GBC) noted that the UAE is among the top countries with the highest number of energy-efficient buildings. The Estidama initiative, for example, integrates sustainability in the design, planning, and construction phase of new urban developments. In 2019, the emirate of Ajman's first-ever green building is 40% complete. It will use sunlight-reflecting glass for insulation and energy saving as well as thermal bricks that are scientifically tested to be adaptive to the UAE's climate.

The climate-related challenges to the UAE's infrastructure system offer new challenges as well as opportunities to explore more innovative approaches in engineering, architecture, and urban planning. Critical interventions going forward include integrating climate risks into the insurance schemes of infrastructure assets and retrofitting old structures and facilities. Robust research is also necessary to develop construction materials that are well-

suitable to the UAE's local climate. Developing well-coordinated regulations and planning guidelines at the federal and emirate level especially at the early stages of construction and maintenance will outweigh the huge cost of repair in the event of disasters. Adherence of construction companies to such regulations will build the bottom-up foundation toward a more climate-resilient infrastructure sector.

### 1.4.4. Climate Risks to the Environment

The natural environment provides food, water, air, and other essential ecosystem services to all living creatures. Being the planet's life support, the UN Environment noted that "a healthy environment is the foundation of human life"; thus, about half of the SDGs are directly related to the environment such as poverty, hunger, health, water and sanitation, energy, cities, sustainable consumption and production, climate change, oceans, and biodiversity. The combination of natural and human-induced stressors is putting the natural resources under severe strain and disrupt fundamental environmental processes. This calls for a rapid response to address the risks and promote sustainability to ensure environmental health.

The UAE Vision 2021 aims for a sustainable environment that will support the shift toward a diversified and knowledge-based economy. While the country is known for its vast desert lands, it is also home to other natural habitats such as its coastline, sabkhas, wetlands, mangroves, seagrass, saltmarshes, wadis, and mountains and rocky terrains hosting diverse species. Its marine and terrestrial biodiversity has been adapting to harsh natural conditions, but more extreme climate events may threaten their survival. Both anthropogenic and climate-related factors have led to water scarcity, air quality issues, land degradation, biodiversity loss, and other related challenges.

Driven by the UAE leadership's commitment toward environmental protection, MOCCAEC carried out a two-

day workshop gathering stakeholders from environmental agencies at the federal and emirate levels, universities, research institutions, private sector, and others to identify and prioritize the biggest climate-related risks to the country's natural environment. Guest experts from the UAE University as well as the Center for Environment, Fisheries, and Aquaculture Science (Cefas) of the Department for Environment, Food and Rural Affairs (Defra) of the United Kingdom also participated to share relevant local and global experiences on climate change adaptation in the environment sector.

The assessment results revealed that the UAE's natural ecosystem is indeed facing a number of risks posed by climate change and two major threats are deemed most urgent: coral bleaching and loss of wetlands. The impacts of damaged corals in the UAE due to increased ocean temperature and ocean acidification are considered significant since coral reefs are highly valuable resources that help sustain life especially for marine biodiversity. Moreover, projected temperature changes in the UAE and the region indicate the high probability of recurrence of coral bleaching at a faster pace. On the other hand, the loss of wetlands due to extreme temperature, inundation, and extreme events will impact some of the common types of coastal, marine, and inland wetlands in the UAE such as mangrove swamps, coral reefs, inland swamps, and sabkhas. The socioeconomic and environmental impacts of climate change on both mangroves and corals are significant considering the large number of people living near the coast and the households that still rely on fish for their livelihood.



Climate risks to the UAE's environment sector	
Risk Level	Impact
Very High	Increased frequency of coral bleaching
High	Loss of wetlands and associated ecosystem services
Medium	Loss of marine life
	Reduced groundwater levels and recharge capacity
	Loss of inland habitats and resources due to high salinity induced by sea level rise
	Increased soil erosion and land degradation during extreme weather events
	Reduced local food production
	Increased cases of harmful algal blooms
Low	Habitat destruction and fragmentation due to increased flash flood events
	Change in spatial distribution and temporal appearance of disease-causing species
	Increased landward migration of sandy shoreline

Source: MOCCA

Aside from coral bleaching and loss of wetlands, the UAE is also facing other risks that may be less urgent but should still be monitored closely. Extreme temperature, rising sea level, drought, and extreme events may lead to loss of marine life, water scarcity, deterioration of natural habitats, land degradation, less agricultural production,

and rise of harmful algal blooms. The interconnectedness of these risks reflects the symbiotic relationship of natural ecosystems, which thus requires a holistic approach to adaptation to optimally address the interlinked impacts.

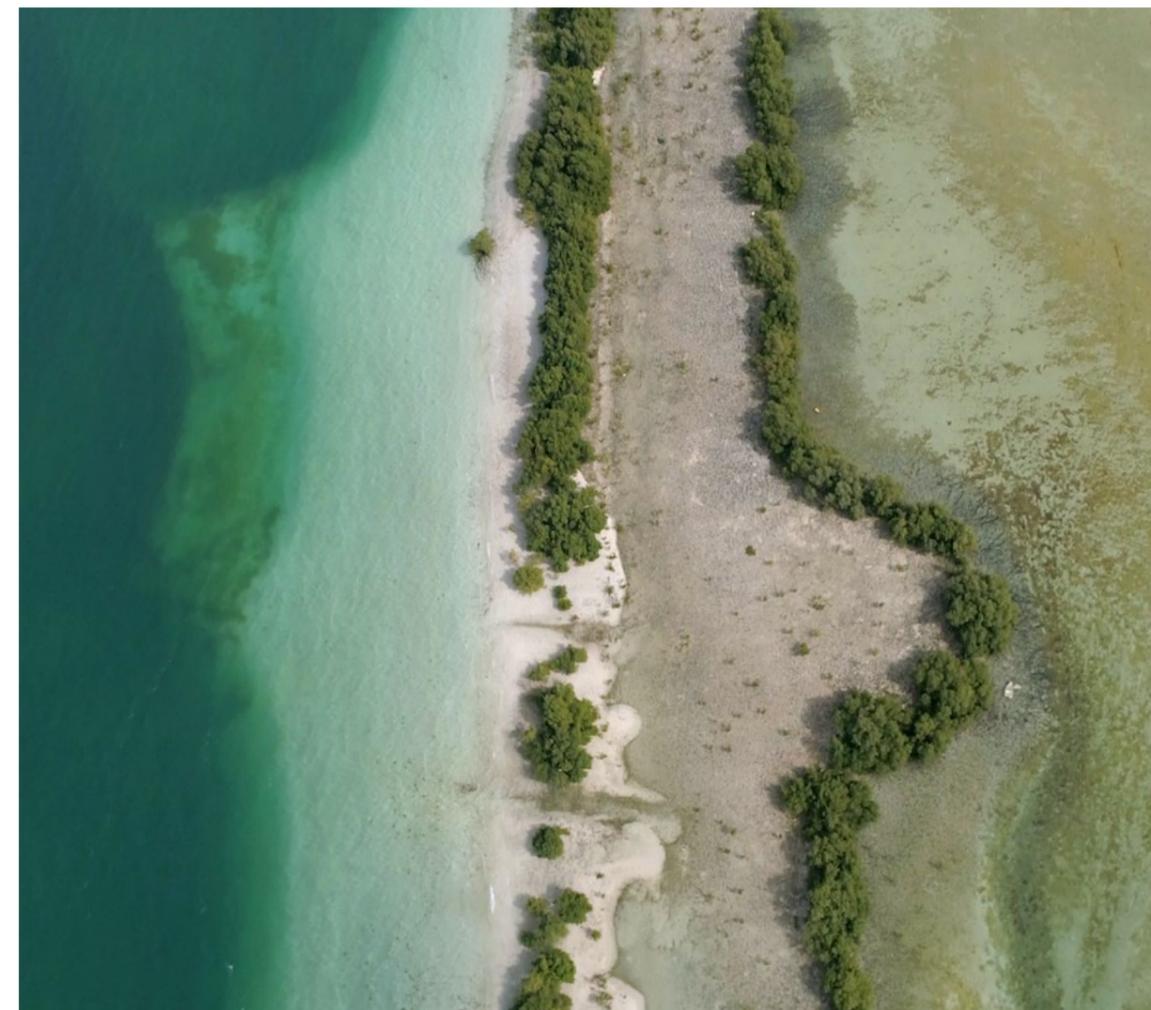
### Relevant adaptation initiatives on corals and wetlands

The UAE hosts rich biodiversity that includes its precious corals and wetlands. Rising sea temperature, alongside other anthropogenic and natural factors, threatens their natural growth. The initiatives below offer innovative ideas and mobilize public action toward saving the country's natural ecosystem.

**Exploration of heat-tolerant algal and coral species in Abu Dhabi:** New York University (NYU) Abu Dhabi is investigating how coral reefs cope with climate change through genetic examination. They found some species of Arabian Gulf corals and their algae that have adapted to cope with extreme conditions. This offers promises of propagating the right coral and algae species with superior thermal tolerance traits.



**Designation of 8 wetlands as protected areas:** As a signatory to the Convention on Biodiversity and the Convention on the International Trade of Endangered Species, the UAE plays a key role in establishing and managing protected areas as part of its commitment to the conservation of natural ecosystems. During the COP 13 in Dubai, the Jebel Ali Wetland Sanctuary was declared as a Wetland of International Importance (Ramsar Site), making it the eighth protected wetland in the UAE.



The climate risk assessment for the UAE's environment reveals that while the UAE's natural assets already confront a range of human-induced pressures, climate change is further aggravating the risks and that climate projections in the coming decades indicate that the risks may further intensify. This calls for proactive and integrated approaches to natural resource management and resilience planning to account for the

interdependencies of different ecosystems. Key opportunities going forward include strengthening nature-based adaptation, promoting eco-tourism, exploring the potential of payment for ecosystem services (PES) to support adaptation, assessing the climate vulnerability of protected areas, and incorporating climate resilience in coastal development planning.



### 1.5. Priority Climate Risks and Progress of Actions

The sectoral climate risk assessment completed for the UAE has identified the priority risks to be addressed through adaptation measures in the coming years. The

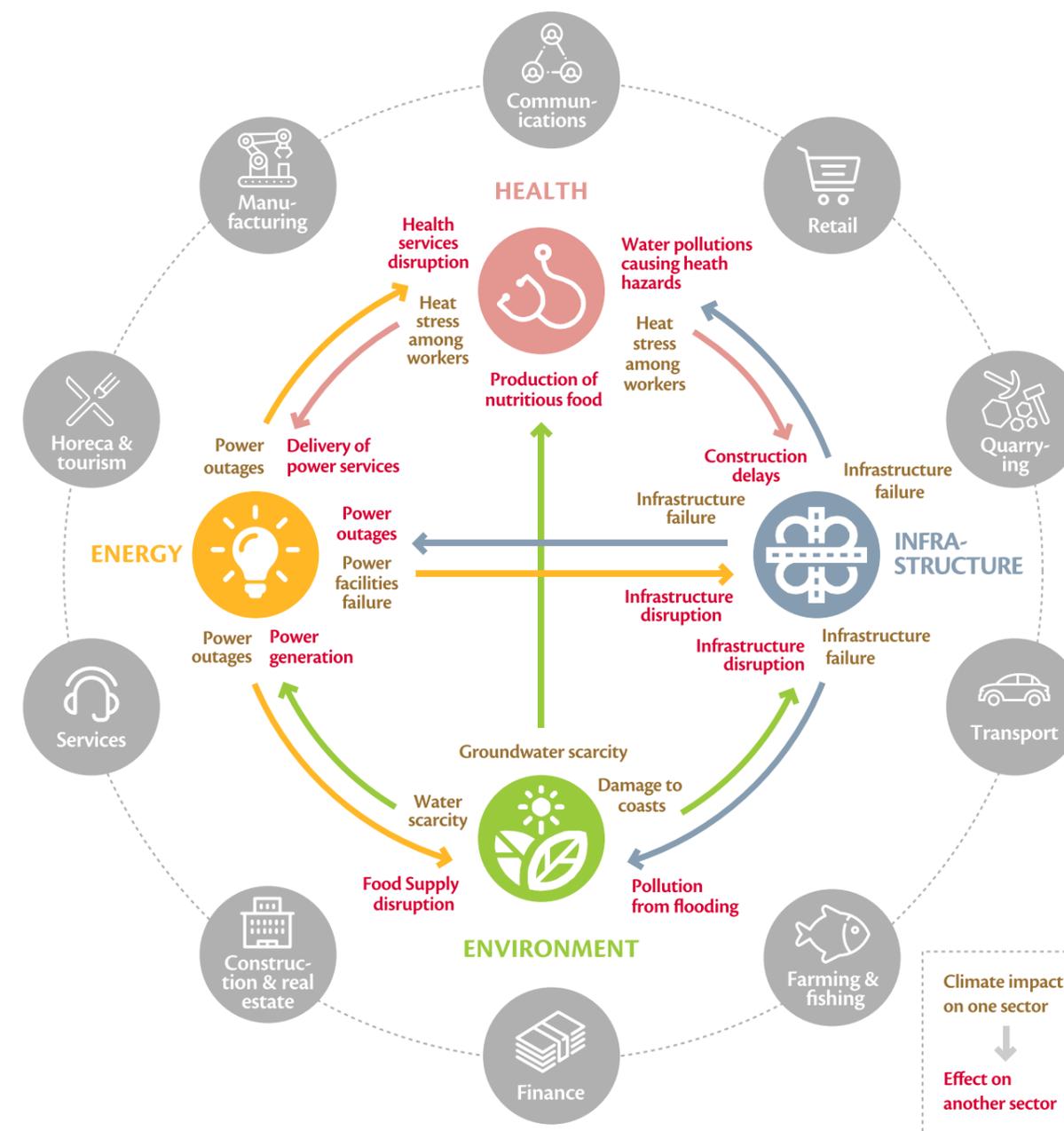
risk assessment results will be used to inform adaptation policy and provide the objective foundation for implementing the appropriate actions. Specifically, the priority risks will feed into the sectoral adaptation action plans of the UAE, which will lay out the key adaptation measures with corresponding timeline, lead and supporting actors, outcome indicators, etc.

Summary of priority risks for the UAE	
Sector	Priority Risks
Health	<ul style="list-style-type: none"> <li>Reduced productivity of outdoor workers due to heat stress</li> </ul>
Energy	<ul style="list-style-type: none"> <li>Efficiency losses of power plants</li> <li>Reduced power output due to warmer cooling water</li> <li>Deterioration of power facilities</li> </ul>
Infrastructure	<ul style="list-style-type: none"> <li>Damage to coastal and offshore infrastructure</li> <li>Increased infrastructure maintenance cost</li> <li>Loss of business opportunities due to transport disruptions</li> <li>Reduced reliability of transport infrastructure and buildings</li> </ul>
Environment	<ul style="list-style-type: none"> <li>Coral bleaching</li> <li>Loss of wetlands</li> </ul>

Source: MOCCA

Note that while the assessments were carried out by sector, the analysis considered the co-benefits and interdependencies of the four sectors. This approach prevents maladaptation, in which actions that are targeted toward avoiding or reducing vulnerability to climate change in one sector bring detrimental impacts in

other sectors due to inadequate consideration of sectoral interlinkages. It demonstrates a systems perspective in understanding cross-sectoral interaction of climate risks to show how the risks relate to each other, which should guide the identification of appropriate adaptation measures.



Cross-sectoral linkages of climate risks  
Source: MOCCA

#### 1.5.1. National Framework for Action on Climate Change and Public Health

The UAE Ministry of Health and Prevention (MOHAP) has integrated the findings of the health risk assessment into the WHO-UNFCCC Climate and Health Country Profile Project, a global initiative that aims to assess and monitor the health impacts of climate change and

facilitate the development of climate-resilient health systems. The report, Health and Climate Change Country Profile 2019 for the United Arab Emirates, identifies the climate hazards to health and their impacts, the health risks posed by air pollution and sand and dust storms in the UAE, and the health sector's responses to address the climate-related challenges to the public health system.



The analysis also guided the development of the UAE National Framework for Action on Climate Change and Public Health 2019-2021, which was showcased during the Abu Dhabi Climate Meeting on 30 June - 1 July 2019. The framework sets out the strategic responses of the UAE in responding to the public health challenges posed by climate change focusing on the following areas: governance, policy, and engagement for health protection from climate change; climate resilient health systems (robust surveillance, early warning, and response); enhanced management of environmental health interventions; and mobilizing support for the public health response to climate change.

### 1.5.2. Studies on Infrastructure Resilience Planning

Drawing from the discussions during the risk assessment workshop, UAE Ministry of Energy and Infrastructure (MOEI), formerly known as Ministry of Infrastructure Development (MOID), has initiated research projects to address some of the knowledge gaps identified in the assessment. In collaboration with the University of Sharjah, MOEI has started embarking on a study about the impacts of climate change on materials selection and asphalt pavement performance in the UAE. It involves gathering historical climate data from local weather stations and predicting how future climate change will affect the asphalt pavement performance, the results of

which will determine new asphalt binder specifications.

MOEI has also begun analysing the impacts of climate change on traffic safety and transportation system performance in the UAE. The study involves the investigation of data on road traffic and accidents during fog and dust conditions to establish the linkage between extreme climate events and road crashes. It will deploy statistical models to predict future crashes under different weather conditions and develop risk maps to identify hotspot areas for weather-related crashes using Geographical Information System (GIS). The safety statistical models and the GIS-based risk maps will guide transportation planners and decision makers on resource allocation for emergency preparation and response.



### 1.6. Advancing Climate Resilience to Support the Green Economy Transition

Despite the increasing impacts of climate change in the Middle East, there are scarce documentation of case studies on climate risk assessment and adaptation. As one of the forerunners in the region, the UAE's experience can demonstrate the pursuit of evidence-based, participatory, and expert-guided approach to resilience planning, setting an example for other countries.

The UAE's risk assessment exercise provides useful lessons for undertaking similar endeavour in the future. Key areas of improvement include enriching climate science through more advanced climate modelling to reduce the level of uncertainties, integrating top-down and bottom-up approaches to risk assessment; improving inter-sectoral collaboration; enhancing climate science communication; operationalizing a more integrated approach to risk analysis; and making the stakeholder consultation process more inclusive and conducive for knowledge co-production.

For next steps, the UAE will pursue necessary actions to

address the priority risks posed by climate change. Such actions can be in the form of physical safeguards including engineered structures and technology that support adaptation; risk management measures such as regulations and incentives, as well as early warning systems and emergency plans that directly address climate risks; knowledge-related measures related to climate data and research, vulnerability assessment, and public communication; and policy enablers that facilitate conditions for enhanced resilience.

In the longer term, the Climate Plan states that: "efforts will be geared toward systemizing and mainstreaming adaptation in planning future development at national, subnational, and sector levels." This offers multiple entry points for integrating adaptation in development strategies such as sectoral plans, federal and emirate-level development plans, investment plans, land use and zoning, business/corporate strategies, education curricula, and relevant laws and regulations on climate change and sustainable development. Convergence of these efforts will help realize climate resilience, which is an essential precondition toward the transition to green economy.



## Chapter 2. Progress on the Implementation of the UAE Green Agenda

The UAE is a living example of how venturing in off the beaten path towards green economy transformation is not only economically but socially and ecologically worthwhile. In the years since the launching of the UAE Green Agenda 2030, stakeholders from the government sector and even those in the private sector launched and implemented initiatives supporting the nation's aspirations for a greener and sustainable future. The accelerated efforts in the area of data and information innovation, as well as ingenious technological novelties that provide green investment and job opportunities, show how UAE manages to sustain economic growth and social development while minimizing impacts to its ecological and environmental systems.

This chapter provides a snapshot of the action plan for the UAE's green economy transition. It features key strategies, plans, and on-the-ground initiatives at the national and emirate-levels that show green economy transformation at various scales. The chapter highlights key contributions of the various initiatives to the national green economy transformation.

### 2.1. The UAE's Green Agenda at a Glance

The UAE Green Agenda 2030 consolidates the UAE's green growth initiatives, covering multiple sectors of the country's green economy transition. It provides an overarching policy framework to achieve five strategic objectives: (1) competitive knowledge economy; (2) social development and quality of life; (3) sustainable environment and valued natural resources; (4) clean energy and climate action; and (5) green life and sustainable use of resources. It mobilizes different entities at the federal and emirate level, private sector, and civil society to work together in carrying out the 12 programs, which are further concretized into 31 subprograms.

The Green Agenda timeframe (2015-2030) is in line with the immediate timeline of the UAE Vision 2021 and the medium-term (2030) timeline of the Climate Plan. It does not work in silo with other development plans and rather enables them; thus, achieving the objectives of the Green Agenda results in helping meet the broader national aspirations on green growth and sustainable development.

The formulation of the Green Agenda involved systematic consultation with various stakeholders to understand the UAE's green growth needs and potential, identify gaps, and synthesize expert inputs to guide the development of programs. Currently, the implementation of the Green Agenda initiatives across various sectors is ongoing and significant progress has been achieved to date. Going forward, it is imperative to track progress and enhance the achievement of desired outcomes and results.

### 2.2. Green Agenda Implementation Framework and Governance

The Green Agenda not only outlines the programmatic direction but also the governance structure for implementing green economy actions across all sectors. It gained strong support from high-level leadership in the UAE through the formation of the Emirates Green Development Council (EGDC), which was tasked to coordinate and oversee the implementation of the Green Agenda. The EGDC was then restructured into what is now called the UAE Council on Climate Change and Environment through the Ministerial Decision No. 795 of 2016.

Currently, H.E. Dr. Abdullah Belhaif Al Nuaimi, Minister of Climate Change and Environment, is the chair of the Council, working closely with representatives from the federal and local government as well as the private sector. The Council plays an instrumental role in developing concrete plans and monitoring the progress of Green Agenda. It also represents the UAE in regional and international negotiations on climate change and other

relevant areas within MOCCA's mandate. Moreover, the council is tasked to forge partnerships with the private sector and pursue scientific research on the environment and climate change.

The Council holds regular meetings with stakeholders to evaluate the implementation of Green Agenda initiatives, synergize efforts from different sectors, share lessons learned, and lay out the next steps. They also discuss new ideas and proposals as well as the status of the Council's overall performance as an oversight body. To ensure the achievement of Green Agenda outcomes by 2030, the Council is committed to creating a robust monitoring and evaluation (M&E) system to identify the suitable indicators that will measure the extent of the shift to green economy as envisioned in the Green Agenda.

### 2.3. Progress of Green Agenda Strategic objectives

In many concrete ways, the UAE shows its clear commitment to creating a better future not only for its people but for the planet through various initiatives supporting transformation into a green economy. In tackling economic, social, and environmental challenges that come with transition to a green economy, the UAE has demonstrated that there are better, greener, and innovative ways to do public and private businesses. In this regard, this section shows just how far the UAE has come since it launched the UAE Green Agenda 2030 in 2015. The section highlights plans, strategies, and on-the-ground initiatives that support the various strands of the UAE Green Agenda 2030.

Competitive Knowledge Economy	
Green Innovation	Green Diversification
<p><b>Supporting Plans, Policies, and Strategies</b></p> <ul style="list-style-type: none"> <li>National Artificial Intelligence Strategy 2031</li> <li>National Advanced Sciences Agenda 2031 and 2021 Advanced Science Strategy</li> <li>Advanced Skills Strategy</li> <li>National Tourism Development Strategy</li> <li>COVID19- Economic Stimulus Package</li> </ul>	<p><b>Initiatives</b></p> <ul style="list-style-type: none"> <li>Artificial Intelligence Empowering Households</li> <li>Food Production Capability</li> <li>Economic Diversification through the World's First Benchmark Corporate Green Sukuk</li> <li>Abu Dhabi Sustainable Finance</li> <li>Mohammed bin Rashid Innovation Fund</li> <li>Solar Decathlon Middle East</li> <li>UAE Green Business Toolkit</li> <li>The Green Business Network</li> <li>Climate Innovation Exchange</li> </ul>

#### UAE's Blueprints Supporting Competitive Knowledge Economy

As a concept that calls for innovation across key economic sectors including oil and gas, construction, healthcare and hospitality, enhancing knowledge economy has been in the forefront of the UAE Vision 2021. Through the enhancement of the country's competitive knowledge economy, the UAE aims to be the economic, touristic and commercial capital for more than two billion people by encouraging invention, research and development, firming the regulatory framework for key sectors, and encouraging high value-adding sectors. In support of

becoming a champion in entrepreneurship by unlocking the potential of the nationals and enabling them to drive UAE's economic development through small and medium enterprises in the private sector through knowledge economy enhancement, the UAE developed several strategies and plans to support its economic and social position as well as expand its national income based on a sustainable and knowledge-based economy. The key strategies and plans include but not limited to the Strategy for Artificial Intelligence, Agenda for Advanced Sciences, and Advanced Skills Strategy, among others.

#### National Artificial Intelligence Strategy 2031

In October 2017, the UAE Government launched the UAE Strategy for Artificial Intelligence to mark the country's transition from post-mobile and smart government phase to one that relies on artificial intelligence (AI). The strategy is a first in the region and the world. It aims to achieve the objectives of UAE Centennial 2071, enhance government performance at all levels, use an integrated smart digital system that can offer efficient solutions to challenges, champion UAE in the field of AI investments in various sectors, and create new vital market with high economic value.

The UAE Cabinet approved the National Artificial Intelligence Strategy 2031 in April 2019. The ten-year strategy aims to advance customer services, evaluate government performance and enhance living standards. The strategy also outlines ways to harness AI technology in the transport, tourism, health, and education sectors. The National Artificial Intelligence Strategy 2031 is composed of eight objectives which include reiterating the UAE's position as a global hub for AI, increasing the competitive edge of the AI sector in the UAE, launching an incubator for AI innovations, incorporating AI in the field of customer services to enhance the quality of life, attracting and training talents for jobs of the future, attracting leading research capabilities, offering a data-driven infrastructure to support AI experiments, and optimizing AI governance and regulations.

#### National Advanced Sciences Agenda 2031

In April 2018, the UAE government launched the National Advanced Sciences Agenda 2031 and the 2021 Advanced Science Strategy. To attain the ideas of Vision 2021 and Centennial Plan 2071, the National Advanced Sciences Agenda 2031 seeks to use advanced sciences in the expansion and formation of solutions to future challenges and advance the government's efforts through three consecutive strategies starting with 2021 Advanced Science Strategy. The National Advanced Sciences Agenda 2031 has eight high-priority science objectives: optimizing the use of natural resources in the UAE; fostering sustainable energy; developing urban food science and systems; pursuing cleaner water solutions; treating health challenges; evolving to adaptive manufacturing; designing logistics analytics; and developing an integrated industrial complex.

#### Advanced Skills Strategy

Grounded on a forward-thinking approach at combining the concept of life-long learning for citizens and residents of the UAE to attain the goals of Centennial Plan 2071, the UAE launched the national Advanced Skills Strategy in November 2018. Led by the Ministry of Education, the Advanced Skills Strategy aims at maintaining the country's competitive edge and ensure that UAE remains at the front of global advancements in key areas such as education and the economy. The Advanced Skills Strategy targets three groups of audience: students in schools and universities, the new higher education graduates, and the experienced employees. To provide life-long learners and students with flexible skills relevant along different professions and sectors, the Advanced Skills Strategy recognizes four main classifications for future skills: basic skills, competencies, personality traits, and specialized skills.

**Artificial Intelligence Empowering Households Food Production Capability**

The UAE's knowledge economy swiftly evolved in the last few years. The application of artificial intelligence (AI) is no longer limited to the information technology sector but to the wider economic sector such as agriculture. Gracia Farms, a UAE-based agricultural company that the Khalifa Fund for Enterprise Development supports, is one of the many entities in the UAE that used AI to enable individuals to plant and grow healthy foods at the comfort of their own homes.

Gracia Farms developed mini-green houses that AI runs. Considering climatic and environmental factors that prohibit backyard farming in the UAE, the model that Gracia Farms developed allows private homeowners to plant and grow their own food with less inputs, obtaining better outputs. The mini greenhouse has various eco-friendly features as the water used is recycled water and the solar panels can also be used as an add on to the greenhouse. Gracia Farms showcased the mini greenhouse at the 2019 Global Forum for Innovations in Agriculture.



Mini-green house of Gracia Farms  
Source: www.graciafarms.com/gallery

**Vertical Farming by Emirates Catering**

Emirates Flight Catering (EKFC) and Crop One will co-invest USD 40 million to build the world's largest vertical farming facility near Al Maktoum International Airport at Dubai World Central. The project is a joint venture with U.S.-based Crop One Holdings, the world's leading vertical farm operator. At full productivity the project will daily produce 2,700 kilograms of herbicide-free and pesticide-free leafy greens.

Vertical farming is a technique with a significantly smaller carbon footprint than traditional farming. The facility is predicted to use 99 percent less water than outdoor fields with only 0.003 percent of the space. It will cover 130,000 square feet and will produce the equivalent of 900 acres of farmland.

**Economic Diversification through the World's First Benchmark Corporate Green Sukuk**

Considering that green economy contributes to UAE's low-carbon, resource-efficient, and socially-inclusive development, Majid Al Futtaim (MAF), a private company in the UAE, marked the listing of the world's first benchmark corporate Green Sukuk in support of the UAE's transition to a green and low carbon economy. In May 2019, the MAF issued the first Green Sukuk by a corporate in the region with a value of USD 600 million. This financing mechanism allows further investment to increase MAF's competitive knowledge through current and future green projects, green buildings, renewable energy, sustainable water management, and energy efficiency.

Through the Green Sukuk, MAF will be able to continue to achieve innovative sustainability. Among large businesses in the UAE, MAF was the first to attain a company-wide LEED certification for its shopping malls, hotels, and offices buildings in the region. Al Zahia, the company's flagship community in Sharjah is the first BREEAM "Very Good" rated community in the MENA region. With the Green Sukuk, Majid Al Futtaim announced a Sustainable Building Policy that specifies minimum building standards as: LEED Gold V4 (USGBC), 3 Pearl (ESTIDAMA) or BREEAM "Very Good" Rating. The company now owns close to 3 million square meters of green-certified floor areas, including the recently opened

My City Centre Masdar which is termed as Abu Dhabi's most sustainable shopping mall.

Majid Al Futtaim group stated that the "issuance [of the Green Sukuk] will enable Majid Al Futtaim to deliver more sustainable experiences for our customers and to address the implications of climate change." Through the Green Sukuk, MAF will identify pioneering innovative ways to meet its ambition to be Net Positive by 2040. Majid Al Futtaim also established a Green Finance Framework and a Green Finance Steering Committee, to manage the shortlisting of new and existing projects for the green portfolio.



**Abu Dhabi Sustainable Finance**

To catalyze more ambitious thinking and for businesses to keep thriving, mobilization of sustainable financing is necessary at the Emirate and national levels. It is for this reason that the Municipality of Abu Dhabi developed the Abu Dhabi Sustainable Finance Declaration, which seeks to strengthen the cooperation among government, regulators and key UAE and international institutions to institute a healthy sustainable finance sector that supports the UAE in achieving the United Nations Sustainable Development Goals. Nearly 30 public and private sector entities signed the Declaration at the opening of Abu Dhabi Sustainable Finance Forum in the presence of H.H. Sheikh Hamed bin Zayed Al Nahyan,

Chairman of the Abu Dhabi Crown Prince Court and Managing Director of the Abu Dhabi Investment Authority (ADIA).

The Abu Dhabi Sustainable Finance Declaration includes the development of a concerted framework that integrates and fosters green and sustainable investments in Abu Dhabi, the UAE and the wider region. As part of the Declaration, the Central Bank of the UAE, the Securities and Commodities Authority and the Abu Dhabi Global Market will play a facilitative part in working with public and private entities to increase investment flows and support the various agreed provisions. The Declaration also involves educating stakeholders, investors, and the public on the significance

of environmental protection and sustainability, as well as recognizing pioneering solutions for positive economic, social and environmental development in Abu Dhabi and beyond.

On a related note, the Ministry of Climate Change and Environment supported the implementation of the Abu Dhabi Sustainable Finance Declaration by becoming a member of the Working Group on Sustainable Investments. The Ministry also pledged support with the Abu Dhabi Global Market in July 2019. Part of the pledge

will embed sustainable finance policies in the UAE and wider region as a part of national commitments to fight climate change. The Minister of the Climate Change and Environment, H.E. Dr Abdullah Belhaif Al Nuaimi, noted that investing in climate action makes economic sense and that financial services must be sustainably done. Therefore, with the Abu Dhabi Sustainable Finance Declaration, the UAE will be the go-to environment for clean technology and green investors.



#### Mohammed Bin Rashid Innovation Fund

In support of the UAE National Innovation Strategy, H.H. Sheikh Hamdan bin Rashid Al Maktoum, Deputy Dubai Ruler and Minister of Finance, launched the Mohammed Bin Rashid Innovation Fund Accelerator (Innovation Accelerator) in November 2018. As a public-private partnership to encourage local and international innovators in a revolutionary initiative intended at enhancing the growth potential of innovative businesses to shape the future of the UAE's economy, the Innovation Accelerator recognizes and supports the finest innovators in the UAE. It will do so by supporting innovative businesses that are local and providing them the essential tools to progress both nationally and internationally.

Although the Innovation Accelerator is still in its infancy stage, they hosted their first Pitch Day in 2019 to showcase innovations that can contribute in shaping the future of the UAE towards a greener economy. Out of 159 applications worldwide, the first 16 selected showcased their innovative solutions in technology, health, education, clean energy and transport to an independent Advisory Decision Committee (ADC) comprising of leaders in government and private institutions. The innovation accelerator is aligned with the UAE National Innovation Strategy, with the aim to place UAE among the top 10 most innovative nations in the world.

*"The UAE has been at the forefront of [the] Global Innovation Index (GII) in the Arab World, and this spurs us on to continue to support innovation as a key driver of the economy, that, under an inspirational leadership looks towards a stable and ambitious future. The initiative aims to explore the future, keep abreast of the latest developments and support innovative talents that seek to establish companies that contribute to the betterment of the UAE by achieving the objectives of the UAE Vision 2071."*

**H.H. Sheikh Hamdan bin Rashid Al Maktoum**



The Mohammad Bin Rashid Innovation Fund also announced a disbursement of AED 5.5 million to UAE-headquartered Pure Harvest. Pure Harvest is a regional innovator in sustainable agriculture that targets food security issues as well as water scarcity in the UAE. The start-up focuses on producing greenhouse fruits and vegetables in arid climates using Dutch hydroponics and climate management technologies. The innovation accelerator will push innovation, research, science and technology to be the pillars of a knowledge-based and competitive economy, driven by entrepreneurs in a business-friendly environment where public and private divisions create operative partnerships.

#### Solar Decathlon Middle East

Conceived in 2015 and implemented starting 2018, the Solar Decathlon Middle East (SDME) is a collaboration between the Dubai Supreme Council of Energy, Dubai Electricity and Water Authority (DEWA), and the U.S. Department of Energy. The SDME is a competition that integrates unique local and regional characteristics in support of designing, building, and operating sustainable solar houses. Since 2018, the SDME had more than 30 participating teams that showcased innovation, creativity, and skills that benefit the residents of the Middle East region who are exposed to high temperatures, high

humidity, and dust condition during most part of the year.

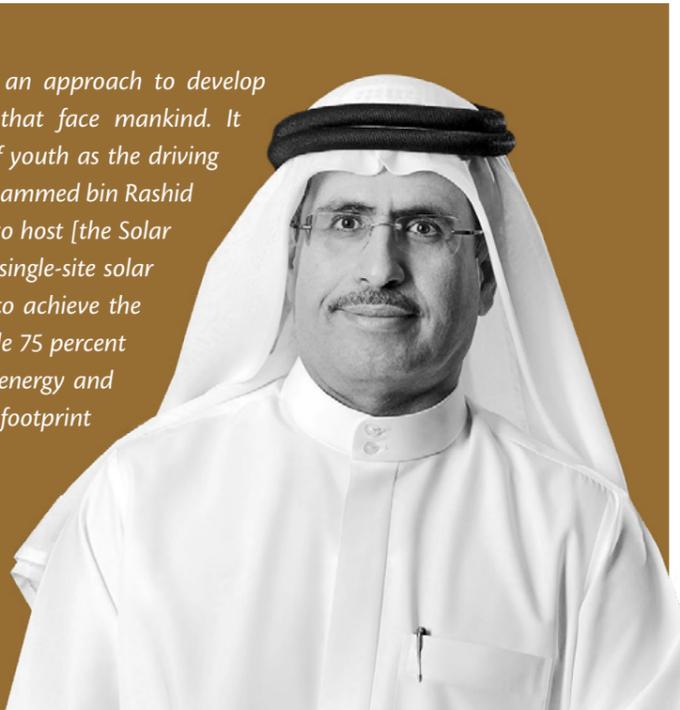
The FutureHAUS Dubai was the inaugural winner of the SDME in 2018. Designed by students and staff from Virginia Tech, a U.S.-based university, the FutureHAUS is a solar powered, energy efficient, and smart home that produces more energy than it uses and proposes a new way of building and living. The prototype entered in the SDME utilized advanced CNC technologies, industrialized processes, and prefabrication strategies to allow to produce higher quality and electronically sophisticated, plug and play house modules. The SDME will continue to recognize similar innovations in 2019 and 2020.

#### COVID-19 Economic Stimulus Package Focusing on Digital and Green Economy

To facilitate post-pandemic recovery efforts, the Ministry of Economy announced a long-term economic stimulus package that accelerates the convergence of digital economy and green economy. This entails maximizing opportunities of the Fourth Industrial Revolution through Artificial Intelligence (AI), renewable energy, electric cars, circular economy, 5G networks, Internet of Things, smart cities, blockchain, 3D printing, and robotics.

*“The UAE gives priority to innovation as an approach to develop sustainable solutions for the challenges that face mankind. It believes in the potential and capabilities of youth as the driving force for building a brighter future. The Mohammed bin Rashid Al Maktoum Solar Park has been selected to host [the Solar Decathlon Middle East], as it is the largest single-site solar park in the world. It supports our efforts to achieve the Dubai Clean Energy Strategy 2050 to provide 75 percent of Dubai’s total power output from clean energy and make Dubai the city with the lowest carbon footprint in the world by 2050.”*

**H.E. Saeed Mohammed Al Tayer**  
 Vice Chairman of the Dubai Supreme Council of Energy and CEO of the Dubai Electricity and Water Authority



people in the UAE to be confident, dignified, healthy, educated, and able individuals who can achieve their dreams, which in turn will benefit the whole society. The key strategies and plans include but not limited to the

National Strategy for Wellbeing 2031, National Policy on Vital Residential Communities, National Employment Strategy 2031, and Youth Climate Strategy, among others.

**National Strategy for Wellbeing 2031**

In June 2019, the UAE Cabinet adopted the National Strategy for Wellbeing 2031. Chaired by H. H. Sheikh Mohammed bin Rashid Al Maktoum, Vice President and Prime Minister of the UAE and Ruler of Dubai, the UAE Cabinet approved the 14 components and nine strategic objectives of the National Strategy for Wellbeing 2031, which targets to make the UAE a world leader in quality of life and citizen’s wellbeing. Based on a national framework of three main levels: individuals, society, and the country; the Strategy involves enhancing people’s wellbeing by encouraging healthy and active lifestyles, promoting good mental health, and adopting positive thinking. The Strategy also includes 90 supporting initiatives directed at 40 priority areas. One of the key initiatives is the development of the first ‘National Wellbeing Observatory’ to complement the policymaking process. It will monitor several indicators of wellbeing in the UAE, submit regular reports to the UAE Cabinet, propose training programs for government employees, and launch the Academy of Wellbeing of future generations, as well as form the National Wellbeing Council to synchronize with the national strategy.

**National Policy on Vital Residential Communities**

The UAE government launched a national policy in January 2019 that includes regulations and standards that aims to enhance the living standards in the country. Known as the National Policy on Vital Residential Communities, the National Programme for Happiness and Well-being in cooperation with the Sheikh Zayed Housing Programme developed the policy that stipulates that residential communities must contain facilities that will support the lives of their residents and provide a rich residential experience, such as shared gardens and sporting facilities. The policy is in line with the provisions of the UAE Vision 2021 and the UAE Centennial 2071. To provide an integrated life for every citizen and resident in the UAE, the Vice President, Prime Minister, and Ruler of Dubai, H.H. Sheikh Mohammed bin Rashid Al Maktoum, noted that “residential communities must bring people together and improve their health and social cohesion.” Accordingly, the Prime Minister understands the “integrated role of government sectors and authorities is to improve life quality in the UAE.” As such, the National Policy on Vital Residential Communities includes the following criteria: perfect location, integrated facilities, interconnected communities and places designated for interactive social life as well as venues for cultural life and intelligent systems.

**Social Development and Quality of Life**

Green Infrastructure Programs	Green Workforce and Talent Programs
<p><b>Supporting Plans, Policies, and Strategies</b></p> <ul style="list-style-type: none"> <li>• National Strategy for Wellbeing 2031</li> <li>• National Policy on Vital Residential Communities</li> <li>• National Employment Strategy 2031</li> <li>• National Strategy for Smart Transportation</li> <li>• Emirates Youth Climate Strategy</li> </ul>	<p><b>Initiatives</b></p> <ul style="list-style-type: none"> <li>• Improving Quality of Life in Ras Al Khaimah through the Model Villa Initiative</li> <li>• Real-time Air Quality Index for UAE Residents</li> <li>• National and Emirate-Level Early Warning and Alert Systems</li> </ul>

**National Strategies for Social Development and Quality of Life**

In very broad strokes, quality of life is commonly linked to social and economic development whether it is at an individual level or at the scale of a community. Informed by the intimate link between social development and quality of life, the UAE placed these two variables as important cornerstones of its agenda for green economy. To become a world leader in making its citizens and residents happy and contented, the UAE developed plans and strategies as well as implemented initiatives that support job skills development, youth engagement,

educational enhancement, and improvement of general well-being of the people.

In general terms, social development refers to people development. It is about investing in people’s well-being so that they can reach their full potential. Against this premise, the UAE government introduced several strategies and plans that would allow not only its citizens but all the residents in the UAE the opportunity to grow, develop their skills, and become productive members of their families and the society. The strategies related to housing, employment, youth, health, and the environment provide the framework and means for all

### National Employment Strategy 2031

In support of increasing the participation of Emiratis and women in value-added economic sectors, the Ministry of Human Resources and Emiratisation (MOHRE) launched the National Employment Strategy 2031 in November 2018 during the UAE Government’s Second Annual Meeting. To a large extent, the Strategy supports the UAE’s efforts to create a knowledge-based economy by empowering labor productivity, increasing the number of R&D personnel, and encouraging entrepreneurship in the areas of energy, communications, technology, transport and storage, finance, health, and education as well as areas of artificial intelligence, space, digital transactions and advanced science. Through the National Employment Strategy 2031, MOHRE projects that the total national force working in the government and private sectors will grow to about 610,000 by 2031.

### National Strategy for Smart Transportation

To leverage innovative technologies to improve the safety and prepare the infrastructure for autonomous vehicles and high-speed means of transportation that improves well-being, sustainable, and environment-friendly, the UAE government developed and launched the National Strategy for Smart Transportation in November 2018. The Strategy aims to develop smart and innovative transportation system that will help improve the quality of life of citizens and residents. The Strategy includes the institution of a global smart transportation system that embeds integration and compatibility across federal and local levels, improves traffic safety, lessens the environmental impact, and increases economic productivity.

### Emirates Youth Climate Strategy

In line with the Emirates Global Youth Initiative, the Ministry of Climate Change and Environment launched the Emirates Youth Climate Strategy on the International Youth Day 2018. The strategy offers a cohesive framework to boost the role of youth in meeting the challenges of climate change in accordance with the UAE’s ambition of having mature and empowered future generation to achieve the UAE Vision 2021, the 2071 Plan, the National Climate Change Plan, the National Youth Agenda, and the Arab Youth Strategy. The Emirates Youth Climate Strategy aims to inculcate leadership skills in the youth via an array of programs and activities in partnership with stakeholders, locally and internationally. The three main objectives of the Strategy involve raising awareness about climate change among the youth, developing youth capacities to create a dialogue on climate change, and promoting youth involvement in climate action.

### Improving Quality of Life through the Model Villa Initiative in Ras Al Khaimah

The drive to provide residents the opportunity to live in areas where available housing spells sustainability and efficiency helps families save and stay in communities that are conducive for long-term success, which in turn radiates quality living. The Municipality of Ras Al Khaimah is one of the leading proponents of sustainable and efficient housing development. To help improve the long-term quality of life of its residents, the Municipality of Ras Al Khaimah launched its building retrofit program in October 2018 with a target to retrofit 3,000 buildings by the end of 2040.

Complementing the retrofit program is the “Model Villa Initiative” (MVI) that the Municipality of Ras Al Khaimah launched in partnership with Masdar–Abu Dhabi Future Energy Company. The MVI seeks to promote energy efficiency and the building of more sustainable residential villas in Ras Al Khaimah. The initiative is in line with the Ras Al Khaimah’s campaign to help its residents gain savings and improve their economic standing through its Energy Efficiency and Renewable Energy Strategy 2040, which has nine pillars: green building regulations, building retrofits, energy management, efficient appliances, efficient street lighting, water reuse and efficient irrigation, solar programs, energy from waste, and efficient vehicles. Under the MVI, a selected local villa will undergo retrofit and monitor the energy savings that the retrofit provides to the families. To provide more information to encourage more local residents to participate in the MVI, the results will be available to the public after analysis and evaluation.

In 2019, the Municipality of Ras Al Khaimah also introduced the green building regulations that would apply to all new buildings in the Emirate. The regulations will account for the largest share of the energy and water savings for residents as proposed under the Ras Al Khaimah’s Energy Efficiency and Renewable Energy Strategy 2040, which targets 30 and 20 percent energy and water savings, respectively. The savings generated from the implementation of the regulation will go back to the local economy as investment green products and services, which in the long term will lead to more sustainable and quality life of the local residents.

*“The first [retrofit program] involved the retrofit of municipality buildings through a guaranteed savings contract, which will bring 31 percent savings on energy and water consumption.”*

**H.E. Munther Mohammed bin Shekar**  
Director General of Ras Al Khaimah Municipality



### Real-Time Air Quality Index for UAE Residents

To ensure that the residents of the UAE have real-time information about the quality of air they breathe, the Ministry of Climate Change and Environment, in cooperation with the Khalifa University of Science and Technology, developed a smart application on UAE's Air Quality Index (UAE AQI). The Index displays real-time readings of the satellite-monitored air quality across the UAE. The smart application employs cutting-edge technologies to live monitor the air quality and, by using specific algorithms, it estimates the AQI status for up to three days, in addition to forecasting the concentration of dust and particulate matters with a diameter of less than 2.5 microns (PM<sub>2.5</sub>).

According to H.E. Dr. Abdullah Belhaif Al Nuaimi, Minister of Climate Change and Environment, poor air quality has a serious impact on human health and the environment. It is for this reason that the quality of the air we breathe is a key issue highlighted in UAE Vision 2021. The Minister mentioned that through the information gathered by the UAE AQI, the UAE will have the necessary science-based information that will be useful in implementing initiatives that can help raise the country's air quality from its current level to 90 percent by 2021.

At present, there are 49 air quality monitoring stations across the UAE. The satellite readings complement the output of the stations leading to reliable data. With more accurate air quality data, citizens and residents will be able to make informed decisions to help them lead quality lifestyle.

### National and Emirate-Level Early Warning and Alert Systems

The promotion of health, safety, connectedness, and resilience is a telltale characteristic of a community that

advocates the overall wellbeing of its residents. In the UAE, safety is an important priority to help its residents reach their full potential. To foster safety, the UAE, through the National Emergency Crisis and Disaster Management Authority (NCEMA), launched the National Early Warning System, in cooperation with the Abu Dhabi Police. The nationwide early warning system aims to issue warning and awareness messages to road users and residents to be careful while driving in certain areas amidst bad weather and traffic accidents.

Amidst sudden changes to weather conditions and unprecedented traffic events, the Abu Dhabi Police highlighted that the National Early Warning System can scrutinize weather conditions and pinpoint areas that are susceptible to serious traffic accidents using traffic patrols and smart towers. The initial implementation of the system began in Abu Dhabi. The second stage of the project involves adopting the system in other neighboring areas that may get affected by bad weather and serious traffic accidents. The subsequent stages involve creating partnerships between the police, NCEMA, and phone service operators for the messages to be sent directly to the public via their mobile phones. The direct message will allow the driver to undertake an alternative route while being careful due to bad weather conditions.

Concurrent to the initial implementation of the National Early Warning System in Abu Dhabi, the Municipality of Dubai also deployed a system to provide real-time information on critical weather indicators, including the density of fog, visibility, rainfall, and wind speed to Dubai Police and Coastal Guards via smart phones to avoid weather-related disasters. As part of its road safety program, the main objective of the system deployment is to increase safety not only on the roads but also in the sea. The system has been useful to road officials including the police to provide enough warning to motorists during extreme weather events.

Sustainable Environment and Valued Natural Resources	
Natural Capital and Resilience Program	Environmental Goods and Services Program
<p><b>Supporting Plans, Policies, and Strategies</b></p> <ul style="list-style-type: none"> <li>• National Strategy for Integrated Management of Chemicals</li> <li>• National Food Security Strategy 2051</li> <li>• Water Security Strategy 2036</li> </ul>	<p><b>Initiatives</b></p> <ul style="list-style-type: none"> <li>• World's Largest Coral Reef Garden in Fujairah</li> <li>• Developing Water Resources to Promote Economic Sustainability</li> <li>• Food Security through Agricultural Technology</li> <li>• Biosecurity Early Notification System</li> </ul>

### Recognizing Nature's Role in Economic Development through Plans and Strategies

The UAE recognizes that its natural resources – water, land, minerals, and energy – are the base upon which the country's economic wealth depends. As such, to achieve green and inclusive growth, the UAE introduced several strategies, plans, and initiatives that support sound management of the country's natural assets. The plans and strategies, which includes the National Strategy for Integrated Management of Chemicals, National Food Security Strategy 2051, and Water Security Strategy 2036, provide the framework on how the UAE can wisely use its

natural assets while ensuring to minimize environmental and social risks in support of a green economy.

In offering a strategic lens in managing the UAE's natural resources, the strategies and plans in place identify areas for cooperation across sectors and leverage past and current efforts. The development of policies, programs, and partnerships are integral part of the strategies. Most importantly, the strategies emphasize the importance of managing the natural resources as part of the country's economic assets that help support UAE's green economic transformation.



### National Strategy for Integrated Management of Chemicals

To prevent illegal trafficking in chemicals and build national capacities with licensing the circulation, importation and disposal of chemicals, the Ministry of Climate Change and Environment (MOCCA) proposed the development of the National Strategy for Integrated Management of Chemicals in 2017. The development of the strategy shows that the UAE "is well aware of the challenges and negative effects created by the increasing demand for chemicals as a key component in various industries, on the environment and public health, especially in the stages of disposal." The National Strategy for Integrated Management of Chemicals is also a testament to UAE's commitment to strengthen its international cooperation on chemicals and waste as part of the parties to the United Nations' Stockholm, Basel and Rotterdam Conventions, in which the UAE played a key role by hosting the first international conference on chemicals management in 2006 and oversaw the adoption of the global chemicals management policy known as the Strategic Approach to International Chemicals Management (SAICM).

In April 2019, the Council of Ministers approved the National Strategy for Integrated Management of Chemicals for implementation. To ensure proper and timely implementation of the strategy, the MOCCA held stakeholder meetings in July 2019. Key stakeholders from the Ministry of Interior, Ministry of Health and Prevention, Office of Weapons, Ammunition, Explosives and Military Equipment, Environment Agency – Abu Dhabi, Federal Customs Authority, Environment Protection and Development Authority of Ras Al Khaimah, and municipal authorities in Dubai, Sharjah, Ajman, Fujairah, and Umm Al Quwain participated in the meeting and discussed the legislative frameworks and initiatives as well as programs related to the strategy.

The strategy represents an important step in UAE's efforts to achieving sustainability, where the sound management of resources including chemicals is an essential pillar in sustainable development. The National Strategy for Integrated Management of Chemicals serves as a regional benchmark in promoting sustainable development in the Middle East. With the strategy, the UAE will be able to provide a framework not only for the management of chemicals but also the management of natural assets exposed to the chemicals.

### National Food Security Strategy

As an effort to improve UAE's position as one of the major regional players in achieving food security and food diversification supporting green economy, the UAE launched the National Food Security Strategy at the second UAE Government Annual Meetings in Abu Dhabi in 2018, in which the government considered a wide range of actions to strengthen and support food sustainability in the UAE.

Based on a comprehensive review of the food system against the four pillars of food security, which include accessibility, availability, utilization, and stability, the strategy identifies and assesses opportunities for food diversification. The specific components of the strategy include local food production covering water use, agriculture, livestock, fisheries, and aquaponics; domestic and international food investments; food trade considering state-owned and private sector food enterprises; utilization, which covers food safety, consumption, nutrition, food losses and wastes. There are also overarching issues such as strategic reserves, planning and coordination, research and development as well as climate change that the NFSS touches on.

To achieve the objectives of the strategy, it proposed several initiatives for its various components. For local food production, for example, there is an initiative for efficient water use in agriculture as well as provision of support towards both the commercial as well as traditional and heritage farmers. There is also an initiative to enhance the sustainability of the date industry and the diversification of the vegetable supply in the UAE.

To support the livestock component, there is an initiative to develop smallholder sheep and goat value chain as well as the value chain for camel milk. The strategy also includes initiatives that enhance the commercial dairy and poultry sectors. Another initiative in support of the livestock component is the re-orientation of the government hay allocation.



### Water Security Strategy 2036

Considering the limited amount of freshwater resources in the UAE, the sustainable management of water assets has never been more important for the UAE's national security especially amidst its nexus with the changing climate. With global projections showing that the Middle East will experience severe water stress by 2030, the UAE comes prepared by developing a two-decade water security strategy known as the UAE Water Security Strategy 2036. The strategy recognizes that water is and will continue to be a socioeconomic catalyst that will help the UAE transition to a green economy and realize the UAE Vision 2021.

In September 2017, the Ministry of Energy and Infrastructure, formerly known as Ministry of Energy and Industry, launched the UAE Water Security Strategy 2036, which aims to ensure sustainable access to water during both normal and emergency conditions in line with local regulations, standards of the World Health Organization, and the UAE's vision to achieve prosperity and sustainability. Once implemented, the strategy will help reduce total demand for water resources by 21 percent, increase the water productivity index to USD 110 per cubic meter, reduce the water scarcity index by three degrees, increase the reuse of treated water to 95 percent, and increase national water storage capacity up to two days. To help achieve the targets, the UAE Water Security Strategy 2036 tackles policy development, legislation, water conservation awareness campaigns, use of advanced technologies, innovation, and building national capabilities in the field of water security through three main programs: Water Demand Management, Water Supply Management, and Emergency Production and Distribution.

The UAE Water Security Strategy 2036 also includes the establishment of six connecting networks between water and electricity entities across the UAE. The connected water networks will be able to provide 91 liters of water per person per day in cases of emergency, or 30 liters per person per day in cases of extreme emergencies. In two decades of implementation, the UAE Water Security Strategy 2036 will achieve savings of AED 74 billion and reduce the emissions of carbon dioxide (CO<sub>2</sub>), associated with water desalination process, by 100 million metric tons.

H.E. Suhail Mohammed Al Mazrouei, Minister of Energy and Infrastructure, affirmed that "the UAE Water Security Strategy 2036 came as a result of consolidated efforts between federal and local water authorities to explore and define a vision for the water sector in the UAE and to ensure adaptability to future demands on water resources." Minister Al Mazrouei pointed out that the comprehensive, long-term strategy covers all components of the water supply chain throughout a time frame of twenty years. The Minister also explained that the strategy will reduce average consumption per capita by half through increase reuse of treated water to 95 percent. The UAE Water Security Strategy 2036 encourages initiatives focusing on water efficiency, waste reduction, and behavioral change. According to Minister Al Mazrouei, the UAE Water Security Strategy 2036 introduces reforms to current water subsidies that have a negative effect on the sustainable development and the environment.

*"Such agreements are important to help preserve the pristine natural beauty of the region, and its precious marine environment. The project is the largest in the world and will help boost local and international interest in the coral reef and the marine environment"*

#### Saeed Al Muamari

Director of the Fujairah Centre for Adventures



### Fujairah is Home to the World's Largest Coral Garden

Coral reefs in the UAE were among the most extensive and highly productive ecosystems in northeastern Arabia. They provide a variety of valuable goods and services such as fish that serves as the main source of protein for a large segment of the population. Coral reef resources also provide services like recreation and tourism as well as coastal protection from storm surges.

Scientific evidence recognizes that the coral reefs in the Arabian Gulf sub-regions adapt well to some of the world's highest shallow sea temperature. In recent decades, however, the increase in sea temperature caused intense and frequent massive coral bleaching and mortality. There were mass coral bleaching and mortality in the Gulf that occurred in 1996 and 1998 that resulted in vast areas of dead corals. As such, there were losses of fish species of environmental importance that feed on coral-associated invertebrates.

To revitalize the fading of once healthy coral reefs in the marine waters of the UAE and to contribute to the preservation of marine biodiversity, the Ministry of Climate Change and Environment (MOCCA) signed an agreement with Fujairah's Centre for Adventures to create the world's largest coral garden off Fujairah's coast. The coral garden will help further boost the thriving marine tourism in Fujairah, which attracts keen snorkelers and divers across the country. The initiative also will make Fujairah a sanctuary for marine ecosystem rehabilitation not only in the UAE but globally.

MOCCA will provide the grown corals of various sizes and types for the garden. The Ministry will also render technical support and logistics services to the onsite team. The Fujairah Centre for Adventures, meanwhile, will ensure that the garden is easily accessible, within a protected area, and at less than one nautical mile from the shore. The Centre will also monitor the development of the coral garden and the area's biodiversity every three months.

### Developing Water Resources at the National and Emirate Levels to Promote Economic Sustainability

In line with the UAE Water Security Strategy 2036 and the UAE Vision 2021, the UAE Government protects its underground aquifers to act as strategic emergency reserves. Further considering climate change with some emirates getting more than their usual share of precipitation, the UAE government improves the efficiency of rainwater harvesting in dams to raise groundwater levels. Artificial injection technology is another option that the UAE puts in place to help replenish underground water reserves.

To ensure support towards the protection and development of natural water resources in all emirates, the UAE Government adopted the UAE Hydrological Map Initiative during the Annual Government Meetings in Abu Dhabi in 2018. As an e-plan that will help assess surface and groundwater resources for construction of dams and water facilities, the UAE Hydrological Map Initiative also provides data and information to identify areas of floods and the geographic distribution of different types of water bodies, as well as to determine the level, quality, and quantity of groundwater. The UAE Aqua Storage and Recovery Initiative, which focuses on the study of strategic water reserve storage in the northern and eastern Emirates, complements the UAE Hydrological Map Initiative.

At the Emirate-level, the Municipality of Abu Dhabi also recognized the mounting pressures on its aquifers. It is for this reason that in 2018, it unveiled the Groundwater Atlas of the Abu Dhabi Emirate, which complements the Groundwater Wells Inventory and Soil Salinity Mapping Project that the Environment Agency - Abu Dhabi (EAD) developed in 2015. To ensure sustainability and balance between development and the protection of essential water resources in Abu Dhabi, EAD developed the Atlas to improve the efficiency of the use of water resources and increase financial investment in the water management sector. The Atlas includes updated

groundwater maps as well as its natural, chemical and biological properties. For the first time in the UAE, the Atlas also provides the calculation of groundwater reserves and the capacity of the aquifers in the Emirate. The data and information provided in the Atlas allow decision-makers to develop the necessary plans, policies and procedures for sustainable groundwater management and protection from pollution, founded in evidence-based scientific study.

*"The provision of water at all times and under all conditions is one of the most important strategic challenges facing all countries. On its part, the UAE has developed comprehensive strategic plans to preserve water resources and enhance water security."*

**H.E. Suhail bin Mohammed Al Mazrouei**  
Minister of Energy and Infrastructure



### Boosting Food Security through Agri-Tech Platforms and Aquaculture Guidelines

At the UAE Government's second Annual Meeting in November 2018, the Minister of State for Food and Water Security, H.E. Mariam bint Mohammed Saeed Hareb Almheri, presented the National Food Security Strategy 2051. Key initiatives support the strategy to help the UAE achieve zero hunger by ensuring access to safe, nutritious and enough food all year round not only within its borders but throughout the world. The strategy specifically aims to implement resilient agricultural practices that increase productivity and production, that help maintain ecosystems. The key initiatives include the Food Valley Platform, the Aquaculture Pulse, and the Aquaculture Basket.

The Food Valley Platform seeks to provide basic and necessary information related to food security to enable interested parties to pursue research and development that facilitates global food trade for the UAE as well as food import source diversification. Information on funding resources, research agenda, and patent registration mechanisms for homegrown agricultural technology are available in the platform. There are also awareness-raising materials together with a list of the most important investors and relevant global research that the private sector can access to help them in the registration of agricultural technology-related patents.

Through the Aquaculture Pulse: A Guide to Grow the Aquaculture Sector, the UAE government will provide an overview of the consumption patterns of local and global markets, and the product specifications in terms of quality and size. Having the knowledge of production and consumption volume is part of the strategic approach to attract aquaculture investors. As such, the guide provides an overview of the most important ways to achieve success in the aquaculture sector, highlights the most

important competitive advantages of the country and the local production in terms of quality and cost, and aims at promoting sustainable farming systems, which would in turn reduce the pressure on the country's aquaculture stocks.

Together with the Aquaculture Pulse, the UAE also introduced the Aquaculture Basket, which is an integrated work program to acquaint the society with the importance of supporting sustainable production systems. It aims to and educate the community about the benefits and quality of aquaculture products. Further, the Aquaculture Basket helps promote local aquaculture products and facilitate their provision to customers, by enhancing cooperation with cooperative associations and vendors to allocate special markets the products.

Overall, the National Food Security Strategy 2051 through its various initiatives and projects, which also includes the creation of the National Governance Structure for Food Security, make the UAE one of the most food-secure countries in the world. Through enhancement of local agricultural production and the development of a comprehensive national system based on enabling sustainable food production using modern technologies, the initiatives will enable to make the UAE the world's best in the Global Food Security Index by 2051 and among the top 10 countries by 2021. The strategy and the various initiatives will also strengthen UAE's position as a global partner in food diversification.

The Municipality of Dubai agreed to build 12 vertical farms in the city, with the Ministry of Climate Change and Environment saying that it would allocate 7,600 square meters of land for the purpose.

### Biosecurity Early Notification System

With the aim to facilitate early identification and verification of outbreaks to UAE's plant and animal resources, the Ministry of Climate Change and Environment (MOCCA) released the Biosecurity Early Notification System in July 2019. Accessible at [https://](https://biosecalert.ae)

biosecalert.ae, the online system enables the public to report suspected cases of emerging epidemic agricultural threats and foodborne diseases with the aim of facilitating early identification and verification of outbreaks. The system features three main categories of notifications: Animal Development and Health; Agricultural Development and Health; and Food Safety.

#### Animal Development and Health

- Allows members of the community to alert the authorities to incidents related to infectious diseases of animals and violations of animal legislation, including animal cruelty, possession of dangerous animals, incompliant veterinary products and facilities, as well as illegal animal consignments.

#### Agricultural Development and Health

- Focuses on the occurrences of agricultural pests, such as the red palm weevil, Dubas bug, and stem and stalk borers.
- Early identification of pests and timely control action prevent major crop losses.

#### Food Safety

- Public can report unsafe food products including foodstuff traded or stored in unsanitary conditions, food products that are misleading to the consumer, contaminated, non-halal, or expired, as well as those that have caused food poisoning or an allergic reaction after consumption.

The online notification system utilizes artificial intelligence (AI) to direct alerts to concerned authorities. Through AI, the system can assess if a case is high-risk and if so, the system will generate an automatic notification to the Environmental Disasters Department of MOCCA. The system provides real-time information to staff of relevant government entities to allow for a coordinated response. The notification system produces investigation reports and provides updated statistics on the reported incidents to track the geographical distribution of the disease and contain it to reduce morbidity and mortality as well as prevent further spread. In addition, the system automatically generates daily reports of high-risk notifications, and circulates the latest laws and ministerial resolutions to government authorities.



*"MOCCA developed the Biosecurity Early Notification System to detect and contain suspected outbreaks and create a database of notifications to inform biosecurity decision making. The move aligns with the objectives of the UAE Vision 2021 and the Ministry's mission of protecting the environment, preserving and developing natural resources, and ensuring their efficient and sustainable use. The user-friendly, bilingual platform engages the public in our endeavors to keep pathogens at bay. Implementing a unified process for reporting environmental threats on a national scale will help us remain vigilant and highly responsive."*

**H.E. Saif Al Shara**

Assistant Undersecretary for the Sustainable Communities Sector at the Ministry of Climate Change and Environment





Clean Energy and Climate Action		
Integrated Power and Water Management Program	National Renewable Energy Program	National Green Economy Data Program
<b>Supporting Plans, Policies, and Strategies</b> <ul style="list-style-type: none"> <li>National Policy for Reducing Transport Sector's Emissions</li> <li>Energy Strategy 2050</li> <li>Water Security Strategy 2036</li> <li>National Energy and Water Demand Program</li> <li>UAE Energy Outlook</li> <li>National Climate Change Adaptation Program</li> </ul>		<b>Initiatives</b> <ul style="list-style-type: none"> <li>Al Dhafra Solar Photovoltaic (PV) Power Project</li> <li>Solar Rooftop Panels at the Dubai International Airport</li> <li>Clean Energy and Emissions Reduction at the 2019 Special Olympics World Games in Abu Dhabi</li> <li>Waste-to-Energy Initiative in Ras Al Khaimah</li> <li>Knowledge and Data-Driven Change through Environmental GIS</li> <li>Peaceful Nuclear Energy Program</li> <li>Green Hydrogen Project</li> </ul>

### Policies and Strategies to Promote Clean Energy Use and Address Climate Change Impacts

At the global level, there is an agreement that to combat the impacts of climate change, there must be a dramatic change on the way we produce and use energy. The shift to renewable and non-fossil-based fuels is necessary if we are to reduce emissions and transform to a greener economy. The UAE, through various international agreements, committed to be part of the change at the policy and institutional levels.

Between 2017 and 2019, the UAE reached several milestones in support of clean energy and combatting climate change. The most recent is the launching of the National Policy for Reducing Transport Sector's Emissions in 2018. The Ministry of Energy and Infrastructure, formerly known as Ministry of Energy and Industry, also developed the UAE Energy Strategy 2050, which the National Energy and Water Demand Program and the UAE Energy Outlook complement.

#### National Policy for Reducing Transport Sector's Emissions

In its effort to support the reduction of emissions from the transport sector, the Ministry of Energy and Infrastructure, formerly Ministry of Infrastructure Development (MOID), developed the standards and specifications of electric and hybrid vehicles through the National Policy for Reducing Transport Sector's Emissions. The policy adopts a future-oriented and holistic approach to the transportation sector based on alignment between various stakeholders. By implementing this policy, MOEI exemplifies integration with initiatives in other ministries such as those related to air quality under the Ministry of Climate Change and Environment as well as the Ministry of Health and Prevention.

#### UAE Energy Strategy 2050 and the UAE Energy Outlook

Considered as the first unified energy strategy based on supply and demand, the UAE Energy Strategy 2050 targets an energy mix that combines renewable, nuclear and clean energy sources to meet the UAE's economic requirements and environmental goals: 44 percent clean energy, 38 percent gas, 12 percent clean coal, and %6 nuclear. Launched in 2017, the strategy aims to intensify the contribution of clean energy in the total energy mix to 50 per cent by 2050 and reduce carbon footprint of power generation by 70 percent, thus saving AED 700 billion by 2050. It also aims to increase consumption efficiency of individuals and corporates by 40 per cent. To meet these targets and ensure sustainable economic growth, the UAE government invests AED 600 billion in support of this strategy.

The UAE Energy Outlook launched in 2015 served as the precursor to the development of the UAE Energy Strategy 2050. The outlook features current energy models to form an integrated framework and simulate the several policy options to support the accomplishment of the UAE Energy Strategy 2050 objectives. The UAE Energy Outlook also offers long-term energy forecasts for all sectors.

#### National Energy and Water Demand Program

In January 2019, the Ministry of Energy and Infrastructure, formerly known as Ministry of Energy and Industry, unveiled the National Energy and Water Demand Program, an initiative to align with the UAE Energy Strategy 2050. The program involves the MWH company, a leading engineering and consulting firm, to undertake a six-month study devoted to the expansion of a major action plan for all key sectors in UAE including construction, industry, transport, and agriculture sectors. In partnership with strategic partners to support the existing national efforts towards a better future for UAE, the National Energy and Water Demand Program uses knowledge and innovation to support the development of sustainable and diversified UAE economy.

In September 2017, the Ministry of Climate Change and Environment unveiled the National Climate Change Adaptation Program. The Program involves a systematic process to identify risks and adaptation measures based on internationally recognized tools and practices and in close cooperation with relevant stakeholders. The Program considers health, energy, infrastructure and environment sectors as the first set of priority sectors to assess.

**Al Dhafra Solar PV Power Project**

The construction of the 2,000 MW solar photovoltaic (PV) power project at Al Dhafra in Abu Dhabi is underway with the PV power project expected to be operational in the first quarter of 2022 taking Abu Dhabi's solar capacity to 3,200 MW according to the Emirates Water and Electric Company (EWEC). The initiative forms part of the UAE's commitment to the Energy Strategy 2050 and targets to service nearly 100,000 households. The initiative's target is to decrease Abu Dhabi's CO<sub>2</sub> emissions by more than 1.6 million metric tons per year, equivalent to eliminating 330,000 cars from the road. Othman Al Ali, CEO of EWEC, noted that "the strong interest expressed so far [in solar PV] illustrates the attractive business model and reaffirms the strong case for investment in UAE's renewable energy sector...we continue to deliver on our ambitious sustainable generation program, and this new plant is integral to our strategic plan to deliver on the clean energy mix outlined by the UAE Energy Strategy 2050." EWEC, a subsidiary of Abu Dhabi Power Corporation (ADPower), specializes on integrated coordination of planning, purchasing, and supply of water and electricity in Abu Dhabi and beyond.

**Solar Rooftop Panels at the Dubai International Airport**

As part of its green initiatives, the Dubai International Airport (DXB) completed the installation of 15,000 photovoltaic panels on the rooftop of its Terminal 2. The Etihad Energy Services Company (Etihad ESCO), a subsidiary of the Dubai Electricity and Water Authority (DEWA), oversaw the installation of the solar project that has a capacity of 5 megawatts. The panels will generate

approximately 7.5 million kilowatt-hours of energy annually that will help reduce energy consumption for Dubai Airport's Terminal 2 by 29 percent, which is equivalent to AED 3.3 million savings in electric bills. The project also slashes annual carbon dioxide emissions by 3,243 metric tons, equivalent to 53,617 tree seedlings grown for 10 years or 688 passenger vehicles driven for one year.

The installation of the solar rooftop panels at the Dubai Airport is part of Shams Dubai, a DEWA initiative that targets to endorse the use of clean renewable energy sources. The Shams Dubai initiative supports the installation of solar panels on rooftops to generate electricity and connecting it to DEWA's grid to transfer surplus generation. The initiative will expand beyond solar projects in the industrial sector to private homes.

*"Dubai Airports has undertaken a variety of green initiatives over the past several years to limit our carbon footprint and support Dubai's goal for a 30 per cent reduction in the city's energy consumption by 2030."*

**Michael Ibbitson**  
Executive Vice-President, Infrastructure and Technology - Dubai Airports



### Clean Energy and Emissions Reduction at the Heart of the 2019 Special Olympics World Games in Abu Dhabi

While keen on creating an atmosphere of inclusion and community through games where every single person is accepted and welcomed regardless of ability, the UAE government also ensured that the 2019 Special Olympics World Games in Abu Dhabi sets the standard for sustainability. As such, the various government partners including the Ministry of Climate Change and Environment (MOCCA) as well as the Abu Dhabi Department of Energy (DOE) launched several initiatives that support the use of clean energy and reduction of emissions during the 2019 Special Olympics World Games. The initiatives include Clean Energy on the Move, Sustainable Energy at the Venues, and Powering the Olympics.

The DOE allocated a fleet of electric cars and eco-friendly bus to shuttle participants and the public between the venues of the Special Olympics World Games in Abu Dhabi 2019. This is part of DOE's Clean Energy on the Move initiative. Throughout the duration of the Special Olympics from March 14 to 18, the electric vehicles travelled 5,652 kilometers, which cut carbon emissions by 1,778 kilograms, making an environmental impact that is equivalent to planting 23 trees.

The Clean Energy on the Move initiative also asserts Abu Dhabi's position as an active partner in global efforts that aim to rationalize the consumption of natural resources, reduce carbon emissions, and curb the effects of pollution on the environment and public health. It also reflects the Emirate's commitment to adopting advanced technologies and solutions that help in energy conservation. The DOE hopes that at the global level, individuals and companies will embrace these solutions and play their part in improving quality of life.

In further support of sustainability at the 2019 Special Olympics World Games in Abu Dhabi, MOCCA signed an agreement with the Higher Committee of the Special Olympics to lessen the Games' carbon footprint. The agreement includes a memorandum of understanding (MoU) to plant local trees to balance out the carbon emitted during the Special Olympics. The agreement is in line with targets set by UAE's Supreme Council of Energy

in June 2018 to eliminate 11 million tons of local carbon emissions by 2021. H.E. Dr. Thani bin Ahmed Al Zeyoudi, former Minister of Climate Change and Environment, and His Excellency Mohamad Abdullah Al Junaibi, chairman of the Higher Committee of Special Olympics World Games Abu Dhabi jointly signed the agreement.

*"The Clean Energy on the Move initiative allows us to highlight the importance of clean energy and sustainable lifestyles and encourages the public to embrace green transportation solutions that reduce carbon emissions, protect the environment and natural resources, and significantly improve quality of people's life. This also reduces noise pollution resulted from the ordinary cars using traditional fuel sources. This is aligned with the wise vision of the UAE's leadership, the objectives of the UAE Centennial 2071 to make the UAE the best country in the world, and the Abu Dhabi Vision 2030, to create a sustainable environment, improve air quality, and limit the impact of climate change."*

**H.E. Mohammed Juma bin Jarsh Al Falasi**  
Undersecretary, Abu Dhabi Department of Energy



### Waste-to-Energy Initiative in Ras Al Khaimah

To reduce the impact of waste on the environment and human health, the various Emirates implemented waste-to-energy projects in support of the Ministry of Climate Change and Environment's circular economy campaign where coal-burning cement factories must use local municipal solid waste for at least 10 percent of its energy needs by 2020. The Waste Management Agency of Ras Al Khaimah is one of the Emirates that heed the Ministry's call. Centered on making the most out of its natural resource waste such as animal waste, the Municipality of Ras Al Khaimah initiated the waste-to-energy initiative from camels in 2018.

As home to roughly 9,000 camels that produce around 50 tons of waste daily, Ras Al Khaimah has a lot of camel waste that farmers traditionally use as fertilizers. The rise of the camel racing industry across the country led to an oversupply of camel waste in Ras Al Khaimah. Instead of dumping the excess wastes, the Waste Management

Agency at Ras Al Khaimah's Public Works and Service Department tied the camel and cement industries to cut carbon emissions and support the central premise of circular economy, which is to reduce waste and make the most of the available resources.

By May 6,000, 2019 camels in Ras Al Khaimah provided more than 10,000 tons of waste to the Gulf Cement Company in the town of Khor Kair. The cement factory converts the camel waste to fuel that helps them generate electricity. Current estimates show that camel waste replace about eight to ten percent of coal utilized in the cement factory, which results to an estimated 18,000 tons of carbon emissions reduction.

The Waste Management Agency of Ras Al Khaimah plans to expand the project following the success at the Gulf Cement Company. There are 14 cement plants in the UAE and six are in Ras Al Khaimah. The expansion will help lessen the amount of coal burned in the Northern Emirates, which is currently 13,000 tons daily.

**Knowledge and Data-Driven Change through Environmental GIS**

In support of knowledge and data-driven change, MOCCAЕ launched the interactive Environmental Geographic Information System (GIS) in 2018. The Environmental GIS offers access to baseline geospatial database of environmentally-significant locations. It has three main features: GeoEnvAE smart application for smart phones and tablets, the MOCCAЕ GIS website, and the ad hoc “Environmental Atlas” maps system.

The GeoEnvAE application provides a range of geospatial data and services to help the Ministry’s service users effortlessly locate any of the Ministry’s customer service centers, agricultural and veterinary quarantine centers, agricultural and veterinary extension centers, and fishing boats registration centers, which are distributed across the country. The application has a total of 1,133 geographic locations on 16 maps. The GIS websites offers 48 maps, which in turn feature over 20,000 locations. The Environmental Atlas, on the other hand, shows 11 maps that highlight 21 types of services offered in 16,474 locations. MOCCAЕ carried out a large-scale agricultural survey of the Northern Emirates using drones to further support the Environmental GIS initiative and improve services to farmers, as well as enhance policy development.

Speaking on the newly-launched system, His Excellency Dr. Thani bin Ahmed Al Zeyoudi, former Minister of Climate Change and Environment, said: “The bilingual system is aimed at facilitating and expediting customers’ access to environmentally-significant locations. It provides niche maps that can be of great value to the Ministry’s customers, environmental and agricultural researchers, as well as control and awareness teams from the Ministry and local entities. The new system will serve as a guide for the Ministry’s services, ecotourism sites, environmental development and research activities, among many others.”

**UAE’s Operation of its First Nuclear Power Plant**

As part of the UAE’s Peaceful Nuclear Energy Program, the Emirates Nuclear Energy Corporation (ENEC) has started the operation of Unit 1 of the Barakah Nuclear Energy Plant, located in the Al Dhafrah Region of Abu Dhabi. The UAE is the first Arab country to develop a nuclear energy plant, which contributes to the UAE’s efforts to move towards the energy security and decarbonization of power production.

**Green Hydrogen Project**

The UAE is also investing in green hydrogen as part of diversifying the energy mix. DEWA is collaborating with Expo 2020 and Siemens Energy in commissioning the first green hydrogen plant in Dubai. The Abu Dhabi Hydrogen Alliance – composed of Mubadala, Abu Dhabi National Oil Company (ADNOC), and ADQ – was also launched to accelerate the adoption of hydrogen technology in domestic and international markets. As a first concrete step of the alliance, Masdar City is developing the design of its green hydrogen demonstrator plant.



Green Life and Sustainable Use of Resources		
Natural Energy and Water Efficiency Program	National Waste-to-Resource Program	National Sustainable Transport Program
<b>Supporting Plans, Policies, and Strategies</b> <ul style="list-style-type: none"> <li>National Policy on Vital Residential Communities</li> <li>National Strategy for Integrated Management of Chemicals</li> </ul>		<b>Initiatives</b> <ul style="list-style-type: none"> <li>Umm Al Quwain’s Refused-Derived Fuel Facility</li> <li>Smart Metering in Sharjah and Dubai</li> <li>National Bank of Fujairah’s Green Auto Loans</li> <li>E-Vehicles in Ajman and Dubai</li> <li>Sustainable and Integrated Waste Management in Umm Al Quwain and Ras Al Khaimah</li> </ul>

**Cross-cutting Plans and Strategies that Support Greener Lifestyle and the Sustainable Use of Resources**

The use of primary resources in the UAE has been increasing since nationhood. Recognizing that resources such as fossil fuels and minerals are limited while renewable resources such as water are at times mismanaged, the UAE government focused on achieving sustainable and efficient resource use for a greener economy. Considering that natural and manmade resources are the backbone of UAE’s economy, the government developed and implemented plans and strategies that traverse across sectors to support sustainable resource use.

In using water resources and transforming them to other products, for example, the UAE has the Water Security Strategy 2036 that supports the efficient utilization of the country’s scarce yet very precious freshwater resources. The UAE also has the National Policy on Vital Residential Communities, which promotes sustainable production and consumption of energy. In addition, national authorities launched several procedures through the National Strategy for Integrated Management of Chemicals to manage utilization and minimize its adverse impacts to ecosystems and human health. Several on-the-ground initiatives and projects support these strategies including those related to energy efficiency in the transport and power sectors as well as waste management.

**Umm Al Quwain’s Refused-Derived Fuel Facility**

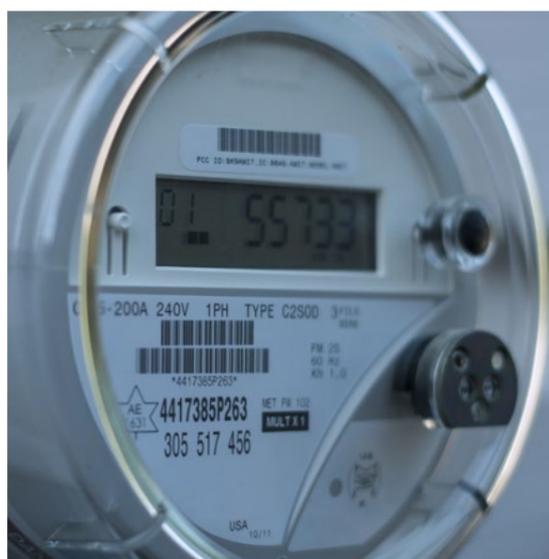
To sustainably manage the growing stream of waste generated across the country, the Ministry of Climate Change and Environment (MOCCAЕ) entered into an innovative venture that will not only help reduce waste but also generate energy. Under a public-private-partnership scheme co-financed by the Ministry of Presidential Affairs, MOCCAЕ signed an AED 132 million concession agreement with the shareholders of the Emirates RDF Company to develop and operate a refused-derived facility in Umm Al Quwain. The Emirates RDF Company is a joint-venture among Belgium-based Besix, the UAE’s TG Eco Holding, and Finland’s Griffin Refineries.

With target full operation in 2020, the -40hectare refuse-derived fuel (RDF) plant in Umm Al Quwain implements a build-operate-transfer scheme including a -15year operational phase. Accordingly, the RDF facility will operate using the latest technologies to produce alternative fuel from solid waste. The facility will use and process approximately 1,200 tons of municipal solid waste (MSW) from Ajman and Umm Al Quwain. The alternative fuel produced in the facility will go to cement factories to replace traditional coal as fuel sources.

### Sustainable Energy and Water Resource Use through Smart Metering in Sharjah and Dubai

The UAE utilities are pursuing smart metering for power and water. Smart meters allow utilities to better manage power outages and restoration especially during peak events. In January 2018, the Dubai Electricity and Water Authority (DEWA) announced its goal to install 1.2 million smart water meters by 2020. In October 2018, DEWA announced their initiative to establish 270,000 new smart meters across Dubai under Phase 3 of its Smart Applications via Smart Grid and Meters Initiative, which supports the Smart Dubai initiative. The Smart Grid and Meters Initiative in Dubai enables monitoring efficient consumption.

To reduce losses and more effective power consumption among its residents, the Sharjah Electricity and Water Authority (SEWA) completed the installation of 48,000 smart meters across the Emirate in April. Together with the smart meter installation, SEWA also regularly implements effective energy conservation campaign that urges families to reduce the power usage at home during summer between 2.30 pm and 3.30 pm, the peak hours of power consumption. In 2017, this initiative had led to energy savings of up to 40 megawatts, which is sufficient to power up to 2,000 UAE homes on a daily average. The Municipality of Dubai has a similar initiative called Peak Load summer campaign.



### Supporting Low-Carbon Economy through the National Bank of Fujairah's Green Auto Loans and the Introduction of E-Vehicles in Ajman and Dubai

Sustainable consumption and production patterns are not only essential to a low-carbon society but also a vital building block for a greener life. In the UAE, there are several initiatives in place related to transport that support transition to low-carbon economy and greener lifestyle. These initiatives help create a market for climate-friendly and sustainable products, which lead to less environmental pollution.

Between 2017 and 2018, the Municipalities of Ajman and Dubai started the aggressive campaign to shift to electric and hybrid vehicles. In December 2018, the Dubai Roads and Transport Authority (RTA) launched the very first hybrid Abra, a traditional wooden ferry that transports people mainly along the Dubai waterways. The hybrid Abra has a capacity for 20 riders and powered by a 20 kilo-watt electric motor that has a lighter weight due to use of cutting-edge technology. In addition, the hybrid Abra has 26 lead crystal batteries and solar energy panels along with a standby generator to recharge batteries when running low in power. With its features, the hybrid Abra lessens fuel consumption by 172 percent and therefore saves about 134 percent of fuel cost.

Also, in 2018, the Dubai Supreme Council of Energy launched the E-Sayyara, a government-backed campaign to increase the use of electric vehicles (EV) driven by the private sector and residents on the roads of Dubai. E-Sayyara means e-car in Arabic and it aims to encourage residents of Dubai to join the Drive Clean Initiative. In support of the E-Sayyara, DEWA offered registered EV users free charging for their vehicles through DEWA's green charger stations, which saw an additional 100 EV green charger stations in October 2018. The RTA also supports the Drive Clean Initiative with the aim to transfer 50 percent of its fleet to hybrid cars by 2021 and operate 50 electric limousines at the Dubai International Airport.

The Municipality of Ajman launched an initiative that also promotes the use of eco-friendly hybrid vehicles. In December 2017, Ajman's Department of Agriculture and

*"E-Sayyara initiative comes in line with the Dubai Green Mobility Strategy 2030, UAE Vision 2021 and Dubai Plan 2021 which supports the efforts of Dubai Emirate to enhance sustainability, air quality and fuel efficiency."*

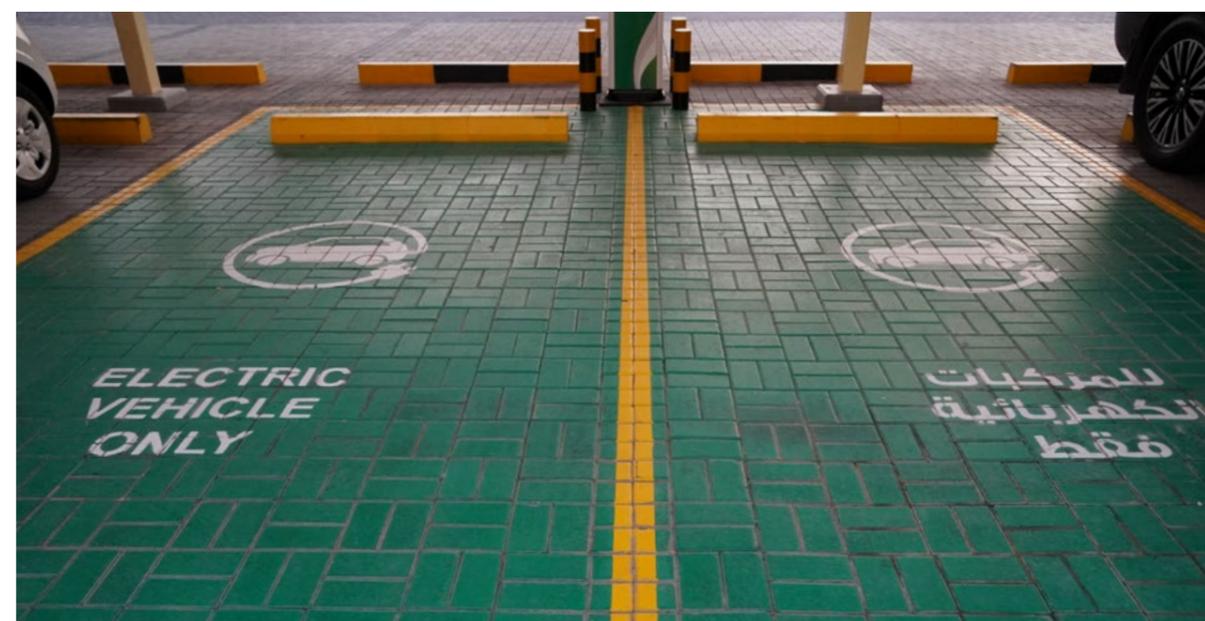
**H.E. Saeed Mohammed Al Tayer**  
Vice Chairman of the Dubai Supreme Council of Energy and CEO of the Dubai Electricity and Water Authority



Public Parks and the Planning Department launched environmentally friendly hybrid vehicles to harness alternative energy in protecting the environment. The initiative reflects the strategic objective adopted by Ajman's Council of Happiness and Positivity to provide clean renewable energy in public facilities for achieving sustainable development.

To ensure that UAE residents have the financial capacity to support the EV initiatives in various Emirates, the National Bank of Fujairah (NBF) launched the Green Auto Loan in July 2018. The loan product is in line with NBF's pledge to support the UAE's transformation into a low-

carbon economy as part of the UAE Vision 2021. Together with its Go Green Initiative, NBF draws the interests of UAE residents towards hybrid and electric vehicles by making car financing more accessible. As a signatory to the Dubai Declaration on Sustainable Financing since 2017 supporting environmentally friendly projects, NBF continues to demonstrate its position as the financial partner that is dedicated to satisfying its clients' changing needs while boosting them to invest in environmentally friendly solutions. Customers who are UAE nationals and expat residents aged 18 years are eligible to apply for the Green Auto Loan.



**Sustainable Waste Management through Landfill Rehabilitation in Umm Al Quwain and Recycling in Ras Al Khaimah**

To achieve the target of treating 75 percent of municipal solid wastes (MSW) across the UAE, the Ministry of Climate Change and Environment (MOCCA) implements a holistic approach to improve the capacity and efficiency of UAE’s waste management facilities. In October 2018, the Ministry awarded the contract to ETHPE Contracting to commence the rehabilitation of the landfill in Umm Al Quwain. ETHPE Contracting specializes in the implementation of integrated approaches in public works, hydraulics, and the environment sector.

This initiative is in alignment with the Ministry’s mandate to implement sustainable and integrated waste management across the UAE. The landfill rehabilitation initiative includes sustainable site remediation. The construction of a drying bed for industrial wastewater and a landfill cell for hazardous solid waste is also part of the initiative.

Recycling or the reuse of resources is not only an important part of sustainable waste management system but also an integral component of sustainability. Recycling supports

the reduction of waste on the environment and it alleviates the pressure on natural resources. For these very reasons, the Waste Management Agency of Ras Al Khaimah launched an innovative recycling program in 2017 that they called RAK Recycles, which enables Ras Al Khaimah residents as well as local schools, government organizations and companies, to streamline their waste management technology by segregating the different types of waste before being placed in designated bins.

The recycling program encourages residents to separate food waste from other recyclable materials. The Ras Al Khaimah Waste Management Agency re-purposed shipping containers as waste food treatment centers. The Agency fitted out the containers with either a waste food digester or a food waste composter to demonstrate how food waste can be used very efficiently to contribute positively to the environment.

Through the RAK Recycles program, the Waste Management Agency of Ras Al Khaimah can reduce MSW by 75 percent by 2021 because the program diverts a large amount of waste especially plastics from landfills resulting in lower toxic emissions and carbon footprints.



*“Our landfills are under immense pressure to accommodate the growing amounts of waste generated due to the steady increase in population and industrial activity. Unless we address this issue, the waste management challenge will pose a significant risk to the environment and the community at large.”*

**H.E. Dr. Abdullah Belhaif Al Nuaimi**  
Minister of Climate Change and Environment

## Chapter 3. International Cooperation for Green Economy Transformation

While working to ensure a green economy transformation within its borders, the UAE remains committed to global and regional ambitions for a resilient and sustainable future. Through participation in international multilateral negotiations, the UAE also engaged in various dialogues and engagements to catalyze cooperation in the area of data and knowledge sharing, capacity development, and building green alliances. The UAE also served as the global stage for several high-level global gathering supporting sustainability.

### Abu Dhabi Climate Meeting as a precursor to the UN Climate Change Summit 2019

The UAE, in collaboration with the United Nations, hosted the high-level Abu Dhabi Climate Meeting from 30 June to 1 July, 2019. The Abu Dhabi Climate Meeting served as a precursor to the UN Climate Action Summit 2019, where world political leaders, climate change experts, and global business chiefs descended in September 2019 in New York City to develop ambitious climate solutions. In New York, the UAE articulated its continued support for the Summit and expressed its honor at hosting the Abu Dhabi Climate Meeting, which helped prepare for the UN Secretary-General's Climate Action Summit 2019.

The Abu Dhabi Climate Meeting brought together Ministers, government officials, businesses, civil society organizations, local authorities, youth representatives, and the UN system with the central purpose of taking stock of the global climate action progress. At the Climate Meeting's leaders' roundtable on energy transition for climate action that assessed the economic and political

levers for transformative reduction of greenhouse gas emissions in the energy sector, MOCCA reflected on the importance of utilizing accessibility to renewables and sustainable sources of energy. MOCCA announced UAE's pledge to launch a 2GW solar project in Al Dhafra region of Abu Dhabi.

One unique feature of the Abu Dhabi Climate Meeting included two events tailored to the international youth. The first is the Youth Dialogue Session, which provided a platform for selected youth delegates to directly have a dialogue and discussion with the UN Secretary General and the Meeting's key speakers including H.E. Shamma Al Mazrui, UAE Minister of State for Youth Affairs and H.E. Jayathma Wickramanayake, the UN Secretary-General's Youth Envoy. The youth delegates also participated in all the roundtable meetings as representatives with speaking privileges. The participation of the youth in the roundtable meetings paved the way for the second youth session which followed a feedback format. The second youth session gave the international youth delegates the opportunity to direct their feedback on key climate issues discussed at the Climate Meeting to the UN Deputy Secretary-General, Amina Mohammed, as well as the chairs of the other roundtable meetings.

Speakers at Abu Dhabi Climate Meeting outlined a series of key recommendations that they believe are necessary if the global community is to meet targeted climate action objective. At the Leaders' Roundtables, Ministers recommended for enhanced collaboration with the private sector to scale up action. The Leaders also espoused for the development of ambitious national policies to support the energy transition, taking into account securing a just transition, and how the private sector can support this, not least in hard-to-abate sectors through renewables and energy efficiency, including the role of innovation, new technologies, and research and development. The other key recommendations include the engagement of young people from across the globe as catalysts for climate action and to establish the health and climate nexus.

## International Green Development Coalition: The Belt and Road Initiative

The UAE has been a key player in the implementation of the Belt and Road Initiative, currently the world's largest infrastructure investment with the aim to connect 115 countries through transportation, energy, and telecommunications infrastructure, industrial capacity, and technical capacity building. During the visit of Sheikh Mohammed bin Rashid Al Maktoum, Vice President and Ruler of Dubai, to China in April 2019, he announced UAE's investment of USD 3.4 billion in Dubai via the Belt and Road Initiative. In July 2019, during the state visit to China of Sheikh Mohammed bin Zayed Al Nahyan, Crown Prince of Abu Dhabi and Deputy Supreme Commander of the UAE Armed Forces, the Chinese Foreign Minister Wang Yi reiterated that the Belt and Road Initiative does not only economically benefit the two countries but also serves as a positive example of bilateral cooperation.

In further support of the Belt and Road Initiative, the UAE Cabinet approved its accession to the International Green Development Coalition in June 2019. As an inclusive and voluntary international network, the Coalition includes over 100 international partner institutions. It integrates sustainable development considerations throughout the design, execution, and long-term implementation of infrastructure projects. The International Green Development Coalition also serves as a platform for policy dialogue and communication, as well as for exchanging data and other information on ecological

conservation, environmental protection, and the prevention and mitigation of pollution. Through green policy dialogues, trade, and cultural exchanges, the UAE supports the Coalition.

## High-Level Meeting on Climate and Sustainable Development for All

In March 2019, Maria Fernanda Espinosa, President of the United Nations General Assembly for the 73rd session convened senior representatives and officials from governments and international organizations in New York City to address the issue of safeguarding global climate for present and future generations of humankind within the framework of the economic, social and environmental dimensions of the 2030 Agenda for Sustainable Development.

MOCCAIE participated in the High-Level Meeting. On the sidelines of the meeting, MOCCAIE joined a panel session titled Synergies between the Climate and Sustainable Development Agendas to highlight the UAE's National Committee on SDG's and its efforts of mainstreaming SDGs across all the operations. Furthermore, MOCCAIE discussed the creation of SDG Global Council in UAE which is a unique coalition of decision-makers from governments, international organizations, private sector, academia, and the youth that mandates to share innovative initiatives and deliberate on the creative application of the SDGs at national and global levels.

## UNEA-4 | The Fourth Session of the United Nations Environment Assembly

The UAE reiterated its call for collective international action to boost and fast-track sustainable development outcomes at the fourth session of the UN Environment Assembly (UNEA-4) held in Nairobi from 11-15 March 2019. Under the theme "Innovative Solutions for Environmental Challenges and Sustainable Consumption and Production," the UAE affirmed its commitment to responsible production and consumption. For three consecutive years, the UAE has celebrated the National Environment Day under the theme 'Sustainable Production and Consumption' to promote sustainable production and consumption patterns in the country. The UAE's efforts in this area led to the development of the Framework for the UAE National Sustainable Production and Consumption Plan (2019-2030), the National Strategy for the Integrated Management of Chemicals, and the federal law on integrated waste management.

In further support of the Sustainable Development Goals (SDGs), the UAE stated at the Assembly that it is gearing up to launch into space the first nanosatellite in the region. The nanosatellite will collect and analyze environmental data to inform sustainable solutions to climate and environmental challenges. Furthermore, as part of the discussions during UNEA-4, the UAE emphasized the importance of mobilizing sustainable finance to support the UAE Green Agenda 2030, which promotes the development of value-added industries such as clean energy, as well as the green buildings and sustainable cities concepts.

## World Ocean Summit

The UAE, under the patronage of His Highness Sheikh Mohamed bin Zayed Al Nahyan, Crown Prince of Abu Dhabi and Deputy Supreme Commander of the UAE Armed Forces, hosted the sixth edition of the World Ocean Summit from 5-7 March 2019. The Summit, brought together more than 500 delegates including political leaders and policymakers, heads of global

business, scientists, NGOs and multilaterals from across the globe. With the overarching theme of "Building Bridges," the Summit aimed to provide a forum for discussion on how best to transform, govern and encourage a sustainable blue economy. The Summit featured topics related to the role of finance in blue carbon systems as well as technology and innovation in advancing sustainable fisheries.

During the Summit, the Ministry of Climate Change and Environment (MOCCAIE) and the Environment Agency – Abu Dhabi (EAD) unveiled the UAE National Framework for Sustainable Fisheries 2019-2030. The framework is the country's first national recovery plan for fisheries. It aims to mitigate the effects of certain threats such as overfishing and sustain an environmentally sustainable fishing sector in UAE that is economically viable and socially responsible as well.

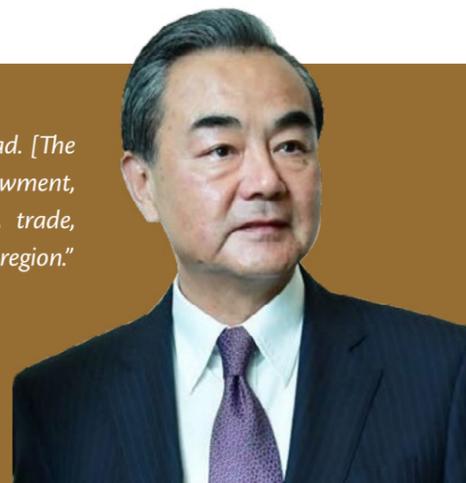
The summit also hosted a panel discussion on UAE's blue economy where, Razan Khalifa Al Mubarak, managing director of the EAD, stated that the summit is an opportune moment considering the UAE's leadership in the Indian Ocean Rim Association (IORA). IORA is a dynamic inter-governmental organization that aims to strengthening regional cooperation and sustainable development within the Indian Ocean region. Currently, IORA has 23 Member States and 9 Dialogue Partners.

## Davos 2019 | World Economic Forum

In January 2019, H.H. Sheikh Hamdan bin Mohammed bin Rashid Al Maktoum, Crown Prince of Dubai, led the UAE delegation to the forty-ninth session of the World Economic Forum in Davos, Switzerland. The delegation includes Mohammad Al Gergawi, Minister of Cabinet Affairs and The Future, Obaid Al Tayer, Minister of State for Financial Affairs and Dr. Thani Al Zeyoudi, former Minister of Climate Change and Environment (now Minister of State for Foreign Trade and Minister in charge of Talent Attraction and Retention at Ministry of Economy), among others. The UAE delegation participated in various sessions and meetings under the overall theme of Globalisation 4.0: Shaping a Global Architecture in the Age of the Fourth Industrial Revolution.

*"The UAE will become a shining pearl along the Belt and Road. [The UAE has] favourable location, rich energy and resource endowment, and peaceful and stable economy, and as an economic, trade, financial, and shipping hub in the Middle East and the Gulf region."*

**H.E. Wang Yi**  
Foreign Minister of the People's Republic of China



The forum witnessed an active UAE participation in ten key sessions that addressed the most imperative global challenges in the domains of economy, advanced science, space, artificial intelligence, environment and entrepreneurship. In the environmental domain, MOCCAIE participated in the “Accelerated Economy Acceleration Platform,” which aims to support leaders in the public and private sectors and stimulate collaborative projects aimed at achieving smooth transition to the circular economy, focusing on combating the topic of electronic waste and lifecycle assessment of such products. Moreover, MOCCAIE also participated in a session calling for collaborative action towards the use of plastic. The latter session focused at devising a focused group of government, business and civil society members to lead the formation of a global partnership on plastic waste.

## COP 24 | United Nations Climate Change Conference

The 24th Conference of Parties to the United Nations Framework Convention on Climate Change (COP 24) held in Katowice, Poland in December 2018 adopted the Paris Agreement Work Programme (PAWP), which includes the agreed rules for the implementation of the Paris Agreement. The outcome of the PAWP recognized the need for flexibility for developing countries, as well as the mitigation co-benefits resulting from adaptation action and economic diversification plans, which is in line with the position of the UAE and the Arab League. The PAWP also highlighted the need for financial and technical capacity building support from developed to developing countries.

MOCCAIE led the UAE delegation to COP24, which consisted of over 100 members from federal and local governments as well as the private sector and youth representatives. The UAE delegation actively participated in the negotiations and side events where they showcased UAE’s commitment to climate action, including the Talanoa Dialogue, Youth Climate Mentorship, Global Climate Action Agenda, Sustainable Innovation Forum and the Arab League Ministerial Meeting.

At COP 24, MOCCAIE also highlighted the Climate Project of the UAE. The Project aims to positively influence 10 million people globally and support them to become resilient to the impacts of climate change. COP 24 served as the stage for MOCCAIE to launch the project on an international scale.

## UAE-Caribbean Renewable Energy Partnership

The UAE hosted the UAE-Caribbean Development Forum on the sidelines of the General Assembly of the International Renewable Energy Agency (IRENA). The Forum discussed the implementation of clean energy and climate change projects. More than 30 ministers from 16 Caribbean nations participated in the Forum and discussed cooperation between the UAE and the Caribbean states.

At the Forum, the UAE re-affirmed its commitment to provide grants totaling USD 34.5 million to fund renewable energy projects in the Caribbean that are built to withstand Category 5 hurricanes. The fund builds on the USD15 million of projects announced in 2017 as part of the UAE-Caribbean Renewable Energy Fund. The UAE plans to support seven new projects in Belize, the Dominican Republic, Grenada, Guyana, Haiti, St Kitts and Nevis, and St Lucia. This funding commitment was announced at the second annual Bloomberg Global Business Forum, held on the sidelines of the 73rd Session of the United Nations General Assembly (UNGA) in New York City. During this event, H.E. Dr. Thani bin Ahmed Zeyouidi, former Minister of Climate Change and Environment, was invited to speak in the climate segment with former US President Bill Clinton and Kristalina Georgieva, CEO of the World Bank.

The UAE foreign aid for renewable energy has reached nearly USD1 billion since 2013. In addition to the UAE-Caribbean Renewable Energy Fund, the UAE also launched the USD50 million UAE-Pacific Partnership Fund in 2018. The UAE-Pacific Partnership Fund supports projects in 11 Pacific Island states and runs a USD350 million soft loan facility with IRENA.

## Second United Nations World Data Forum

The UAE hosted the second edition of UN World Data Forum 2018. Through the auspices of the Federal Competitiveness and Statistics Authority (FCSA) and with support from the Statistics Division of the UN Department of Economic and Social Affairs, the Forum aimed to bring together major producers and users of data to collaborate and launch innovative initiatives that will deliver better data on health, migration, refugees, education, income, environment, human rights, and other aspects of sustainable development. Over 2,000 data experts from 100 countries participated in the various sessions of the Forum including the High-Level Plenaries on Migration and Health Statistics.

The Forum concluded with the launching of the Dubai Declaration calling for increased financing for better data and statistics for sustainable development. The Dubai Declaration seeks the establishment of an innovative funding mechanism open to all stakeholders, that will aim to mobilize both domestic and international funds, and to activate partnerships and funding opportunities to strengthen the capacity of national data and statistical systems. The funding mechanism will be created under the guidance of representatives of statistical systems and different data and donor communities who will support the decision making on the operational modalities and on raising resources to address the data needs for the full implementation of the 2030 Agenda.

At the end of the Forum, H.E. Abdulla Nasser Lootah, Director General of FCSA of the UAE emphasized that hosting influential data leaders, decision makers, and experts delights the UAE. He further noted the positive and insightful outcomes of the Forum. The outcomes, according to the Director General are essential for unifying visions and empowering individuals, institutions, and governments to embrace modern technologies and harness data to serve the Sustainable Development Goals (SDGs) locally, regionally and internationally.

## COP 13 | Meeting of the Conference of the Contracting Parties to the Ramsar Convention on Wetlands

Under the theme, “Wetlands for a Sustainable Urban Future,” the Government of the United Arab Emirates through the Ministry of Climate Change and Environment with the sponsorship of Municipality of Dubai hosted the 13th Meeting of the Conference of the Contracting Parties to the Ramsar Convention on Wetlands (COP13) in Festival City in Dubai from 21-29 October 2018, which the 55th meeting of the Standing Committee and regional meetings preceded.

As an intergovernmental treaty that provides the framework for national events and global cooperation for the conservation of wetlands and the rational use of their resources, COP 13 of the Ramsar Convention allowed the UAE and other member countries to deliberate and propose resolutions to assess the increased synergy of the Ramsar Convention with two landmark agreements since COP 12 of the Ramsar Convention in 2015: the Paris Agreement under the UN Framework Convention on Climate Change, and the 2030 Agenda, with its 17 SDGs.

In support of maximizing the synergies between and among the globally-agreed ambitions, the UAE proposed several resolutions that the Parties passed and adopted during COP 13. Considering the Convention theme, the UAE put forward a resolution that aims to protect and manage wetlands under specific guidelines that increase climate change and extreme weather events resilience. In addition, the resolution calls on all countries to involve various stakeholders, including governments, private sector entities, non-governmental organizations, research centers, educational institutions, tourism industry, heritage and culture sector, indigenous peoples and local communities to take part in the decision-making process on wetland issues.

The second resolution includes provisions related to sustainable urbanization, climate change, and wetlands to invite the United Nations General Assembly to

recognize February 2, the date of the adoption of the Ramsar Convention on Wetlands, as World Wetland Day. Another resolution that the UAE supported was the introduction of Arabic as an official Convention language, aside from English, French and Spanish, to foster engagement, raise awareness and improve the implementation of the Convention for Arabic-speaking contracting parties. In addition, it would help appreciate the range of distinct wetland types such as wadis, sabkhas, and oases in Arab countries.

During COP13, the Parties recognized the Jebel Ali Wetland Sanctuary as a Wetland of International Importance (Ramsar Site). Located between Jebel Ali and Ras Ghantoot and spanning 21.85 square kilometers, Jebel Ali Wetland Sanctuary is home to rare and unique wetland types comprising coral reefs, mangroves, shallow lagoons, seagrass, oyster beds, and sandy shorelines, that support 539 species of vulnerable, endangered, and critically endangered species of flora and fauna. The sandy

beaches of Jebel Ali are also one of the key breeding sites for the critically endangered hawksbill turtle. Established in 1998, the Convention on Biological Diversity (CBD) recognizes the Jebel Ali Wetland Sanctuary as one of the Ecologically and Biologically Significant Areas (EBSAs) in the Arabian Gulf.

The key takeaways from COP 13 include the following: a step-by-step plan and timetable for including Arabic as the fourth official Convention language; a consensus approach and deft negotiations demonstrating that parties can reach agreement, even on politically sensitive issues, such as cooperation on wise use of wetlands in West Asia; and the launch of the Global Wetland Outlook underscoring the urgency and scale of work needed to ensure the conservation and wise use of wetlands. With this in mind, the Director General of Dubai Municipality – the main sponsor of COP13 – H.E. Dawoud Al Hajri asserted COP 13 allowed Dubai and other cities in the world to play an active role in furthering the cause for

the protection and wise use of wetlands for humanity. The Director General also noted that Dubai Municipality's vision focuses on building a happy and sustainable city, and a part of achieving that goal is to ensure the protection and sustainability of the environment. He further said that the Municipality of Dubai is proud to now have a second Ramsar Site of International Importance, and to continue protecting our ecologically-significant areas.

### Commitment to Green Development at the Global Green Growth Institute's Assembly and Council Meeting

The UAE reiterated its commitment to green development at the Global Green Growth Institute's (GGGI) Assembly and Council Meeting held in Seoul in October 2018. At the Assembly and Council Meeting, MOCCAIE announced that the UAE will contribute USD 1.5 million annually from 2019 to 2021 to fund projects carried out by GGGI. During the meeting, the UAE reported that the Cabinet adopted the National Climate Change Plan 2050, which consolidates the country's climate mitigation and adaptation initiatives under one integrated framework. As part of the implementation of the Plan, the UAE conducted a comprehensive climate risk assessment in 2018 across four key sectors and identified priority climate risks that require the development of appropriate adaptation measures. GGGI provided technical assistance to the Ministry to develop the Plan and conduct the climate risk assessment.

During the GGGI Assembly and Council Meeting, MOCCAIE also held several bilateral meetings to boost cooperation in agriculture, food safety, green development and the recycling of industrial materials. MOCCAIE met with H.E. Lee Gae-ho, Republic of Korea's Minister of Agriculture, Food and Rural Affairs. MOCCAIE also had a bilateral session with the former UN Secretary-General Ban Ki-moon, who is also GGGI's Assembly president and Council Chairperson.

### Accelerating Sustainable Development through Climate Action and Global Energy Transformation at the Abu Dhabi Sustainability Week

The UAE hosts one of the world's largest sustainability gatherings every January, the Abu Dhabi Sustainability Week (ADSW). Attracting delegates from more than 170 countries including head of states, ministers, and business leaders, the thematic foci of the 2018 and 2019 Sustainability Week were on accelerating sustainable development through climate action and global energy transformation. In support of this Emirate-level initiative, the Ministry of Climate Change and Environment (MOCCAIE) consistently partners with the organizers of the Abu Dhabi Sustainability Week to further promote sustainability beyond the UAE's borders.

Under the patronage of His Highness Sheikh Mohammad Bin Zayed Al Nahyan, Crown Prince of Abu Dhabi and Deputy Supreme Commander of the UAE Armed Forces, the 2019 and 2018 editions of the Abu Dhabi Sustainability Week featured youth-centered initiatives that support energy and climate change, future mobility, space, biotechnology, and tech for good. MOCCAIE has been leading the Climate Innovation Exchange (CLIX) since 2018 as a global initiative to enable youth to innovate and effectively contribute to sustainability solutions. Also, in 2018, the ADSW included a dedicated Youth Panel after the Opening Ceremony as well as Student Exclusive and Youth Circle sessions that ran in collaboration with the Ministry of Youth Affairs and the Student Ambassadors Programme.

CLIX forum is one of the most important platforms within the Abu Dhabi Sustainability Week. It provides a competitive environment that brings together investors and innovative entrepreneurs to boost partnerships and innovation. CLIX also helps transform creative ideas into reality.

In 2018, CLIX secured USD 300,000 to fund individual entrepreneurs and USD 3.2 million for group enterprises. MOCCAIE reported that "by the end of ADSW 2018, investors expressed their intent to invest USD 17.5 million in the showcased innovations in the first year and



USD 45.5 million over three years.” For its 2019 edition, CLIX received more than 811 submissions, a 222 per cent increase since its inception. The Ministry of Climate Change and Environment selected 48 applicants — 78 per cent more than 2018 — including nine Emirati-led entries.

*“Focusing on the youth and involving them in all sectors has been an important and vital aspect in the UAE since its inception. [The] Abu Dhabi Sustainability Week reinforces the country’s strong position in the clean energy, climate and environment sectors and highlights its efforts to develop local talent and attract global expertise to find effective solutions to the most important challenges facing the international community.”*

**H.E. Dr. Abdullah Belhaif Al Nuaimi**  
Minister of Climate Change and Environment



### Climate Change Forum at the World Government Summit

For two years in a row, climate change took center stage in the World Government Summit (WGS) in Dubai. With the aim to improve the lives of citizens across the world by empowering institutions and decision-makers with the knowledge to shape a better future, the WGS, which convened more than 4,000 participants from 140 countries, is the only global organization dedicated to shaping the future of governments and setting the agenda for the next generation of governments worldwide. In 2019 and 2018, the WGS provided a unique platform to showcase and exchange best practices and smart solutions to the climate change-related challenges that nations face.

The two recent editions of the World Government Summit recognized that climate change is the challenge defining the landscape of the 21st century. As such, the Ministry of Climate Change and Environment (MOCCA) hosted the Climate Change Forum at the WGS. In 2019 and 2018, the forum focused on the interlinkages of climate and health, and oceans and climate, respectively.

In 2019, MOCCA brought together experts and advocates from the World Health Organization, Conservation International, Harvard University, and even from Hollywood to highlight the urgency on the impacts of climate change on human health as well as on the marine species. With global climate-induced health impacts leading to a surge in undernutrition, cardiovascular and respiratory diseases, allergies, vector-borne and waterborne diseases, and heat strokes, the Climate Change Forum examined how governments and other stakeholders can protect human health through climate action. Furthermore, given that climate change impacts transcend beyond human health risks but also lead to irreversible damage to ecosystems, a plenary session themed “Climate Change and the Health of our Oceans” was part of the Forum.

In 2018, MOCCA held the Climate Change Forum with the theme “Climate Action Now.” The 2018 Forum saw the launch of The Climate Project, which aimed at delivering climate initiatives that touch the lives of 10

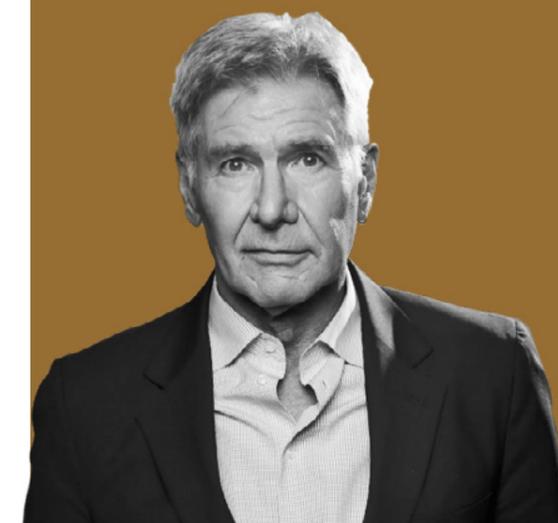
million people. The 2018 Forum held three panel sessions, where MOCCA highlighted the nexus between climate change and the humanitarian crisis and global response.

In both occasions, MOCCA brought two Hollywood powerhouses who are vocal advocates of climate change actions. In 2018, Robert De Niro shared his experience and concern for Barbuda, the island nation that Hurricane Irma devastated in 2017. Mr. De Niro highlighted the increase of extreme hurricanes in the last few decades and its linkage to the changing climate. He urged governments to pay closer attention to these extreme weather events as it will have repercussions for the current and future generations especially in island nations such as Barbuda.

In 2019, Harrison Ford, the Vice Chairperson of the Board of Conservation International, bravely spoke about climate change and ocean conservation at the World Government Summit. Mr. Ford emphasized the unique role that humans play in combatting the natural and anthropogenic impacts of climate change in our oceans. He reminded everyone present at the WGS that no human being is above nature.

*“Humans are animals. We are animals with unique attributes and big brains. However, we are the only species whose behaviour can destroy the planet. We are not above Nature. All these free services of Nature are threatened by what we are doing to the planet through climate change.”*

**Harrison Ford,**  
Actor and Philanthropist



## Chapter 4. Green Economy Transformation Indicators

The transformation to a green economy requires measurement indicators to help track progress towards the attainment of key objectives. Measuring the performance towards the five strategic objectives of the UAE Green Agenda 2030, including competitive knowledge economy; social development and quality of life; sustainable environment and valued natural resources; clean energy and climate action; and green life and sustainable use of resources, enhances the understanding of underlying developments, progress, and potential opportunities as well as risks. Having the ability to assess performance towards a greener economy guides the formulation of public policies and implementation of initiatives not only by government entities but also by the private sector and the civil society.

To enable evidenced-based decision-making on green economy that will help policymakers set clear goals, develop appropriate initiatives, examine progress, and evaluate impacts, the UAE identified 41 Green Key Performance Indicators (Green KPIs) in 2015. Under the helm of the Ministry of Climate Change and Environment (MOCCA), the UAE stepped up the development of the Green KPIs by integrating environmental considerations into the conventional input-productivity-output model. Consistent with the three pillars of sustainable development, the dimensions of the Green KPIs include economic, environmental, and social.

This chapter briefly presents the most up-to-date results on the Green KPIs. The chapter identifies areas where the UAE made substantial progress. It also highlights current challenges related to the indicators such as data availability. Finally, the chapter discusses aspects that need attention to ensure green economy transformation by 2030.

### 4.1. The Green KPIs

The multi-dimensional nature of green economy makes it challenging to measure. It is for this reason that at the global level, there is no agreed set of indicators to date to assess progress towards green economy transformation. Considering the current global and national efforts that seek to evaluate the progress supporting economic, social, and environmental growth, the UAE Green KPIs build on the national key performance indicators for the UAE Vision 2021 and the indicators related to the Sustainable Development Goals (SDGs).

The UAE's Green KPIs have 41 indicators selected according to their environmental, economic, and social dimensions. There are 15 indicators each under the environmental and economic dimensions while the social dimension has 11 indicators. These indicators are not meant to be definitive and exhaustive. Rather, they are the current measures that are relevant to capture green economy performance in the UAE. As experiences and more data become available, it is important to revisit and refine these indicators. It is worth-noting that the different activities and initiatives supporting the UAE Green Agenda 2030 influence the outcome of each of the Green KPIs, and many of these activities and related factors are not directly under the control of the government and national stakeholders. As such, the green economy performance may not only respond to a single strategic objective under the UAE Green Agenda 2030 but possibly to multiple strategic objectives.

## 4.2. Measuring the Transformation towards a Green Economy

To help monitor and evaluate the outcomes of the Green KPIs, for each of the five strategic objectives under the UAE Green Agenda 2030, there are corresponding indicators. The indicators, which include the UAE green economy indicators intend to integrate environmental considerations into the conventional input-productivity-output model. By doing so, it helps policymakers and industries understand the dynamism of the economy-

environment nexus. It also sets the stage to plan and improve green economy policies and activities through the analysis of correlation between indicators.

The UAE's Green KPIs include headline and other designated indicators. Headline indicators are the key indicators representing the strategic objective. The purpose of the headline indicators, two for each strategic objective, is to help decision-makers, in particular the members of the Emirates Council on Climate Change and Environment, to easily understand the overall progress of the UAE Green Agenda 2030.

Strategic Objective	Headline Indicators	Other designated Green KPIs
1. Competitive Knowledge Economy	ECO8: Global Competitiveness Index	ECO1: Real GDP growth (per emirates) ECO2: Share of non-oil GDP ECO3: Share of non-oil export ECO5: R&D expenditure in GDP ECO6: Foreign direct investment net inflows ECO7: Ease of Doing Business Index
	SOC6: Global Innovation Index	SOC5: Number of UAE patents SOC7: Global Entrepreneurship & Development Index
2. Social Development & Quality of Life	ECO12: Material consumption per GDP	SOC1: Labor participation rate SOC2: Employment rate SOC3: Emiratization rate SOC4: Number of green jobs SOC11: World Happiness Index
	SOC10: Human Development Index	
3. Sustainable Environment & Valued Natural Resources	ENV9: Ecological Footprint	ENV1: Rate of groundwater abstraction ENV10: Number of environmental regulations ENV11: Number of environmental standards ENV12: Ratio of protected areas ENV13: Environmental expenditure ECO4: GDP from environmental goods and services SOC8: Environmental awareness rate SOC9: Environmental behavior rate
	ENV14: Environmental Performance Index	
4. Clean Energy & Climate Action	ENV7: Carbon intensity of electricity	ENV6: Rate of non-fossil energy ENV8: Total GHG emissions ECO13: GHG emissions per GDP
	ECO14: Efficiency of water and electricity production	
5. Green Life & Sustainable Use of Resources	ECO9: Water consumption per GDP	ENV2: Water consumption per capita ENV3: Waste generation per capita ENV4: Rate of waste recovery ENV5: Energy consumption per capita ENV15: Ratio of green vehicles ECO10: Waste generation per GDP ECO15: Average fuel efficiency of vehicles
	ECO11: Energy consumption per GDP	

Briefly presented below is a review of the current state of green economy transformation based on the Green KPIs for each of the strategic objectives. It is important to note that the information presented below relied heavily on quality of domestic data. Only when quality data are not

domestically available that the progress report tabulated below utilized information from authoritative international sources such as the World Bank or an agency of the United Nations.

### 1. Competitive Knowledge Economy

The Global Competitiveness Index (GCI) that the World Economic Forum compiles and the Global Innovation Index (GII) that Cornell University, INSEAD, and the World Intellectual Property Organization jointly assemble are the headline indicators for the competitive knowledge economy objective. Since 2015, the UAE has been steadily holding its position in the top 30 for the GCI. In terms of the GI, the UAE rose from 47th in 2015 to 36th in 2019. For both the GCI and the GI, the UAE is the top performer among the member states of the Cooperation Council for the Arab States of the Gulf (GCC).

Between 2015 and 2019, the ease of doing business in the UAE has been improving. According to the World Bank, the organization that oversees the Ease of Doing Business Index (EDBI), the UAE's score rose by almost seven points. From 22nd in 2015, the UAE now ranks 11th in the world – ahead than many high-income countries and just a few notches away from the United Kingdom and the United States.

To further boost competitive knowledge economy, the share of R&D in the UAE's GDP increased from 0.87 percent to 0.94 percent between 2015 and 2018. The target is to increase the expenditure to 1.5 percent by 2021. In the next two years and coincidental with the hosting of the World Expo 2020, the UAE government has plans to push for more innovations considering the trajectory of foreign direct investments, which increased by nearly five percentage point between 2015 and 2018.

### 2. Social Development and Quality of Life

In the last five years, the UAE consistently ranked among the top 35 countries worldwide in terms of the United Nations' Human Development Index (HDI), a measure of the average achievement in key dimensions of human development: a long and healthy life, being knowledgeable and having a decent standard of living. Life expectancy at birth measures the health dimension while the mean of years of schooling for adults aged 25 years and more as well as the expected years of schooling for children of school entering age determines the education dimension.

As to the overall level of happiness, the UAE is among the top 25 countries worldwide considered happy as a nation. The Sustainable Development Solutions Network (SDSN) investigated six variables to explain variation of happiness across countries – GDP per capita, social support, healthy life expectancy, freedom, generosity, and absence of corruption. Considering these factors, the World Happiness Report showed a jump on the UAE's world ranking from 28th in 2016 to 21st in 2019 using Gallup World Poll data from 2016 to 2018.



### 3. Sustainable Environment and Valued Natural Resources

The strategic objective supporting sustainable environment and valued natural resources includes several environment indicators. The headline indicators under this strategic objective are the Ecological Footprint (EF) and the Environmental Performance Index (EPI). The EF and the EPI both measure environmental trends and progress of countries globally.

As an accounting system that assesses how much productive land and water area individuals across different countries use to produce the resources they consume and to absorb the waste they produce, the Ecological Footprint (EF) quantifies the environmental impact of the way a population consumes products and energy considering both imports and exports. EF also considers biocapacity, which is an ecosystem's ability to produce biologically useful material and to absorb anthropogenic waste given prevailing technology. According to the Global Footprint Network (GFN), the organization that compiles the EF, the global hectare (gha) is the central and standardized unit of measurement for the EF as it accounts for different levels of land fertility and productivity making it comparable across countries. In 2019, the UAE's Ecological Footprint is 8.9 gha based on 2016 data, which is lower than the 2015 measure of 9.7 gha.

The Yale Center for Environmental Law and Policy is on its tenth iteration of producing the Environmental Performance Index (EPI). In 2018, the EPI investigated performance indicators across ten issue categories including environmental health and ecosystem vitality for 180 countries. The indicators provide the yardstick at the national scale on how countries perform to achieve their environmental policy goals. In 2018, the UAE's EPI ranking improved by 15 steps. In 2016, the UAE was 92nd in the EPI ranking, it is now 77th. Accordingly, the UAE joins 22 other countries as top-ranking nations in terms of having the highest percentage of marine protected areas (MPAs) within its exclusive economic zone. The recent efforts on marine and terrestrial biodiversity protection at the species and ecosystem levels helped boost UAE's EPI ranking. This is consistent with the 19 percent increase in the ratio of protected areas in the country between 2015 and 2018. In 2018, almost 15 percent of the UAE are protected areas, which is nearly three percent higher than the 2015 rate.

### 4. Clean Energy and Climate Action

Despite having a fossil fuel-dominated energy sector, the UAE has been tapping the potential of clean energy as a strategic decision to meet the country's growing energy demand as well as to reduce reliance on fossil fuels and protect the environment. Considering the wide range of economic, social, and environmental benefits of clean energy, there is strong leadership in the UAE to increase the share of clean energy in the total energy mix in the long term. Specifically, the UAE has set a target for power generation from clean energy to 24 percent by 2021 in support of the Paris Agreement. Correspondingly in 2017, Ministry of Energy and Infrastructure, formerly known as Ministry of Energy and Industry, developed the UAE Energy Strategy for 2050 to increase the contribution of clean energy in the total energy capacity to 50 percent by 2050.

The various initiatives supporting transition to cleaner energy helped the UAE maintain a stable level of greenhouse gas emissions (GHG). Further, the percentage share of non-fossil energy has been increasing since 2015. The ongoing solar projects and initiatives in Abu Dhabi and Dubai contributed to this upward trajectory.

While efforts are on the way to support clean energy and climate change mitigation, the overall measure of carbon intensity of energy in the UAE, one of the headline indicators for this strategic objective, is currently not available. The International Energy Agency (IEA), however, calculated that the CO<sub>2</sub> emissions per unit of GDP remained stable in the UAE since 2014 at 0.50 kg CO<sub>2</sub>/2010 USD. The IEA used its energy balances data and the 2006 IPCC Guidelines to generate the measure based mainly on CO<sub>2</sub> emissions from fuel combustion.

### 5. Green Life and Sustainable Use of Resources

To promote green living and sustainable utilization of resources, the headline indicators under this strategic objective are water and energy consumption per GDP. Data show the energy per capita remains stable at around 8,500 kilograms of oil equivalent (kgoe) since 2015. Water consumption per GDP, on the other hand, follows a downward trend since 2015. The water consumption per capita also reflects the same trajectory of reduction suggesting an increase in water use efficiency despite increasing demand due to population increases.

### 4.3. The UAE Green Dashboard

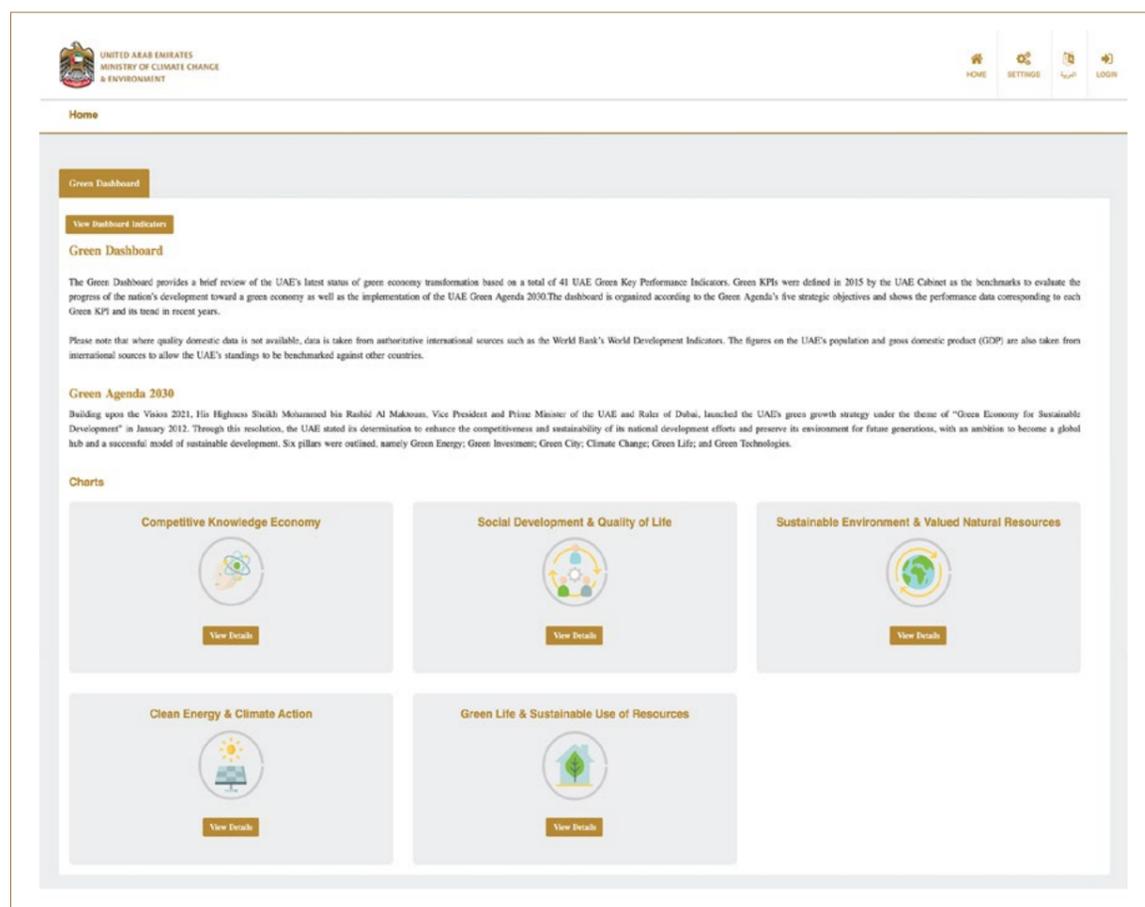
In October 2018, the Ministry of Climate Change and Environment launched the UAE Green Dashboard, a digital open data platform that presents a plethora of statistical data on the country's progress towards its transition into a green economy.

To enable a wide range of stakeholders to become aware and understand the UAE's efforts in greening all aspects of the economy, the UAE Green Dashboard presents information corresponding to each of the Green KIPs. The dashboard is a testament to the government's open data

policy. Through this online data dashboard, people in the UAE will readily have access to information that helps determine the country's direction and current status in green economy transformation.

The UAE Green Dashboard is accessible at: <https://kpis.moccae.gov.ae/#/page/home>.

The platform, which is available in both Arabic and English, allows the general public to not only view the data set, but also arrange them in a way that is easier for the viewer to understand. The data are also available for download from the platform.



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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](mailto:info@moccae.gov.ae)



@MOCCAЕUAE

[www.moccae.gov.ae](http://www.moccae.gov.ae)