حكومة دبي
GOVERNMENT OF DUBAI

بلدية دبي
DUBAI MUNICIPALITY

A SUSTAINABLE DUBAI

THE DUBAI MUNICIPALITY REPORT 2016

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THE DUBAI MUNICIPALITY REPORT 2016

H.H. SHEIKH MOHAMMED BIN RASHID AL MAKTOUM

THE RULER

Vice President and Prime Minister of the United Arab Emirates and Ruler of Dubai

H.H. SHEIKH HAMDAN BIN MOHAMMED BIN RASHID AL MAKTOUM

THE CROWN PRINCE OF DUBAI

and Chairman of the Dubai Executive Council

H.H. SHEIKH HAMDAN BIN RASHID AL MAKTOUM

THE DEPUTY RULER OF DUBAI

and Minister of Finance of the United Arab Emirates

H.H. SHEIKH MAKTOUM BIN MOHAMMED BIN RASHID AL MAKTOUM

THE DEPUTY RULER OF DUBAI

MESSAGE FROM THE

DIRECTOR

H.E. ENG. HUSSAIN NASSER LOOTAH

Director General of
Dubai Municipality

2015 will be remembered as a turning point for development worldwide. In September, the 193 member countries of the United Nations (UN) agreed on a new set of goals and targets within the UN Sustainable Development Agenda to succeed and expand on the expiring Millennium Development Goals, and in December the international community reached a landmark accord that will, for the first time, commit nearly every country to lowering greenhouse gas emissions to avoid the most drastic effects of anthropogenic climate change.

The topic is high on our agenda as we are speaking from experience, as a young developing country following the ambitious path to development laid out by our founding fathers and steered by the current leadership of H.H. Sheikh Khalifa bin Zayed Al Nahyan, President of the UAE, and H.H. Sheikh Mohammed bin Rashid Al Maktoum, Vice-President and Prime Minister of the United Arab Emirates (UAE) and Ruler of Dubai.

We have made such remarkable progress that we are now ranked in the same development tier as countries like France and Japan. Encouraged by this success, the UAE in general, and Dubai in particular, has begun to restructure with the aim of pursuing a more sustainable developmental model.

This transformed priority was reflected in the unprecedented involvement and active voice the UAE displayed within the negotiations of the Paris Agreement and the Sustainable Development Agenda.

As with any other high-level treaty or agreement, the difference will be made not by signing the document, but by putting words into action. This is where Dubai Municipality plays a vital role.

Cities will be at the forefront of implementing and facilitating much of the change that both agreements prescribe, as they provide the canvas for private and commercial actions. Municipal management, therefore, will be establishing the framework for the pursuit of sustainable, low-carbon development.

Dubai Municipality supports the leadership's sustainability commitment in every aspect of operations, from sustainable urban planning to waste management and green buildings – and everything in between. The strategic plan is in line with the Government's goals, and with the long-term vision of building "an excellent city that provides the essence of success and comfort of sustainable living".

We hereby invite you to take a look at what we have achieved so far and what's next, in this report. The Dubai Municipality team, including myself, hope to have you onboard in the interest of our common future.

Sincerely,
H.E. Eng. Hussain Nasser Lootah

FOREWORD:

LETTER FROM THE HEAD OF THE SUSTAINABLE COMMITTEE

BY ENG. ABDULLA MOHAMMED RAFIA

One cannot deny the remarkable change in Dubai over the past few decades. The Emirate expanded and prospered under the esteemed leadership of its ambitious leaders, supported by Dubai Municipality. Change will not stop here; we will continue to strive towards excellence, but one thing will not change – Dubai's commitment to sustainability.

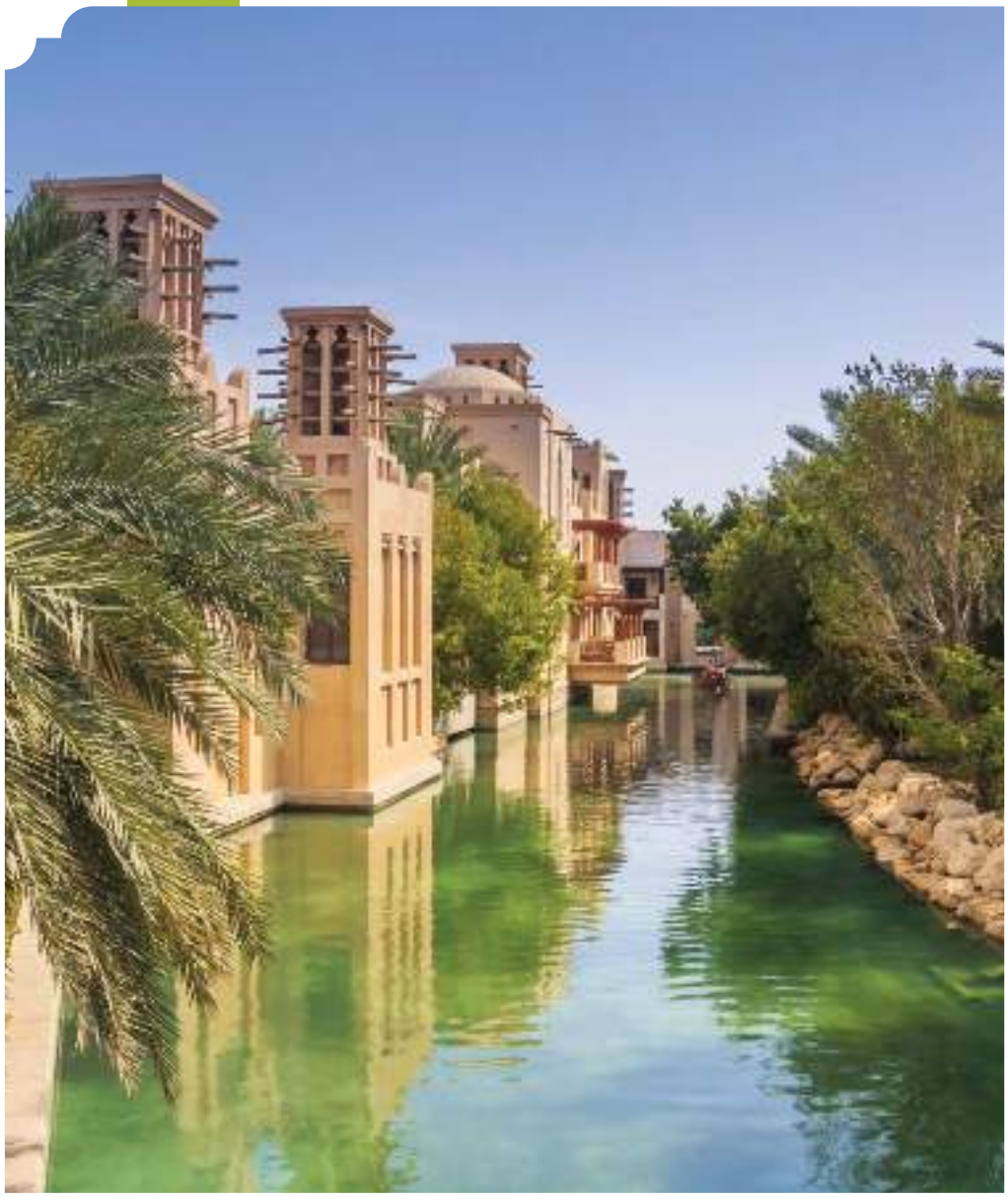
At the federal government level, the nation is committed to make UAE amongst the best in the world in terms of society, people, economy, government, environment and overall living experience by 2021, the Golden Jubilee of the Union. In parallel, Dubai as an Emirate has stated its goals clearly in Dubai Plan 2021 and recently launched the Dubai Clean Energy Strategy 2050. Dubai Municipality shares this vision of building a sustainable future for the Emirate and contributing to the development of the country as a whole. Evidence of this can be seen in the Municipality's noticeable efforts across all aspects of urban planning, development and management.

This report covers some of Dubai Municipality's ongoing initiatives that promote local development and those coming in the near future. Our goals, aligned with our esteemed leadership goals, are ambitious and will drive us forward to become leaders in the quest for sustainability.

Eng. Abdulla Mohammed Rafia

Assistant Director-General for the Engineering and Planning Sector

Eng. Abdulla is also a board member of the Dubai World Trade Centre, the Dubai Green Economy Partnership, the Energy Service Company (Etihad ESCO) and the Demand Side Management (DSM) Committee of the Dubai Supreme Council of Energy (DSCE).



THE CONTEXT OF SUSTAINABILITY

THE EMIRATE OF DUBAI AND ITS AMBITIOUS PATHWAY TO A SUSTAINABLE DEVELOPMENT

The Emirate of Dubai has experienced a rapid and dramatic transformation like no other city on Earth. From humble beginnings as a desert city with an estimated population of 10,000 in 1900, it has burgeoned into a mega-city, with a population of over 2.1 million people and between 8-10 million annual visitors. Today, Dubai is amongst the most cosmopolitan cities in the world, guided along this path by its visionary leadership. This alone is a major achievement, but now, with the Paris Agreement giving the world a new pathway to low-carbon development and the Sustainable Development Goals (SDG) providing a critical new framework for the UAE's domestic and foreign policies, Dubai, and the Municipality, is stepping up its game.

The city is preparing to host the most sustainable world event: Dubai Expo 2020, and is focused on transforming into the most sustainable city in the world. For a city to be sustainable, it needs to encompass three main pillars: environmental, economic and social sustainability. The key goal is to provide residents with the highest quality of life, paired with the lowest environmental footprint.

The UAE has been a pioneer in sustainable development across the three pillars, leading the Middle East, with a demonstrated commitment to legislation, initiatives and the implementation of projects to reach its sustainability goals. This can be seen in the clear strategies the leadership has developed to guide the city forward, starting at the federal level.

FACT BOX
LIVABILITY RANKING

The Economist Intelligent Unit's Livability Ranking and Overview report ranks cities based upon relative comfort variables across five categories – stability, health care, culture, environment, education and infrastructure. According to the 2015 Livability Ranking and Overview report, Dubai ranks first, out of nine shortlisted cities in the Gulf region (Abu Dhabi 79th; Kuwait City 83rd; Doha 85th; Muscat 89th; Bahrain City 92nd; Riyadh 107th; Jeddah 111th; Al Khobar 118th) and 75th out of 140 shortlisted cities in the world (compared to 77th out of 140 shortlisted cities in the world in 2012).[1] Dubai scored 74.7 points out of a possible 100, ranking above the Gulf average of 66.9 points and the world average of 75.2 points.[2]

Mercer's Quality of Living Rankings measure cities' business attractiveness based on various factors, such as climate, disease and sanitation standards, ease of communication, local political and social environment, political violence, crime, etc. According to the 2015 Quality of Living Rankings, Dubai ranks first out of eight shortlisted cities in the Gulf region (Abu Dhabi 77th; Muscat 104th; Doha 108th; Kuwait City 125th; Manama 130th; Riyadh 163rd; Jeddah 166th) and 74th out of 230 shortlisted cities in the world.[3]

Knight Frank's '2015 Wealth Report' identifies and ranks the world's top 40 cities that matter to the world's wealthy, Ultra High-Net-Worth Individuals (UHNWI), based on various factors, such as wealth creation, property investments, luxury spending trends, etc. According to the 2015 Wealth Report Dubai – the only shortlisted city in the Gulf region – ranks eighth out of 40 shortlisted cities in the world, compared to 13th out of 20 shortlisted cities in 2012.[5]

ENDNOTES

1. The Economist Intelligence Unit. Livability Ranking and Overview (August 2012). Retrieved on December 22nd from http://www.tfsa.ca/storage/reports/Liveability_rankings_Promotional_August_2013.pdf
2. The Economist Intelligence Unit. Livability Ranking and Overview (August 2015). Retrieved on December 21st from http://www.investtoronto.ca/InvestAssets/PDF/Reports/EIU-Liveability-Ranking-and-Overview-August-2015.pdf
3. Mercer. 2015 Quality of Living Rankings. Retrieved on December 22nd from https://www.imercer.com/uploads/GM/qol2015/h5478qol2015/index.html
4. Knight Frank. 2015 Wealth Report. Retrieved on December 22nd from http://www.knightfrank.com/resources/wealthreport2015/wealthpdf/04-wealth-report-global-cities-infog-all.pdf
5. Knight Frank. 2012 Wealth Report. Retrieved on December 22nd from http://content.knightfrank.com/research/83/documents/en/2012-800.pdf

UAE Vision 2021, and the according National Agenda, aims to make the UAE one of the best countries in the world. In order to translate this vision into reality, its pillars have been mapped into six national priorities, which represent the key focus sectors of government action over the coming years. The pillars are: a cohesive society and preserved identity; a safe, public and fair judiciary; a competitive knowledge economy; a first-rate education system; world-class healthcare; and sustainable environment and infrastructure. These are supported by the UAE National Agenda, which includes a set of national indicators to measure performance outcomes in each of the priority areas, across the education, healthcare, economy, police and security, housing, infrastructure and government services sectors.

The focus is to shift the UAE towards a knowledge economy with a happy, healthy population, where innovation, research, science and technology will form the basis of a knowledge-based, highly productive and competitive economic model. This will be driven by entrepreneurs in a business-friendly environment where public and private sectors form effective partnerships, harnessing the full potential of citizens. The knowledge-based economy will be promoted through increasing investment in science, technology, research and development, and the results are already being seen in initiatives such as the Mars Mission, a major milestone in developing the nation's nascent space industry.

In addition, a federal Green Growth Strategy has been devised, aiming to further the UAE's goals in developing this competitive, knowledge-based economy and promoting social development. Other broad goals include reducing the country's environmental impact, promoting clean energy, adapting to climate change and ensuring that existing resources are used efficiently.

In response to these federal initiatives, at the national level, Dubai has heeded the call to transform its economic model and take action on sustainable development. The Dubai Plan 2021 describes the future of the Emirate, starting with the people and society who are the bedrock of the city. This aspect looks at the characteristics required by Dubai's people to deliver on the city's aspirations and examines the society needed to support and empower these individuals to achieve their goals. The plan also addresses the urban environment, including both natural and built assets, and considers the living experience of the people of Dubai and its visitors as a result of their interaction with this environment and the economic and social services provided. In addition, there is a focus on the economy; the city's development engine that provides the fuel for its march forward. The plan considers the Government as the custodian of development in all aspects.

Sustainability is the ethos that defines Dubai's future. It describes how we should act, individually and together, to protect, preserve and propagate our environment, harness our knowledge and share insights and technologies for future development, while reducing our burden on the planet. Dubai's commitment to sustainability can be seen in the sub-themes of Dubai Expo 2020: Mobility, Sustainability & Opportunity. From the outset, Dubai Expo 2020 has been positioned as a landmark in sustainable development and a catalyst for the green economy, promising to be one of the most sustainable Expos in history. A key aim of the event is to produce 50% of the Expo's operational energy requirements from renewable sources on site, demonstrating the leadership's commitment to finding innovative solutions for environmental management and energy generation.

In this way, Dubai Expo 2020 will be a landmark in sustainable development, furthering the goals in the long-term national initiative to build the green economy, under the slogan 'A Green Economy for Sustainable Development'. This strategy aims to establish the UAE as a world leader in green economy and a centre for the export and re-export of products and green technologies, as well as maintaining a sustainable environment to support long-term economic growth. Naturally, this covers a broad range of programmes and policies in the areas of energy, agriculture, investment and sustainable transport, in addition to environmental and constructional policies, to raise the quality of life in the UAE. The Green Economy for Sustainable Development initiative includes six major tracks that span every aspect of sustainability, from energy efficiency to strategies for dealing with climate change, water and energy usage, and energy generation.

In this context, The Dubai Clean Energy Strategy 2050 will change the rules of the energy game in the Middle East. The Dubai Supreme Council of Energy presented the ambitious Dubai Clean Energy Strategy 2050 in November 2015, with targets for clean energy in the mix increasing to 25% by 2030 and 75% by 2050. The implementation will be supported by funding of over AED 100 billion for investments as well as R&D and various projects.

In today's world, progress hinges on sustainability. To this end, the UAE Vision 2021, the National Agenda, the Green Growth Strategy, the Green Economy for Sustainable Development initiative and the Dubai Clean Energy Strategy 2050 all encase sustainability at the core. These strategies are set to not only propel the UAE's economy forward, but also to further develop the nation as a whole and spur it onwards. Commitment to these strategies ensures that the Dubai Government, Dubai Municipality and Dubai's citizens are on the same track – to a prosperous future that will benefit generations to come.

FACT BOX

MEET THE EMIRATE OF DUBAI

Dubai is the second largest of the seven Emirates that together form the United Arab Emirates (UAE). Within the federal, presidential, absolute monarchy, the rulers of the seven Emirates and their appointed Emirate-level Executive Councils; departments, agencies and authorities hold broad jurisdiction and competencies in all areas not assigned to the federal authorities. Subject matters like energy and water management, road transport, urban planning, education, healthcare and others are managed on an Emirate-level, with the according federal authorities and ministries involved to coordinate and supervise local efforts.

Dubai Municipality is an example of such a department operating under the Government of Dubai, directing and implementing municipal affairs, with the aim of creating a happy place to live, work and visit.

Dubai's ruler, H.H. Sheikh Mohammed bin Rashid Al Maktoum, also serves as Vice President and Prime Minister of the UAE and is responsible for the continuous and prosperous development of Dubai. Following the lead of H.H. Sheikh Khalifa Bin Zayed Al Nahyan, President of the United Arab Emirates, and H.H. Sheikh Mohammed Bin Rashid Al Maktoum, the UAE, supported by Dubai Municipality, has committed itself to sustainability and green economic development.

FACT BOX

SNAPSHOT OF DUBAI'S SUSTAINABILITY INITIATIVES

GREEN BUILDINGS

In implementing the decision issued by H.H. Sheikh Hamdan bin Rashid Al Maktoum the Deputy Ruler of Dubai and Minister of Finance of the UAE, and as part of the Dubai Strategic Plan 2015 for applying the specifications of green buildings to all the buildings and premises in Dubai with the aim of keeping Dubai a healthy city with a clean and pollution free environment, Dubai Electricity and Water Authority (DEWA), in co-operation with Dubai Municipality, has launched the Green Building Regulations and Specifications. These specifications and guidelines regulate building construction and retrofitting to encourage efficiency in the consumption of electricity, water and energy as part of the green buildings project in Dubai, which will make estimated savings of AED 10 billion until 2030.

ENVIRONMENTAL TOURISM

Environmental tourism encompasses eco-friendly tourism activities that promote preservation of the innate natural and cultural heritage of the environment. One of the initiatives of the Department of Tourism and Commerce Marketing (DTCM) in Dubai to encourage environmental tourism is the Dubai Green Tourism Award, which was launched last year by Dubai Government for the hospitality industry. The Award aims to inspire the industry to adopt eco-friendly initiatives that, amongst other goals, can contribute to reducing carbon emissions.

CLEAN ENERGY

Dubai continues to promote a number of initiatives in sustainable energy. The Dubai Supreme Council of Energy (DSCE) presented its ambitious Dubai Clean Energy Strategy 2050, allocating AED 100 billion for an investment fund, R&D, and projects with targets for clean energy in the mix increasing to 25% by 2030 and 75% by 2050. The Sheikh Mohammed Solar Park broke all records when it achieved a Power Purchase Agreement (PPA) with ACWA for as little as USD 0.054 per kWh in early 2015. Considered as one of the largest of its kind in the world, producing 5,000 megawatts in a single location by 2030, it will see total investments worth AED 50 billion until 2050. Water is also high on the agenda, for example, the Drainage and Irrigation Department of Dubai Municipality established a grey water treatment plant for use in irrigating local parks and trees, amongst others.

ENERGY AWARD

To foster energy conservation and increase awareness, the Emirates Energy Award has been launched by the Dubai Supreme Council of Energy to recognise best practices in energy conservation showcasing innovative, cost effective and exemplary measures. The bi-annual award recognises achievements in categories such as energy efficiency in the public and private sector, large and small energy projects, research and development, education and capacity building amongst others. Find out more at www.emiratesenergyaward.com.

> The focus is to shift the UAE towards a knowledge economy with a happy, healthy population

خطة دبي 2021 DUBAI PLAN

VISION 2021 الإمارات العربية المتحدة UNITED ARAB EMIRATES GOLDEN JUBILEE YEAR 50 عام اليوبيل الذهبي

إكسبو EXPO 2020 دبي، الإمارات العربية المتحدة DUBAI, UNITED ARAB EMIRATES

WE ARE DUBAI MUNICIPALITY

A WORLD REFERENCE FOR DEVELOPING DUBAI AS A PIONEER SMART AND SUSTAINABLE GLOBAL CITY

Dubai Municipality is one of the many departments under the Government of Dubai. The department has a long history, stretching back to 1957, with a major restructure in 1980 that institutionalised the Municipal Council by appointing 32 members headed by H.H. Sheikh Hamdan bin Rashid Al Maktoum the Deputy Ruler of Dubai and Minister of Finance of the UAE, who remains the Chairman today. The Municipality's operations are headed by H.E. Eng. Hussain Nasser Lootah, who was appointed Acting Director General in February 2006 and Director General in January 2009. He has been supported by the Deputy Director-General, Mr. Essa Al Maidoor, since 2012.

DUBAI MUNICIPALITY'S DIRECTOR GENERALS OVER THE YEARS

1954 – 1957
Mr. Abdullah bin Jumaan

1957 – 1961
Mr. Ali Al Bustani

1961 – 1985
Mr. Kamal Hamza

1985 – 2006
Mr. Qassim Sultan

2006 – Present
H.E. Eng. Hussain Nasser Lootah

Today, the Municipality employs over 11,000 people working in 32 departments under six sectors, each headed by an Assistant Director General. This comprehensive organisation has been a major driver of Dubai's phenomenal development over the last 50 years. It manages aspects of urban planning, development and management, touching the lives of all of Dubai's residents.

OUR ASSISTANT DIRECTOR GENERALS

ASSISTANT DIRECTOR GENERAL	SECTOR AND DEPARTMENTS OF OVERSIGHT
Abdulla Mohammed Rafia	Asst. Director General for the Engineering & Planning Sector
Obaid Salem Al Shamsi	Asst. Director General for the General Support Sector
Khalid Ali bin Zayed	Asst. Director General for the Communication & Community Sector
Salah AbdulRahman Amiri	Asst. Director General for the Environment & Public Health Services
Salem Mohammed bin Mesmar	Asst. Director General for the Environment, Health & Safety Control
Mohammed AbdulKarim Julfar	Asst. Director General for the Corporate Support Sector

The sectors within Dubai Municipality are: Water and Waste, dealing with waste-management infrastructure and coastal and green area-management; Environmental Management, responsible for environmental protection; Urban Space and Lifestyle, covering recreation, culture and heritage facilities and activities; Planning and Construction, tackling urban planning, projects and products; Public Health and Safety; and Administration, incorporating human resources and legal and financial services.

WHAT ARE DUBAI MUNICIPALITY'S GOALS?

At Dubai Municipality's heart is the goal of building a sustainable future for the Emirate and contributing to the development of the country as a whole. The Municipality works under the guidance of, and in support of, the Federal and Local Government's visions for development, collaborating with all concerned authorities on the implementation of the leadership's vision and the Dubai Plan 2021. Dubai Municipality is dedicated to contributing to the overarching federal-level goal of making the UAE one of the world's most liveable countries by 2021, as well as the Emirate-level goal of promoting sustainable development and advancing Dubai's global standing, ensuring it is a preferred hub for money, business and tourism. The two go hand-in-hand. At the grassroots level, Dubai Municipality aims to build an excellent city that provides all of the necessary conditions for citizens to enjoy successful and comfortable lives and careers, while ensuring that these conditions are sustainable for the generations to come.

Within this visionary framework, Dubai Municipality works on the design, planning and construction of infrastructure and provides facility management and municipal services, always striving to use resources in the most efficient way, to act as a role model and support sustainable development in the Emirate of Dubai. As the driving force behind the city's urban planning and municipal services, the Municipality touches on many aspects of sustainable development, whether explicitly or implicitly. Dubai Municipality's ambition for development in the environmental, economic and social spheres is embedded explicitly in five of the eight formal, strategic goals, but ultimately all of the Municipality's goals reference sustainability in some shape or form.

The strategic goals directly referencing this sustainable development include the goal of ensuring environmental protection and conservation of natural resources in a sustainable manner, with the Environmental Department taking the lead, along with the Department of Planning's focus on enhancing urban planning policies, achieving a balance between land use and urban development in a sustainable manner and ensuring ease of access to public services and utilities. The Environmental Department also takes the lead on the overarching goal of achieving environmental sustainability. In addition, the General Projects Department is concerned with developing and beautifying the city, and ensuring environmental health and food safety falls under the remit of the Public Health and Safety Management, Food Control and Public Health Services departments. Other strategic goals refer to the sustainable management of resources within municipal operations, including financial sustainability and the sustainability of assets and talent.

WHAT ARE DUBAI MUNICIPALITY'S METHODS?

Dubai Municipality translates goals and targets into relevant regulations and implements them through numerous initiatives related to sustainability, including sustainable urban planning, environmental projects, sewage treatment, solid waste management, thermal insulation, energy conservation and green buildings. Examples of initiatives in these areas include the implementation of the new Makani system, establishing the Green Building Standards and building an iconic addition to the skyline of Dubai: Frame Dubai.

As the ambitions of the Dubai leadership grow in regards to sustainable development, so do those of Dubai Municipality. This can be seen in the UAE's commitment to 24% clean and renewable energy in the mix by 2020, unprecedented in the region. In addition, in November 2015, H.H. Sheikh Mohammed bin Rashid Al Maktoum Vice President and Prime Minister of the UAE and Ruler of Dubai, launched the Dubai Clean Energy Strategy 2050, committing Dubai to produce 25% of its energy from zero-greenhouse gas emission sources by 2030.

Every step forward leads to the same place – with Dubai aiming to become the city with the lowest carbon footprint worldwide. This will continue to guide Dubai Municipality's path in the quest for a sustainable future.

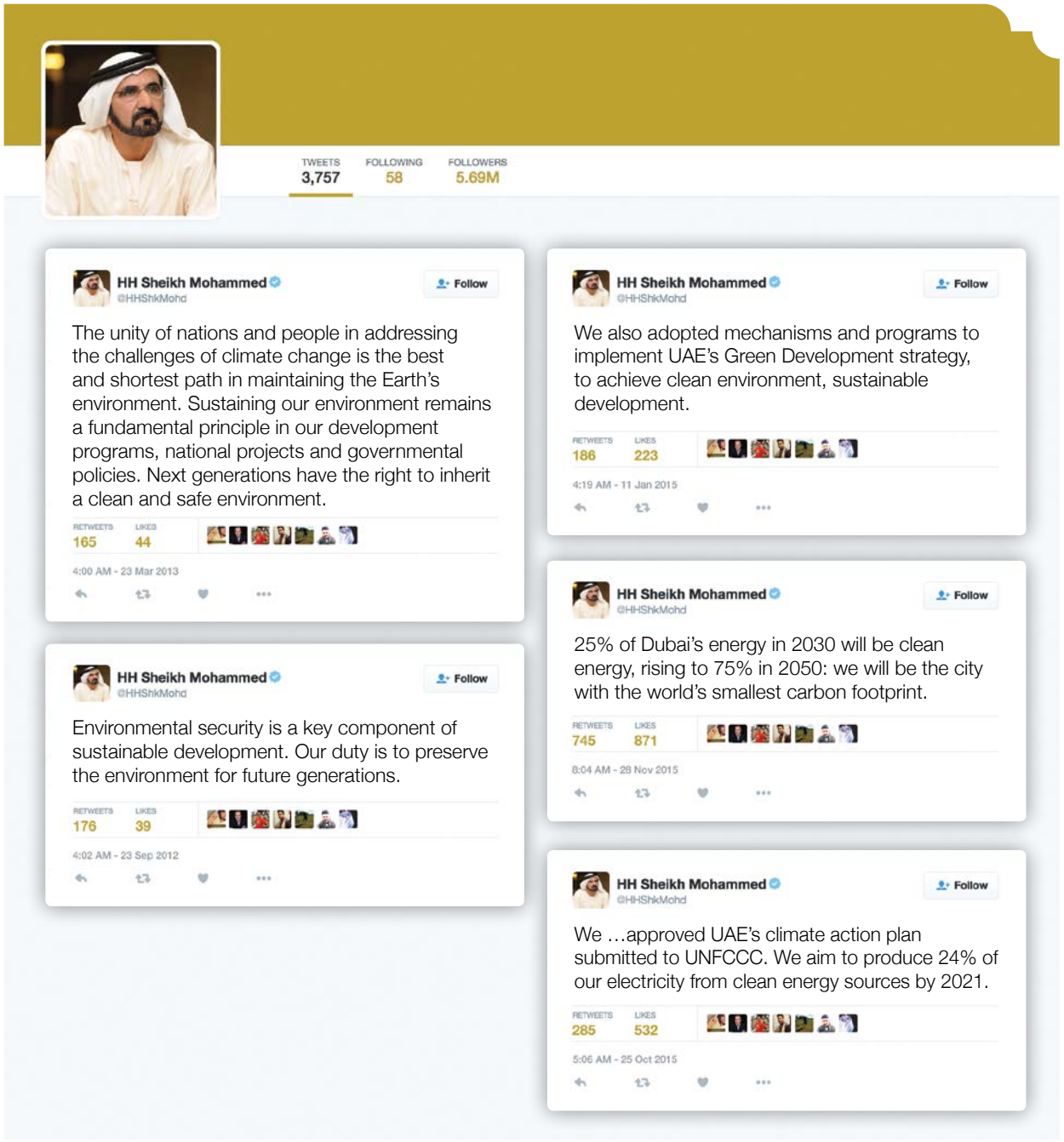
DUBAI MUNICIPALITY STRATEGIC THEMES 2021

Vision

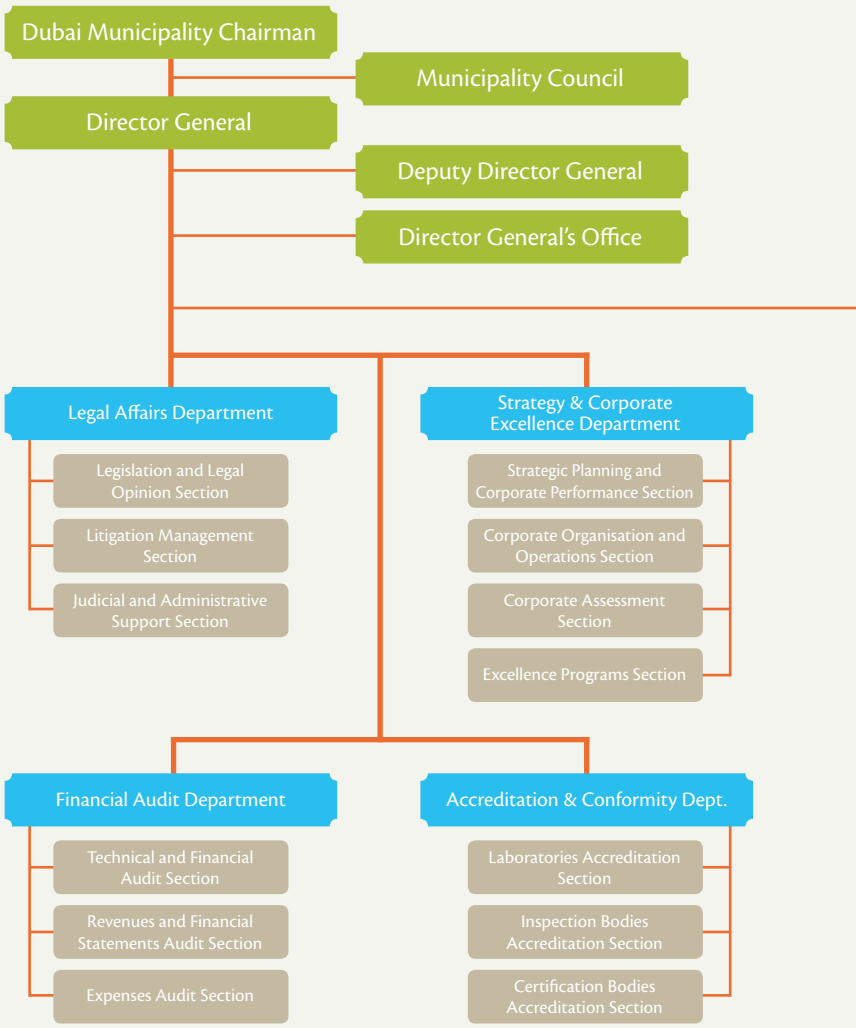
By 2021, the Municipality will become a world reference for developing Dubai as a pioneer smart and sustainable global city.

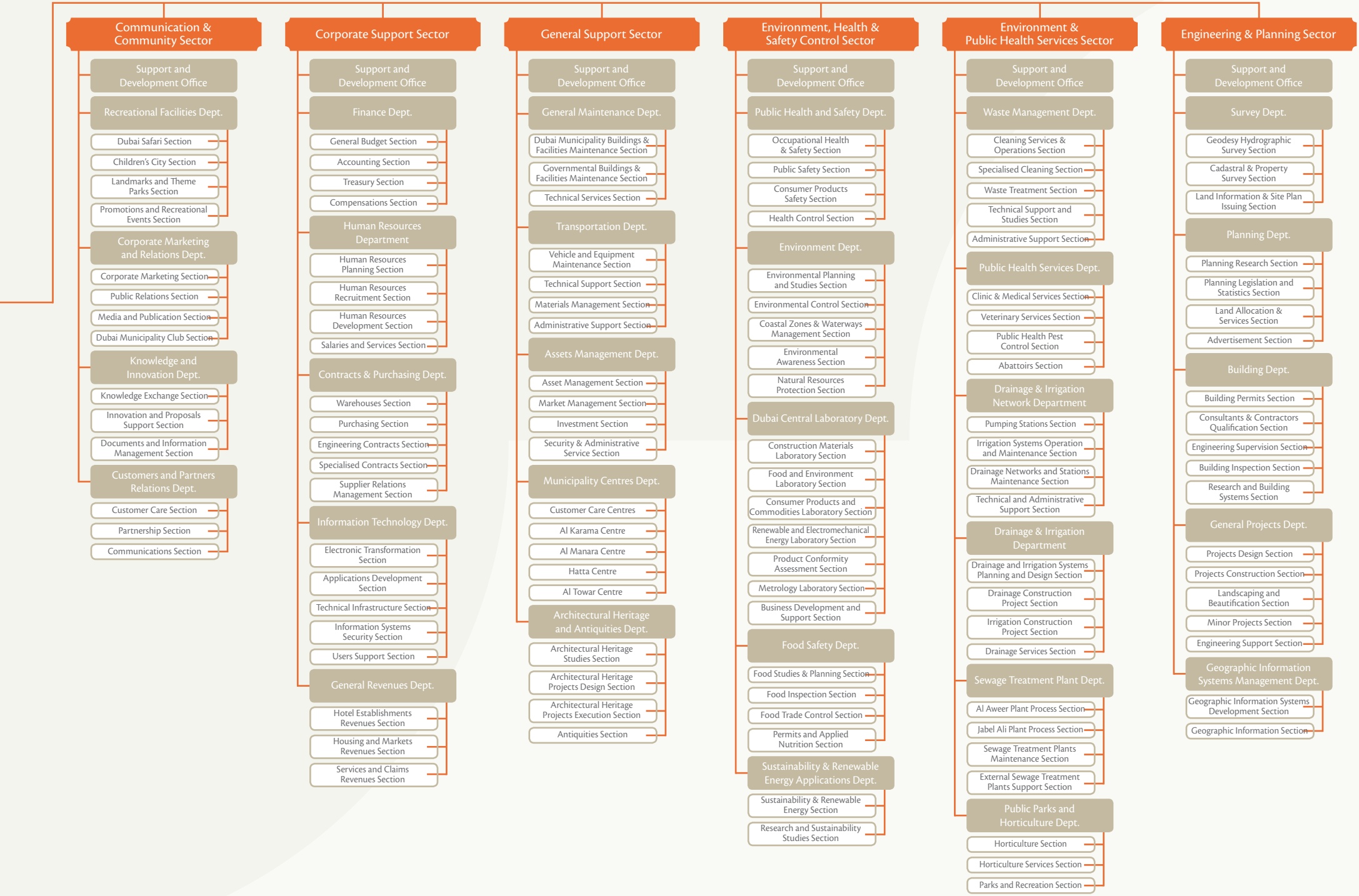
Mission

Plan, develop and manage an excellent city that provides the essence of success and sustainable prosperity.



DUBAI MUNICIPALITY'S ORGANISATIONAL CHART




Communication & Community Sector
Support and Development Office
Recreational Facilities Dept.
Dubai Safari Section
Children's City Section
Landmarks and Theme Parks Section
Promotions and Recreational Events Section
Corporate Marketing and Relations Dept.
Corporate Marketing Section
Public Relations Section
Media and Publication Section
Dubai Municipality Club Section
Knowledge and Innovation Dept.
Knowledge Exchange Section
Innovation and Proposals Support Section
Documents and Information Management Section
Customers and Partners Relations Dept.
Customer Care Section
Partnership Section
Communications Section
Corporate Support Sector
Support and Development Office
Finance Dept.
General Budget Section
Accounting Section
Treasury Section
Compensations Section
Human Resources Department
Human Resources Planning Section
Human Resources Recruitment Section
Human Resources Development Section
Salaries and Services Section
Contracts & Purchasing Dept.
Warehouses Section
Purchasing Section
Engineering Contracts Section
Specialised Contracts Section
Supplier Relations Management Section
Information Technology Dept.
Electronic Transformation Section
Applications Development Section
Technical Infrastructure Section
Information Systems Security Section
Users Support Section
General Revenues Dept.
Hotel Establishments Revenues Section
Housing and Markets Revenues Section
Services and Claims Revenues Section
General Support Sector
Support and Development Office
General Maintenance Dept.
Dubai Municipality Buildings & Facilities Maintenance Section
Governmental Buildings & Facilities Maintenance Section
Technical Services Section
Transportation Dept.
Vehicle and Equipment Maintenance Section
Technical Support Section
Materials Management Section
Administrative Support Section
Assets Management Dept.
Asset Management Section
Market Management Section
Investment Section
Security & Administrative Service Section
Municipality Centres Dept.
Customer Care Centres
Al Karama Centre
Al Manara Centre
Hatta Centre
Al Towar Centre
Architectural Heritage and Antiquities Dept.
Architectural Heritage Studies Section
Architectural Heritage Projects Design Section
Architectural Heritage Projects Execution Section
Antiquities Section
Environment, Health & Safety Control Sector
Support and Development Office
Public Health and Safety Dept.
Occupational Health & Safety Section
Public Safety Section
Consumer Products Safety Section
Health Control Section
Environment Dept.
Environmental Planning and Studies Section
Environmental Control Section
Coastal Zones & Waterways Management Section
Environmental Awareness Section
Natural Resources Protection Section
Dubai Central Laboratory Dept.
Construction Materials Laboratory Section
Food and Environment Laboratory Section
Consumer Products and Commodities Laboratory Section
Renewable and Electromechanical Energy Laboratory Section
Product Conformity Assessment Section
Metrology Laboratory Section
Business Development and Support Section
Food Safety Dept.
Food Studies & Planning Section
Food Inspection Section
Food Trade Control Section
Permits and Applied Nutrition Section
Sustainability & Renewable Energy Applications Dept.
Sustainability & Renewable Energy Section
Research and Sustainability Studies Section
Environment & Public Health Services Sector
Support and Development Office
Waste Management Dept.
Cleaning Services & Operations Section
Specialised Cleaning Section
Waste Treatment Section
Technical Support and Studies Section
Administrative Support Section
Public Health Services Dept.
Clinic & Medical Services Section
Veterinary Services Section
Public Health Pest Control Section
Abattoirs Section
Drainage & Irrigation Network Department
Pumping Stations Section
Irrigation Systems Operation and Maintenance Section
Drainage Networks and Stations Maintenance Section
Technical and Administrative Support Section
Drainage & Irrigation Department
Drainage and Irrigation Systems Planning and Design Section
Drainage Construction Project Section
Irrigation Construction Project Section
Drainage Services Section
Sewage Treatment Plant Dept.
Al Aweer Plant Process Section
Jabel Ali Plant Process Section
Sewage Treatment Plants Maintenance Section
External Sewage Treatment Plants Support Section
Public Parks and Horticulture Dept.
Horticulture Section
Horticulture Services Section
Parks and Recreation Section
Engineering & Planning Sector
Support and Development Office
Survey Dept.
Geodesy Hydrographic Survey Section
Cadastral & Property Survey Section
Land Information & Site Plan Issuing Section
Planning Dept.
Planning Research Section
Planning Legislation and Statistics Section
Land Allocation & Services Section
Advertisement Section
Building Dept.
Building Permits Section
Consultants & Contractors Qualification Section
Engineering Supervision Section
Building Inspection Section
Research and Building Systems Section
General Projects Dept.
Projects Design Section
Projects Construction Section
Landscaping and Beautification Section
Minor Projects Section
Engineering Support Section
Geographic Information Systems Management Dept.
Geographic Information Systems Development Section
Geographic Information Section

INTERVIEW WITH

H.E. ENG. HUSSAIN NASSER LOOTAH

DIRECTOR GENERAL, DUBAI MUNICIPALITY

DUBAI MUNICIPALITY'S DIRECTOR GENERAL DISCUSSES HOW BECOMING A SUSTAINABLE CITY WILL MAKE DUBAI'S RESIDENTS HAPPY

Q1: YOUR EXCELLENCY, LET'S START WITH THE MOST IMPORTANT QUESTION: HOW SUSTAINABLE IS DUBAI?

Dubai is heading towards being one of the most sustainable cities in the world and it's moving faster towards this goal every day. As a fairly new city, we started the race to sustainability a bit later than most other mega-cities, but we have caught up over the past five years. One of our biggest advantages is our visionary leadership, first and foremost H.H. Sheikh Mohammed Bin Rashid Al Maktoum, Vice President and Prime Minister of the UAE and Ruler of Dubai. Since he launched the UAE Green Growth Strategy in 2012 under the slogan "A Green Economy for Sustainable Development", Dubai has changed its course and has been moving with high speed towards a sustainable economic and social model. Within this development, Dubai Municipality has stated its mission to plan, develop and manage an excellent city that provides the essence of success and sustainable prosperity.

This can be seen in so many areas of our nation's recent development, from the rationalisation and efficient use of resources, to energy and water consumption, social welfare and economic diversification, as outlined in the Dubai Plan 2021, which describes the future of Dubai in sustainable terms.

Specific projects include the introduction of a zero waste to landfill strategy and the opening of several new recycling centres, as well as waste-to-energy projects whereby energy is generated from the incineration of waste. The Green Building Regulations and Specifications have been implemented – a set of specifications and guidelines for regulating the criteria of structures that allows for efficiencies in the consumption of electricity, water and renewable energy as part of the Green Buildings project – and in the move towards becoming a smart city, 450 e-services have been instituted. Initiatives such as the Mohammed Bin Rashid Al Maktoum Solar Park are examples of how serious Dubai is in terms of energy-mix diversification, with the goals outlined in the Dubai Integrated Energy Strategy 2030 (DIES), which was deployed in 2011 to set the strategic direction of Dubai towards securing sustainable supply of energy and enhancing demand efficiency of water, power and fuel.

Further, a robust legislative framework is being developed to encourage energy-efficient behaviour and community-oriented initiatives are ensuring this is an Emirate-wide effort. In addition, Dubai is providing leadership within the region for a long-term push toward economic diversification, primarily through tourism, international finance, trade, and alternative energy endeavours.

Q2: HOW IS DUBAI MUNICIPALITY INVOLVED IN MAKING THE LEADERSHIP'S VISION BECOME A REALITY?

As outlined in the Dubai Municipality Strategy 2016 – 2021, our vision is by 2021, for the Municipality to become a world reference for developing Dubai as a pioneer smart and sustainable global city.

We recognise that at the core of sustainable development is one thing: people. It is people's endeavours that build and continue to contribute to the economy, and their behaviour affects the natural environment. The ability to cohabit is the path to a content society and Dubai has expressed the ambition to become the happiest and best city in the world, under the understanding that if we create a desirable place to live and work, there will be a bright future of all of us.

This is why Dubai Municipality's work is so crucial. The Municipality creates the interface between our leadership's vision, and our residents' happiness.

Q3: YOU HAVE BEEN HEADING DUBAI MUNICIPALITY THROUGHOUT DUBAI'S STELLAR DEVELOPMENT FOR MORE THAN 10 YEARS. WHAT IS YOUR SINGLE PROUDEST ACHIEVEMENT IN THIS TIME?

There have been so many achievements during this time that it's impossible to highlight just one. I'm proud that I have been able to play a role in the Emirate's development over the past decade, which has been a turbulent period of significant change. This change has led us to where we are today, at the forefront of so many innovative developments, and all I can do is hope that the nation continues to prosper and build towards a bright and happy future.

Q4: WHERE HAVE YOU BEEN SUCCESSFULLY IMPLEMENTING SUSTAINABLE PRACTICES AND WHAT WILL BE YOUR ONGOING INITIATIVES?

We have had a great number of successes in implementing sustainable practices and will continue to strive in this area with the goal of securing a smart, sustainable Emirate into the future. As technology changes, so too will the initiatives we pursue, as it s vital that sustainability is an ongoing process, not just a one-off activity.

We successfully developed the Green Building Regulations and Specifications in 2011 and these are now mandatory for both public and private sector developments. The key targets of the Green Building Regulations are to reduce the consumption of water and electricity, and reduce waste and CO_2 emissions. They form a baseline for responsible urban development.

Other projects that support sustainability in this area include the Smart Building App, which provides an example of the application of the green building system in a practical, accessible, interactive and easy-to-understand manner, explaining the green building laws and how to apply them in a creative way, and the 10D project, which provides information and partnership with customers throughout the building permit process via the provision of 10 electronic and video-conferencing channels that enable customers to participate in checking applications and the final decision process, while ensuring the highest levels of transparency and governance.

A peek into the future will also see the introduction of a new ranking system for both commercial and residential properties (Al Sa faat) that will be utilised to score or rate a building s total energy efficiency. The new ranking system has been approved by H.H. Sheikh Mohamed Bin Rashid Al Maktoum, Vice President and Prime Minister of the UAE and Ruler of Dubai, and forwards the ultimate aim of improving the energy performance of all buildings.

As we continue along the path to sustainability, we will continue to introduce innovative initiatives to enhance Dubai's sustainable ambitions.

Q5: HOW DO YOU STEER URBAN DEVELOPMENT IN A SUSTAINABLE WAY?

Urban regions are known for their extensive use of natural resources and prolific generation of waste substances, meaning urban development is a major concern for policymakers, planners, public officials, and environmental advocates. Dubai has been progressing steadily on the path of growth and development over the last three decades and the population has steadily increased and is projected to continue in this way. This growth needs to be planned along sustainable lines in order to reduce negative environmental impacts and natural resource depletion and promote sustainable lifestyles.

By promoting cleaner production, renewable energy, water-resource management, reduction of solid waste and sewage treatment, reuse and recycling of materials, ecological urban design and construction, public health, and the social responsibility of residents, Dubai can become a model of long-term environmental sustainability. Dubai Municipality is instrumental in spreading awareness about sustainable development and encouraging its application in all urban systems, including transportation, industry, construction and urban waste management, amongst others.

Q6: YOU MENTIONED THE FOCUS ON THE RESIDENTS. HOW DO YOU GET THEM TO PARTICIPATE?

Dubai Municipality runs a number of public programmes and campaigns to encourage community buy-in as regards sustainability. This includes the Clean Up the World Campaign, which aims to foster environmental awareness, and the My City, My Environment recycling programme, serving residents in high-density areas. These kinds of programmes are designed to create a new culture of environmental awareness.

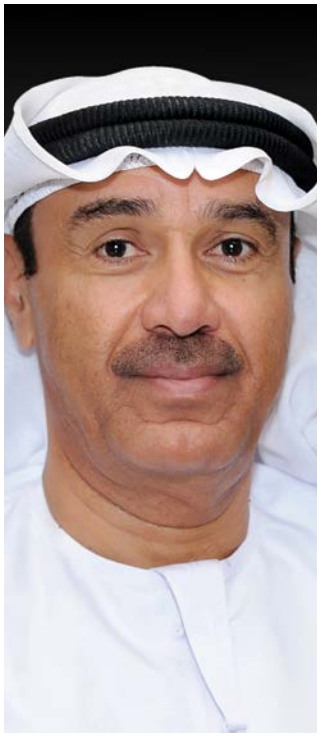
> While there is not a single global model of governance that will apply to all nations, the advantages for Dubai include accountability for actions

Q7: IN CONTRAST TO CITIES IN NORTH AMERICA AND EUROPE, DUBAI IS NOT LED BY ONE MAYOR AND THEIR ADMINISTRATION, BUT BY SEVERAL AUTHORITIES STEERING THEIR INDIVIDUAL SECTOR UNDER THE LEADERSHIP OF THE PRIME MINISTER'S OFFICE. WHERE DO YOU SEE THE ADVANTAGES IN THIS SYSTEM TO ADVANCE SUSTAINABLE DEVELOPMENT?

While there is not a single global model of governance that will apply to all nations, the advantages for Dubai include accountability for actions, as each of the authorities are appointed by H.H. Sheikh Mohammed Bin Rashid Al Maktoum, Vice President and Prime Minister of the United Arab Emirates and Ruler of Dubai. As we have longer appointments, this provides continuity in management, which makes it more feasible to see initiatives through and works towards the bigger sustainable development picture, rather than focusing on short-term goals.

Q8: HOW DO YOU EXCHANGE YOUR EXPERIENCES WITH OTHER MUNICIPALITIES AND CITY GOVERNMENTS ON HOW TO ADVANCE SUSTAINABILITY? DO YOU REGULARLY MEET WITH REPRESENTATIVES OF OTHER EMIRATES OR FOREIGN CITIES?

We are always open to meeting with other municipalities and city governments, as we believe these are valuable opportunities to learn from each other and share experiences and successes. We have several formally established relationships that assist in this regard, including partner city relationships with the Gold Coast in Australia and Frankfurt in Germany. These partnerships allow for cultural, economic and business exchange, which enhance the opportunities for all involved.



H.E. Eng. Hussain Nasser Lootah

Director General, Dubai Municipality

H.E. Eng. Hussain Nasser Lootah is Director General of Dubai Municipality. In this capacity, he chairs and sits on the boards of a number of semi-governmental organisations. He is a also a member of The Executive Council of Dubai Government. Throughout his career, he has been a champion for urban development in the Gulf – always driven by the ambition to make Dubai one of the most liveable cities on this planet. His influence extends through membership of numerous governmental and non-governmental boards, committees and councils, both at the local and international level.

WORKING HAND IN HAND

DUBAI MUNICIPALITY AND ITS PARTNERS IN THE QUEST FOR A BETTER CITY

Having realised stellar social and economic development of the United Arab Emirates in just over 40 years, we are well aware of the most potent contributor this success: collaboration.

In his foreword to the Business Year: Dubai 2015 on Dubai's ambitions as a regional leader and beacon for stability, H.H. Sheikh Mohammed bin Rashid Al Maktoum, Vice President and Prime Minister of the UAE and Ruler of Dubai, stated: "Realising this vision, and the efforts that are going into making Dubai Expo 2020 an event of international significance, depends entirely on the energy, creativity and collaboration of our people".

Dubai Municipality (DM) is one of the Emirate-level governmental bodies but also extends its activities to work with professional networks, peer cities and organisations.

DUBAI MUNICIPALITY S PARTNERSHIP NETWORK

- Membership in government councils and committees (e.g. DSCE)
- Membership in international organisations and bodies (e.g. UN Habitat)
- Partnerships with cities (e.g. Gold Coast, Frankfurt)
- Partnerships with single entities (e.g. Siemens)

PARTNERSHIPS IN PRACTICE

SPOTLIGHT ON THE DUBAI SUPREME COUNCIL OF ENERGY

Dubai Municipality is a member of the Dubai Supreme Council of Energy, and is mandated to lead many of the council's efforts and initiatives relating to supply and demand efficiency in buildings, in close collaboration with other relevant authorities, such as Dubai Electricity and Water Authority (DEWA), Roads and Transport Authority (RTA), Etihad ESCO, Emirates Authority for Standardization & Meteorology (ESMA) and many more.

The Demand-Side Management (DSM) Strategy includes nine programmes, which are being developed and implemented by eleven authorities across the Government of Dubai. The DSM Strategy is an integral part of the Dubai Integrated Energy Strategy 2030, aiming to reduce electricity consumption by 30% and water consumption by more than 40% by 2030, compared with business-as-usual consumption rates.

FACT BOX

MEET THE DUBAI SUPREME COUNCIL OF ENERGY

المجلس الأعلى للطاقة
Supreme Council of Energy

The multi-stakeholder council is the governing body in the Emirate of Dubai tasked with policy development, planning and coordination of the energy sector. It brings concerned authorities and energy bodies to one table to ensure energy security, efficiency and developing alternative and renewable-energy sources while employing a balanced approach to protecting the environment.

The council, under the chairmanship of H.H. Sheikh Ahmed bin Saeed Al Maktoum, Chairman of the Dubai Supreme Council of Energy, consists of representatives from the Department of Petroleum Affairs, Dubai Aluminium Company (DUBAL), Emirates National Oil Company (ENOC) Dubai Supply Authority (DUSUP), Dubai Petroleum Establishment (DPE), Dubai Municipality (DM), Dubai Nuclear Energy Committee (DNEC) and Roads & Transportation Authority (RTA). The council operates through its secretariat, led by H.E. Ahmed Al Muhairbi, Secretary General of Dubai Supreme Council of Energy (DSCE).

Programme (1)

BUILDING REGULATIONS

Cooperation between Dubai Municipality and DEWA

The regulations touch upon aspects of energy, water, materials and waste, ecology and building vitality. The implementation of green building regulations aligns with Dubai's strategic plans by obtaining:

- Energy savings of 20%
- Water savings of 15%
- CO_2 reductions of 20%
- IAQ compliance of 90%
- Waste reductions (municipal 60%, construction 50%)

Programme (2)

BUILDING RETROFITS

Cooperation between Dubai Municipality, the Dubai Supreme Council of Energy's Secretariat and Etihad ESCO

Collaboration with Etihad ESCO can be seen in the support given in realising their mission to convert 30,000 buildings to energy-efficient buildings by 2030. Etihad ESCO will lead the execution of these building retrofits in the public sector, increase penetration of district cooling and build capacity of local ESCOs, also facilitating access to financing for local ESCOs.

Programme (3)

DISTRICT COOLING

Cooperation between Dubai Municipality, DEWA, the Dubai Supreme Council of Energy's Secretariat, developers and district cooling installers

We aim to reduce the total energy consumption for cooling activities by 5% by increasing district-cooling penetration from 20% of Dubai's cooling capacity in 2011 to 40% in 2030. District cooling is the focus as it is the most efficient and best-adapted method in the region.

Programme (4):

ENERGY LABELLING FOR APPLIANCES AND EQUIPMENT

Cooperation between Dubai Municipality and ESMA

The aim of the labelling system is to reduce energy consumption by appliances and equipment. In 2014, 6.5% of the total electricity consumption in Dubai was due to the use of air conditioners, lamps, large appliances, water heaters, electronic equipment, electric motors, water fixtures and other such items.

Programme (5)

WATER REUSE AND EFFICIENT IRRIGATION

Cooperation between Dubai Municipality and DEWA

Potable water in the UAE is produced primarily through energy-intensive desalination processes, which could be reduced by encouraging water reuse and using efficient irrigation. A large component of this is the water used for irrigating Dubai's gardens, parks and green areas. Irrigation water-use will be reduced by promoting efficient landscaping practices and irrigation technologies and maximising the use of treated sewage effluent (TSE).

All public areas will use TSE for landscaping purposes, with the remaining TSE capacity to be utilised by industry. The objective is to ensure that 80% of Dubai's green areas are efficiently irrigated and all public areas use treated sewage effluent, with capacity for other uses by 2030.

Programme (6)

OUTDOOR LIGHTING

Cooperation between Dubai Municipality and RTA

Another large source of energy consumption is outdoor lighting. Reduced power-use in outdoor lighting can be achieved by using more efficient lighting fixtures and expanding RTA's ongoing switch-off initiative for street lights. The objective is to implement the switch-off programme on 30% of residential streets and retrofit 75% of existing lights by 2030.

Programme (7)

CHANGE OF TARIFFS

Cooperation between Dubai Municipality and DEWA

The work on program 7 is now focused on monitoring the impact of the changes in tariffs. Tariffs for power and water were adjusted, starting from1st January, 2011. There are no current plans to change the tarrif once again, however, the tariff structure may change according to the outcome of the Demand Response programme (Programme 8), addressing time of use, curtailable load management and direct load control.

Programme (8)

DEMAND RESPONSE

Cooperation between Dubai Municipality and DEWA

The objective of this programme is to gradually introduce Time-of-Use tariffs (TOU), Direct Load Control (DLC) and Curtailable Load Management (CLM) to reduce peak load growth and accordingly future capacity needs.

Programme (9)

SHAMS DUBAI

Cooperation between Dubai Municipality and DEWA

This programme implements executive council resolution number 46 of 2014, issued by H.H. Sheikh Hamdan bin Mohammed bin Rashid Al Maktoum, Crown Prince of Dubai and Chairman of the Dubai Executive Council, to regulate the connection of solar energy to Dubai's power-distribution grid.

AND THE SUN...

Cooperation within members of the Dubai Supreme Council is the most successful tool for achieving efficiency and efficacy in regards to energy legislation, regulation and management.

Cooperation does not stop within official programmes, but rather, extends to promising, complementary initiatives. One example is Shams Dubai, the solar roof-top initiative developed in collaboration with DEWA, which enables private and commercial electricity users to connect their own roof-top PV installations to the grid. To make this a reality, Dubai Municipality revised the building regulations and assists with the assurance of panels and contractors.

Demand-Side Management (DSM)
Under the Dubai Integrated Energy Strategy 2030

FACT BOX

DUBAI IN C40

C40 is a network that connects more than 75 of the world's greatest cities, representing more than 500 million people, and one quarter of the global economy. C40 drives urban action to tackle climate change by reducing greenhouse gas emissions and climate risks, while increasing the health, wellbeing and economic opportunities of urban citizens. Dubai has joined the C40 network, with the Dubai Executive Council managing involvement. Dubai will be proactively involved in its core areas of development interest: transportation, solid waste and water and adaptation. A series of relevant workshops will be organised by other member cities, with a delegation from the UAE attending.

FACT BOX

PARTNER CITY STATEMENT – FRANKFURT

The most important benefit for partner cities is that citizens learn more about the culture of the respective countries and that there is mutual acceptance of differences in culture. As for the partnership between Frankfurt and Dubai, there is a sculpture in Zabeel Park to underline the relationship and the mutual understanding that goes with it. The artwork is of a book, with an excerpt from well-known German national poet Johann Wolfgang Goethe, who was born and raised in Frankfurt. In addition, there are active friendship associations in Frankfurt (Frankfurt-Dubai Society) and in Dubai (Bembel Beduinen) that work to establish good relations between the civil societies in both cities, the latter being a fan club of the Frankfurt Soccer Team "Eintracht Frankfurt".

At the economic level, Messe Frankfurt (a trade fair company), which is partly owned by the City of Frankfurt, regularly organises fairs such as "Automechanika" (for the automotive sector) and maintains a branch office in Dubai.

In addition, business cooperation in solar technology has been promoted between relevant enterprises in Germany and the UAE. In Frankfurt, the Jumeirah Hotel and the Dubai Tourism Office are investments from the UAE that Frankfurt benefits from.

INVOLVED PARTNERS

- Frankfurt Economic Development GmbH – Initiated the partnership and organises exchange on economic level.
- Tourism and Congress Ltd. Company – organises packages for tourist and business travellers coming from Dubai
- Frankfurt-Dubai Society – organises events and exchange programmes at the civil society level
- Frankfurt RhineMain Marketing of the Region (FRM) – organises economic exchange at the regional level
- Messe Frankfurt – organises trade fairs in Dubai and is part of the Frankfurt presence in Dubai

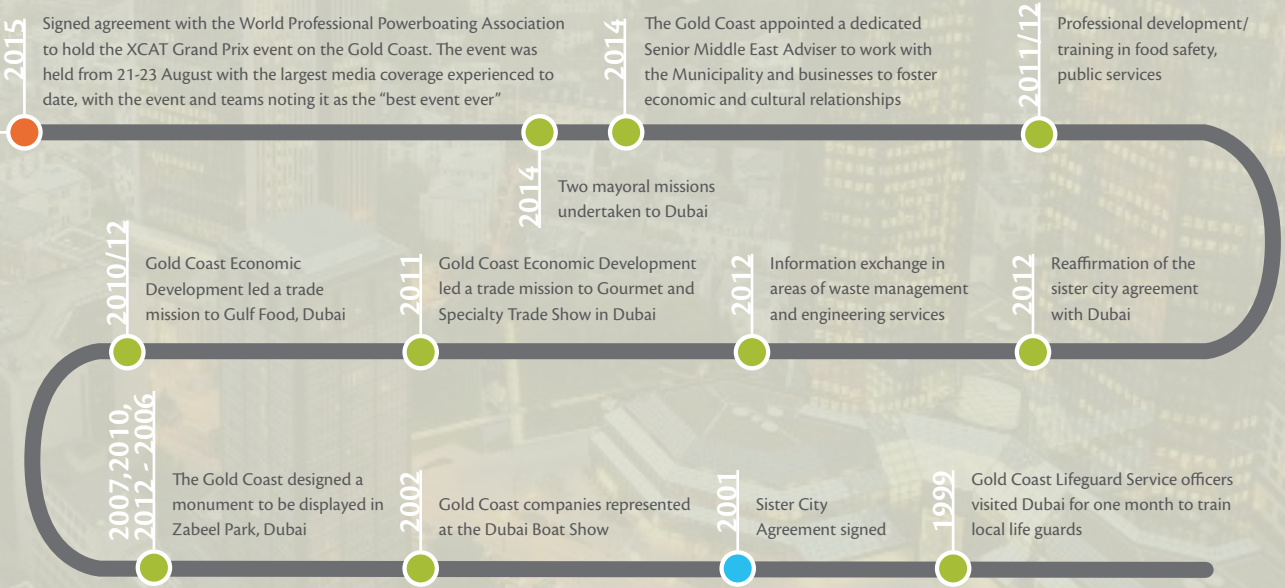
FACT BOX

PARTNER CITY STATEMENT – GOLD COAST

BY MAYOR TOM TATE, CEO AND DALE DISKSON

A sister city relationship between Dubai Municipality and the City of Gold Coast was established in March 2001 and is considered one of the Gold Coast's strongest international connections.

The Dubai/Gold Coast sister city relationship aims to foster civic, community, economic and cultural ties. While traditionally the relationship focused on cultural and education exchanges; knowledge-sharing, commercial objectives also form an important component of the partnership.



DUBAI SUSTAINABILITY CHALLENGES

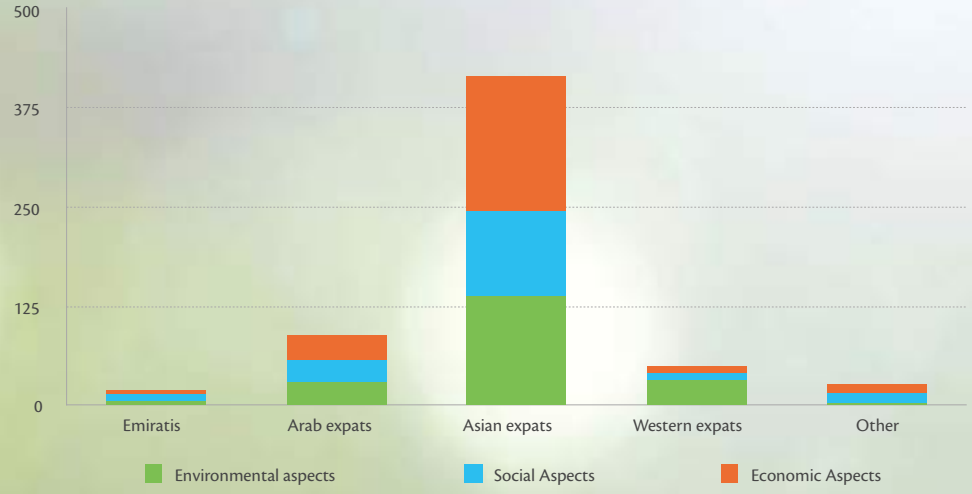
SUSTAINABILITY ONE OBSTACLE AT A TIME

Sustainability goals ranked high on Dubai Municipality's agenda and many important initiatives are already underway.

In 2015, for the first time, members of the public were given the chance to evaluate the Municipality's efforts. A survey was carried out from 22-30 November, by polling company YouGov, which interviewed a total of 606 Dubai residents. The survey aimed to evaluate the Municipality's performance in key areas and identify the level of alignment between municipal strategic goals and public values and concerns.

The survey sample represented various nationalities, ages and income brackets, reflecting Dubai's diversity. Most of the respondents – a total of 417 – were Asian nationals, followed by 91 Arab expatriates and 50 Western expatriates. An additional 21 respondents were Emiratis, while 27 belonged to various other nations. There were 315 men and 291 women.

Sustainable development has three broad pillars related to environmental, social and economic objectives. The survey asked residents to prioritise them. Most people, a total of 230, pointed to economic aspects as the priority. Nearly as many – 211 – said environmental aspects were the most important.



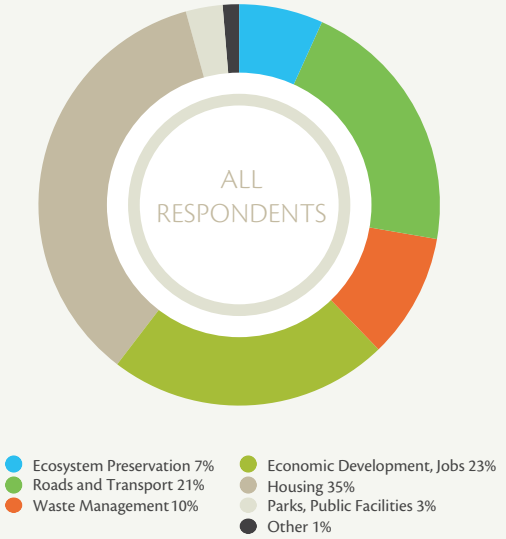
The answers varied depending on respondents' gender, age and nationality. Men gave higher importance to the economy. Among male respondents, some 39% pointed to economic aspects as the priority and 32% to environmental aspects. Among women, the environment was ranked as top priority by 38% of respondents, while 36% said economic goals were the most important.

Young people, those aged 18 to 29, and those earning middle incomes from US$2,666 to US$5,332 placed a higher significance on environmental aspects and could possibly be key audiences for government campaigns targeting environmental performance goals.

Among the different nationalities, some 62% of Western expatriates mentioned environmental aspects as the priority. For Emiratis, social aspects were the most important, while most Arab and Asian expatriates said economic aspects were the most important.

People were also asked to identify key issues facing Dubai until 2021. Inadequate housing and high rent was the issue considered the most urgent issue that the majority of people – a total of 214 – pointed to. Housing was the top priority regardless of respondents' gender, marital status and income, with even top earners, those making US$5,333 per month and above, mentioning it as the priority.

Housing was also the top priority among all age groups except for the very young, those aged 18 to 24, for whom it came second after the need to improve roads and transport.



Of all nationalities, Emiratis were the least concerned with housing, which was mentioned as the top issue by only 10%. Most Emiratis – 38% – said economic development was key for Dubai's future.

In total, housing, the need for economic development and job creation, as well as the safety and utility of roads and transportation infrastructure were identified as priorities by a total of 79% of respondents. Ecosystem preservation and waste management were mentioned as priorities by 17% of residents.

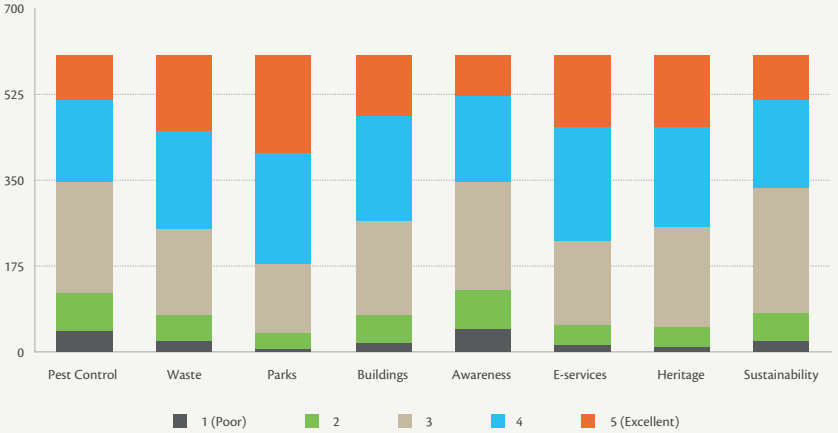
Besides assessing people's attitudes, the Municipality also evaluated its initiatives, asking people to name those they had participated in. Waste management and My City, My Environment were the most popular initiatives. Most respondents said accessibility of the services and lack of understanding prevented them from being more active.

The survey gave participants the chance to rate Dubai Municipality's sustainability progress on a scale of one (poor) to five (excellent). Overall 72% gave a score of three (good) or four (very good). Among the different nationalities, most Arab, Asian and Western expatriates gave the Municipality a ranking of three. The majority of UAE nationals – a total of 38% – gave the Municipality an excellent score.

Specific municipal services were also ranked. The largest share of respondents rated services as either good or very good. The maintenance of public parks and public spaces was the most highly ranked service with 71% of all people giving it a rating of either four or five. This was followed by e-services, which were rated as either very good or excellent by 62% of respondents, and waste collection at 59%.

The survey results show the Municipality is effective in delivering key services to the public and clearly identifies the scope for improvement. It also shows how socio-economic differences shape people's priorities. Gender, age, income and nationality differences must be taken into account when designing campaigns to change public behaviour.

Q3. Residents were asked to rate on a scale of 1 to 5 Dubai Municipality's overall progress towards sustainability, as well as various services such as pest control, waste collection and recycling, parks and public spaces maintenance, building standards, educating the public through awareness campaigns, e-services, and the maintenance of heritage sites.



MESSAGE FROM THE

ASSISTANT DIRECTOR

ENG. ABDULLA MOHAMMED RAFIA

Assistant Director-General for the Engineering and Planning Sector

The Dubai Municipality Sustainable Committee was formed to contribute to the Municipality's efforts to keep pace with global green developments. The committee's role includes developing and updating the strategic vision for sustainability in the Municipality and ensuring its integration with Dubai's strategic plans, working from development to follow-up in executing green initiatives.

The committee's remit is broad, ranging from developing regulations and standards for the conformity certificate for green buildings, according to the green building specifications, to preparing media plans to introduce policies on sustainability and its importance in maintaining the national income, public health and environment. The committee is responsible for overseeing the development and implementation of awareness programmes, training staff and public in the field of sustainability, and supervising the organisation of events related to sustainability policies, in coordination with the relevant organisational units in the Municipality.

In addition, the committee will propose and formulate programmes to encourage the implementation of sustainability policies, providing mechanisms to achieve full cooperation and coordination between ministries, departments and institutions at the local, federal and international levels.

Fundamentally, the committee is responsible for managing the green economy within the Municipality, coordinating with concerned parties and promoting partnership between public and private sectors to encourage projects that contribute to the achievement of sustainability, with the aim of ensuring Dubai is one of the world's most sustainable cities by 2020.

DUBAI MUNICIPALITY'S STRATEGIC SUSTAINABLE DEVELOPMENT GOALS

Following in the footsteps of the Dubai Government, Dubai Municipality recognises that environmental issues must be integrated with economic development in order for the Emirate of Dubai to prosper and meet the needs of the population, without compromising the ability of future generations to meet their own needs. To this end, the Municipality has developed a set of 14 strategic sustainable development goals, to guide future development and support the Government's overarching vision. Dubai Municipality is committed to achieving concrete outcomes in sustainability terms, ensuring the Emirate is a clean, green and economically successful place to live and work.

1

Study, revise and evaluate sustainability policies in the Emirate of Dubai relevant to buildings, cities, green hotels, green economy and others.

2

Develop and update the Municipality s strategic vision of sustainability, ensuring its integration with the strategic plan of Dubai, continue applying it and resolve all problems and obstacles.

3

Identify all problems and solutions that come in the way of applying green building standards and the continuity of application.

4

Set rules, regulations and standards specific to the certification of compliance to green buildings in the Emirate of Dubai, according to the green buildings standards.

5

Prepare a media plan to raise awareness about the adopted policies in the Municipality related to sustainability and highlight its importance in the preservation of national income, public health and the environment, ensuring the continuity of its application.

6

Establish the necessary mechanisms to evaluate the current buildings in the Emirate of Dubai and the extent of its realisation of the sustainability standards and following up on the application procedures of those mechanisms with the concerned parties.

7

Suggest, coordinate and revise sustainability specific studies and research and the development of necessary programmes and plans to certify, publish and apply the resulting recommendations in coordination with the concerned parties.

8

Supervise the execution and development of awareness, training and capacity-building programmes for Municipality employees and the public in the field of sustainability.

9

Supervise the development and organisation of internal and external sustainability policies related to conferences and events in coordination with the Municipality s specialised organisation departments.

10

Suggest and establish compatible programmes to motivate the public and private sector to apply sustainability policies.

11

Suggest the necessary mechanisms to achieve complete collaboration and coordination between all of the ministries, departments and entities at the Emirate, federal and international levels, in regard to sustainability policies.

12

Specify the necessary equipment, tools and qualified cadets required for establishing an applicable sustainability strategy by the concerned departments in the Municipality.

13

Work on management of the Dubai Green Economy Partnership in the Municipality and coordinate with all concerned stakeholders.

14

Encourage partnership between the public and private sectors and identify partnership development projects that contribute to the Municipality s sustainability strategy.

DEFINING THE STRUCTURE

HOW THIS REPORT CAME TO LIFE

Dubai Municipality (DM) is proud to issue this report, detailing its efforts in economically, socially and environmentally responsible business operations and its contributions to the overall sustainable development of Dubai. We see this as an initial step towards the comprehensive sustainability reporting to come in the near future, which will adhere to internationally recognised reporting frameworks such as those of the Global Reporting Initiative (GRI). DM aims to be reporting on core indicators for 2016/2017, with comprehensive reporting to follow thereafter.

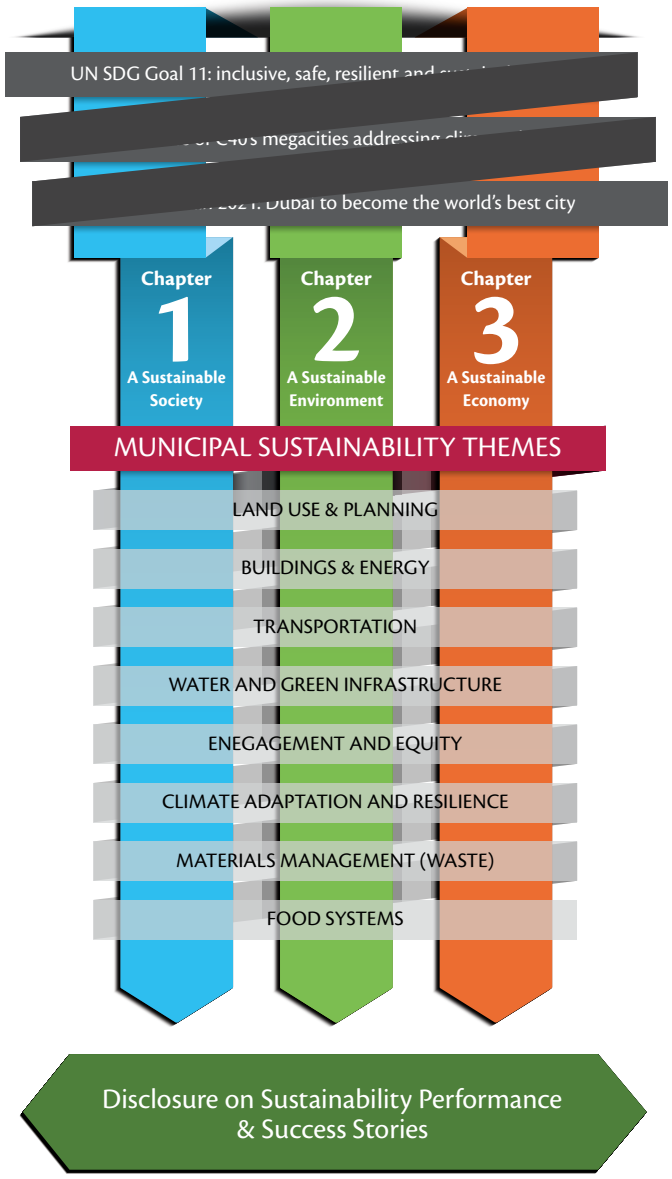
DM considers reporting on strategy, targets and progress on sustainable development as an important matter, integral within the overall DM strategy, hence this report highlights DM's efforts in the field of sustainability through its projects and initiatives. We have seen that quick fixes do not work when it comes to reporting, as the data structures, quality and integrity of information grows with the organisation's experience over several reporting cycles. This is why we have embarked on a multi-phase process, starting with this report, with the goal of building on our learning thereafter.

We have chosen to start with case-study based content and a journalistic format to ease into the data-gathering process and allow sufficient preparation time. This also enables us to scan information across our diverse departments, collate all relevant content and set up the data-flow management structure with all of the relevant departments, and it helps us to achieve the necessary buy-in from the relevant teams.

In this report, we present data in support of our internal sustainability targets, as this is currently where we have sufficient data accuracy and integrity. This is not intended to be aligned to GRI just yet; we are still in the process of analysing how to transfer this rich data-set into the GRI framework in the future, without compromising on the insights we can gain in this stage.

We have reviewed a large number of sustainability reports from municipalities worldwide and have created a report structure that works for DM, presents the aspects that are material to us and our stakeholders at this point, and will merge easily into the international reporting framework structure in the future.

REPORT CONCEPT AND THEMATIC SYSTEM



REPORT STRUCTURE

FOREWORDS

- Royal Quote(s), the Ruler and the DSCE Chairman
- Foreword of the Director General (H.E. Eng. Hussain Nasser Lootah)

INTRODUCTION

- The Emirate of Dubai & Sustainbaility: SDGs, C40 and Dubai to become the best city in the world
- Dubai Municipality & sustainability (en lieu of a mayor / city government): Incl. areas of responsibility, initiatives, organigram, sustainability VISION, Strategy/Plan, Indicators, Baseline, Reporting mechanism
- Sustainable cities: frameworks, partnerships, and indices for sustainabilty planning and reporting at municipal level

CHAPTER 1: A SUSTAINABLE SOCIETY

- Analysis article on sustainability targets, benchmark and performance
- GRI data disclosure (where availabale)
- Articles with case studies on DM activities

CHAPTER 2: A SUSTAINABLE ENVIRONMENT

- Analysis article on sustainability targets, benchmark and performance
- GRI data disclosure (where availabale)
- Articles with case studies on DM activities

CHAPTER 3: A SUSTAINABLE ECONOMY

- Analysis article on sustainability targets, benchmark and performance
- GRI data disclosure (where availabale)
- Articles with case studies on DM activities

The report content is structured along the goals in DM's strategy with relevance to sustainable development along the three spheres: economy, society and environment. It has been created with landmark events shaping the international discourse on sustainable and resource-efficient development in 2015 in mind, and in support thereof.

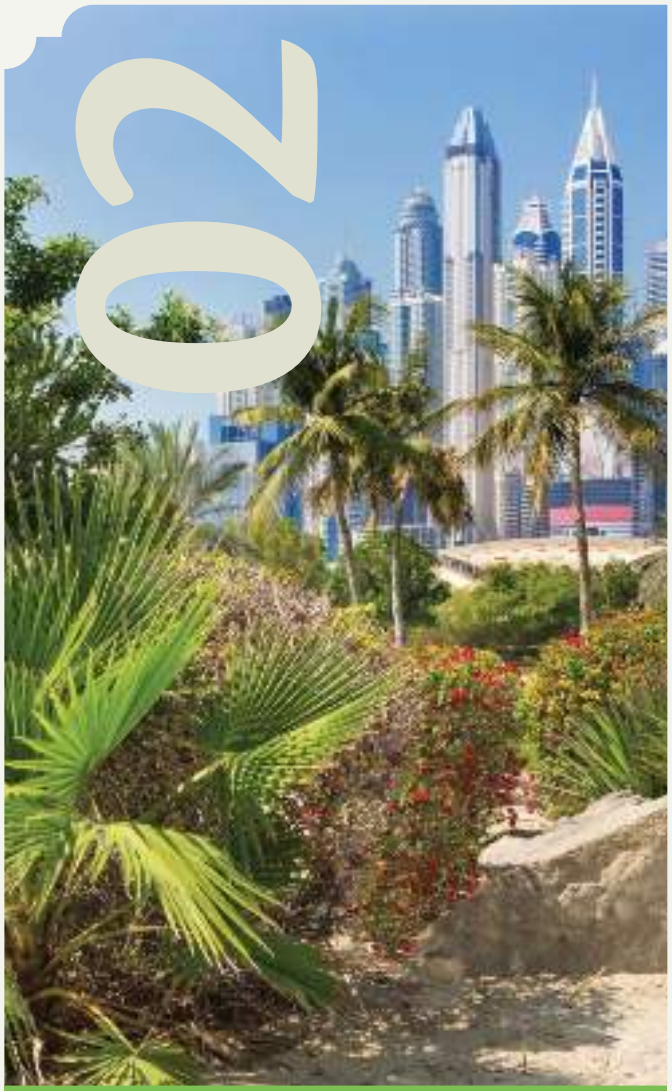
We have structured the content within the three report segments on society, environment and economy as case studies on the diverse initiatives undertaken by DM in each sphere.

Naturally, there are limitations and areas of difficulties in developing any new reporting structure. As a large-scale organisation, the most challenging element has been the time and effort required to communicate across a large number of departments.

We aim to introduce as many of the faces and teams behind these initiatives as possible, but we are aware that DM's successes in sustainability are the result of the hard work of every single DM employee, every one of whom contributes to team success, so we wish to send a big thank you to all employees across DM for their continuous and continuing efforts to achieve results. We are also immensely grateful for the support of DM's leadership for this endeavour, who have made sustainable operations and transparency as regards to our progress a priority.

We know that we are only part of the way along the learning curve. We aim to improve each year and hope you will continue to follow our progress on this journey.

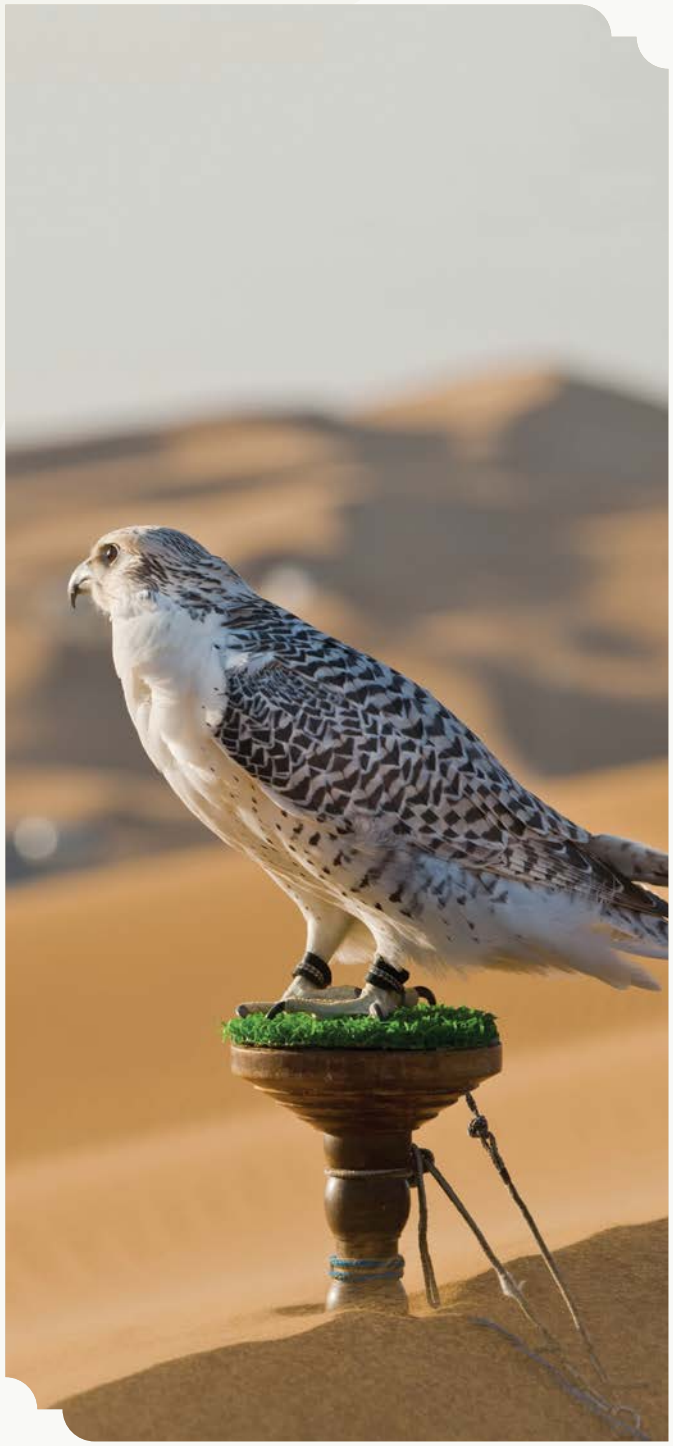
TABLE OF CONTENTS



CHAPTER 1: A SUSTAINABLE SOCIETY

CHAPTER 2: A SUSTAINABLE ENVIRONMENT

CHAPTER 3: A SUSTAINABLE ECONOMY



01 A SUSTAINABLE SOCIETY

Dubai Municipality Social Targets

Dubai Municipality (DM) continues to work on a number of initiatives to reach the community, as well as making a contribution to Dubai's ambitions towards becoming a smart sustainable city. Societal development is vital in ensuring community longevity and engaging citizens on relevant issues and incorporating the diverse interests and cultures of the community in the development process to help foster a vibrant, coherent, sustainable nation.

Throughout this chapter a number of society topics are discussed that are related to community development. This ranges from DM's efforts in the restoration of historic buildings and souks to the Frame Dubai initiative, which aims to bridge the past and present through an architectural landmark. DM has initiated a number of projects to enhance public spaces and parks, such as the redevelopment of Al Khazzan Park as a zero-energy park and propagating the importance of wetlands in conserving biological diversity.

OVERVIEW

A SUSTAINABLE SOCIETY

The community is being engaged through a number of awareness campaigns and of particular note is the Ambassadors of Sustainability programme, which educates and involves the next generation in regards to sustainable practices. DM is also concerned with building a smart community, with numerous Emirate-wide initiatives, including installing smart Wi-Fi palms in beaches, parks and public areas; developing the unique Makani system to simplify navigation; launching a smart buildings app; addressing sustainability issues around schools, mosques and Islamic hotels; and initiating the Desert Rose project, a smart sustainable satellite city based on the principles of sustainable development.

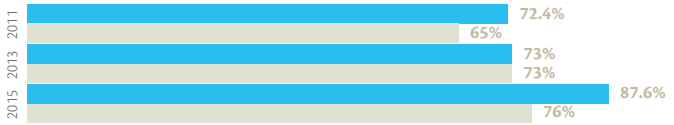
Targets and the measurement of results are essential, so DM outlined sustainability indicators within the Strategic Plan 2013-2015 and has measured progress on these indicators through a variety of mechanisms, including surveys and participation figures. These show a steady increase in the level of public awareness and the number of environmental activities and awareness programmes completed, suggesting there is more engagement from the general public throughout the Emirate. Participation in campaigns and awareness programmes, such as the Clean up the World Campaign, one of DM's longest campaigns, has increased and participants in such initiatives provided a positive response in terms of satisfaction in the awareness campaigns implemented by DM.

LEGEND

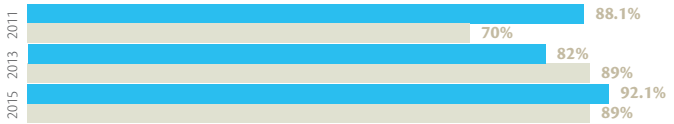
- Real
- Target

Level of Public Awareness & Behaviour Towards Environmental Issues

Environmental Awareness



Positive Environmental Behaviour

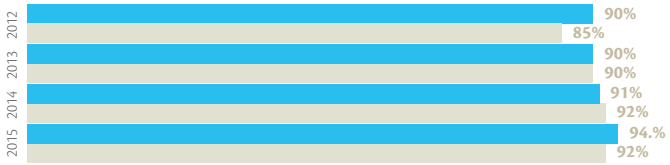


The results regarding the level of environmental awareness and positive environmental behavior have been taken from surveys that are distributed every two years. These results are linked to Dubai Municipality's goal "to ensure protection of the environment and conservation of natural resources in a sustainable manner" [Sustainability Indicators Strategic Plan 2013 – 2015, Dubai Municipality]

Proportion of the Completion of the Programmes and Activities of Environmental Awareness

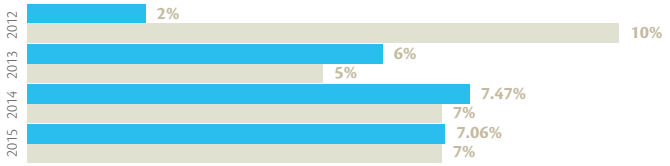
The results used in this analysis have been taken from Dubai Municipality's Environmental Awareness Plan, which is conducted on a quarterly basis.

Rate of Satisfaction of Participants in Campaigns and Awareness Programmes



The figures above are based on a statistical analysis of questionnaires that were distributed to understand the satisfaction of participants in the awareness programmes Dubai Municipality creates and implements. The questionnaire is conducted annually.

Increase in Number of Participants in the Clean Up the World Campaign



From 2012 to 2014, there has been a positive response from the campaign, as seen in the approximate 5% increase in the number of participants. The data is collected annually for this specific target, and is in alignment with Dubai Municipality's Organisational Excellence programme.

The initiatives in this chapter also address indicators from the Global Reporting Initiative's (GRI) comprehensive G4 Sustainability Reporting Framework surrounding community engagement, including those related to Occupational Health & Safety (G4-LAB), Local Communities (G4-SO1) and Product & Service Labelling (G4-PR5), as well as feedback from stakeholders on what DM is doing in support of the Emirate's sustainability initiatives. In addition, these initiatives contribute to the achievement of a number of DM's 14 strategic sustainable development goals, which aim to guide future development and support the Government's overarching vision.

The relevant goals include:

1. Study, revise and evaluate sustainability policies in the Emirate of Dubai relevant to buildings, cities, green hotels, green economy and others. (Goal 1)
2. Develop and update the Municipality's strategic vision of sustainability, ensuring its integration with the strategic plan of Dubai, continue applying it and resolve all problems and obstacles. (Goal 2)
3. Supervise the execution and development of awareness, training and capacity-building programmes for Municipality employees and the public in the field of sustainability. (Goal 8)
4. Suggest and establish compatible programmes to motivate the public and private sector to apply sustainability policies. (Goal 10)

DM is continually striving to achieve results in community engagement and the development of a smart, sustainable city. Societal development is an essential element of this vision.

INTERVIEW WITH

ENG. ABDULLA MOHAMMED RAFIA

ASSISTANT DIRECTOR-GENERAL FOR ENGINEERING AND PLANNING AT DUBAI MUNICIPALITY

THE MUNICIPALITY AT THE CORE OF SUSTAINABILITY

Q1: WHAT DO YOU UNDERSTAND BY THE TERM SUSTAINABILITY?

I believe that sustainability is primarily about quality of life and the preservation of natural resources. This encompasses a lot of things, like using resources responsibly for the health of the planet and creating an economic system that provides for quality of life while renewing the environment. It's all about balancing the needs of a community with the preservation of the environment, to ensure that we pass on a healthy legacy to the generations to come. It's important that we start taking a long-term view of how our actions impact future generations, and making sure we don't deplete resources or damage the environment in ways that will negatively affect health and wellbeing, both now and in the future.

Q2: HOW DOES YOUR DEPARTMENT CONTRIBUTE TO MAKE DUBAI A MORE SUSTAINABLE CITY?

The Engineering and Planning sector of Dubai Municipality is comprised of five departments that are responsible for vital projects, including the Planning Department, Building Department, General Projects Department, Survey Department, and Geographic Information Department (GIS). The sector's projects affect the development of the entire city and support sustainability through a wide variety of initiatives, ranging from sustainable urban planning legislations to the development of green building codes.

Q3: HOW HAS THE URBAN DEVELOPMENT OF DUBAI BECOME MORE SUSTAINABLE IN THE PAST FIVE YEARS?

The topic of sustainability has become increasingly important in the UAE in the last five years, from Dubai announcing its objective of being one of the most sustainable cities in the world, to sustainability being one of the core themes of Dubai Expo 2020 plans. Key sustainability drivers include energy efficiency, compliance with regulatory and corporate social responsibility policies relating to the environment, efficient waste management and disposal, including recycling, the sourcing and use of water, the food supply chain and air, water and ground emissions. Dubai Municipality has focused on these areas in all of its programmes and projects, including integrating the infrastructure into long-term sustainability plans.

Q4: IN WHAT AREAS IS DUBAI ALREADY SUSTAINABLE AND HOW CAN THE CITY AND THE MUNICIPALITY IMPROVE?

Dubai under the leadership of H.H. Sheikh Mohammed bin Rashid Al Maktoum, Vice President and Prime Minister of the UAE and Ruler of Dubai, has made great advancements in recent years in terms of sustainability, making it one of the leading cities in the world and contributing to the establishment of Dubai as a global hub for finance, business and tourism.

Dubai Municipality has worked in collaboration with all of the concerned authorities on the implementation of this vision, in line with the previous Dubai Strategic Plan (2012-2015) and the next (2016-2021). This has included the development of numerous initiatives, projects and laws relating to sustainability, including aspects such as sustainable urban planning, environment, sewage treatment, solid waste management, thermal insulation, energy conservation and green buildings, in order to reach the ultimate goal of making the city of Dubai sustainable and green.

There are too many projects to name individually, but a few examples include taking a proactive approach to recycling, the introduction of a zero waste to landfill strategy, and the opening of several new recycling centres; the commitment to producing 5% of the energy mix from renewable sources by 2030; solar and LED-lighting systems; and community engagement and education programmes to encourage the adoption of green principles.

Naturally, there is always more that can be done. We will continue to adopt best practices and seek green solutions and Dubai Municipality will continue striving to initiate bold plans that make the Emirate sustainable for future generations, as well as a healthy and happy place for all residents.

> It's important that we start taking a long-term view of how our actions impact future generations, and making sure we don't deplete resources or damage the environment in ways that will negatively affect health and wellbeing, both now and in the future.

Q5: IN PERSONAL TERMS, WHAT DO YOU LOVE ABOUT LIVING IN DUBAI?

Dubai has the infrastructure and sense of community needed to be the link between the East and West. It also has what it takes to be the starting point for regional and international businesses. Everything in Dubai has been built to reflect a comfortable and prosperous nation and this has allowed the Emirate to take the lead in becoming a melting pot of different cultures. It is the only place in the Middle East that practically lives the global village dream. This, for me, is what makes it such a great place to live.

Eng. Abdulla Mohammed Rafia

Assistant Director-General for the Engineering and Planning Sector

Eng. Abdulla is also a board member of the Dubai World Trade Centre, the Dubai Green Economy Partnership, the Energy Service Company (Etihad ESCO) and the Demand Side Management (DSM) Committee of the Dubai Supreme Council of Energy (DSCE).

QUICK INFO

The simple addressing system uses 10 numbers to uniquely identify building entrances, with a precision level of one square metre.

MORE THAN JUST A NUMBER: MAKANI

HOW ONE OF THE SMARTEST GEO-MAPPING SYSTEMS WORLDWIDE REVOLUTIONISES NAVIGATION IN DUBAI

BY ENG. ABDULHAKIM MALIK

With fast-paced infrastructure development and a burgeoning population, Dubai didn't have the chance to develop a traditional addressing system, which has meant that location finding in the Emirate can be problematic.

The Dubai Government, as part of the smart city initiative, has been keen to resolve this issue, developing a unique application for this purpose. The solution is called Makani, meaning "my location" in Arabic. Officially launched in April 2015, this state-of-the-art application is based on a Geo Address System, which pins each of Dubai's buildings to a GPS coordinate via a 10 digit smart code. Although streets are currently named in an effort to make locations more recognisable, these unique numbers will leave users in no doubt about the place to be found.

Dubai is the first city in the world to use numbers to locate places with high accuracy through an interactive map. The programme works as a replacement technology for traditional tagging of determining the region name, the name of the street and the number of the building. The simple addressing system uses 10 numbers to uniquely identify building entrances, with a precision level of one square metre. This is so precise that it can be used to pinpoint the specific locations of multiple entrances to a building. The common addressing system makes finding locations around the city significantly simpler for both residents and visitors, as well as for security and emergency services.

The simple-to-use Makani system has been hailed as the smartest map system in the world.

Users can download the Makani app, available on iOS, Android and Blackberry devices, as well as online, and search for locations using the unique Makani codes. Dubai has already indexed 130,000 + buildings, outlining each building's plot and assigning Makani numbers to the entrances. Address plaques with the numbers are being placed on the entrance of buildings for visual reference and in the meantime, buildings have been provided with Makani number stickers and guides to build awareness. Be it a villa, high-rise, hospital, tower or office, every structure in Dubai has been numbered and every number is unique.

The application shows the building's outline and main entrances specified as points on the interactive map viewer. When users click on any building within the map, the building is outlined with each entrance pinpointed.

The Makani numbers label each pin on the interactive viewer. "When a location has several entrances, each entrance is given a different coordinate. For example, when you search for Dubai Mall, the application will give you the boundaries of the mall and all the entrances. Each entrance has a different coordinate," explains Abdul Hakim, Director of the GIS Department at Dubai Municipality.

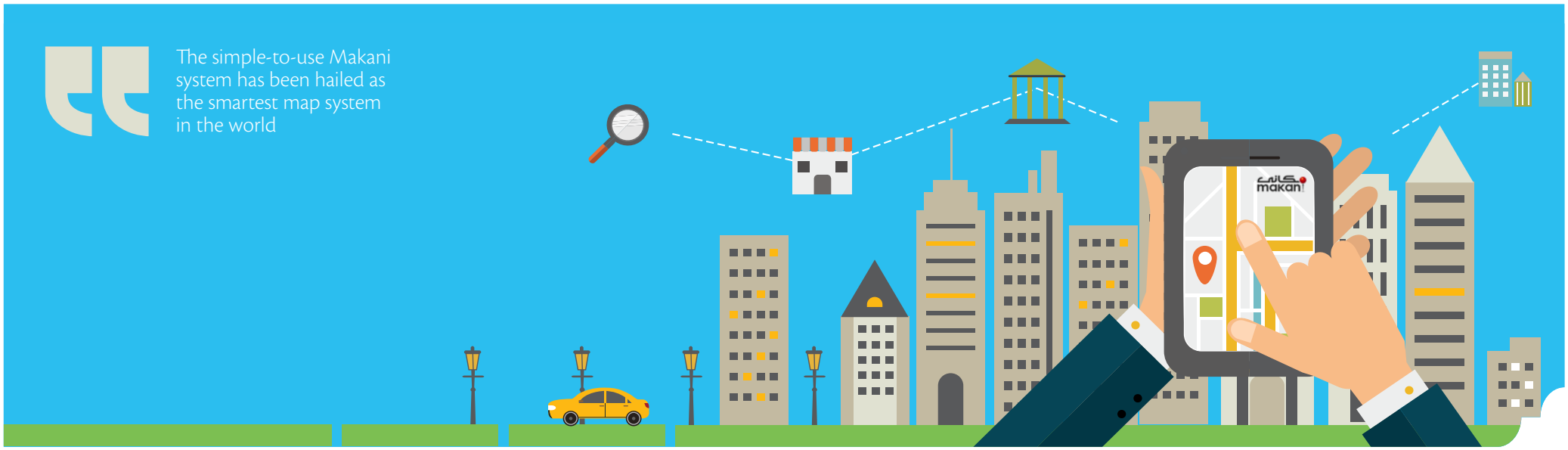
Eng. AbdulHakim Malik

Director of Geographic Information System Department

Eng. AbdulHakim Malik graduated from the University of Arizona, Tucson, USA with a major in Industrial Engineering, in August 1985.

In December 1985 Eng. Malik joined Dubai Municipality and worked as part of the team supporting international experts from the United Nations to establish the Information Technology Centre.

The simple-to-use Makani system has been hailed as the smartest map system in the world



QUICK INFO

For someone on the road, the application is available in the form of a GPS navigator, launched in partnership with Garmin, but directions are also provided by the smart application, offering routes by car, public transport and on foot.

Also within the app, users can share locations, and a voice navigation feature similar to Google Maps is available on smart phones and devices to guide users from their current location to the target site. The application calculates the distance between locations as part of the user s planned destinations and trip, shows the route clearly on the map, and explains each step to reach the target site. For someone on the road, the application is available in the form of a GPS navigator, launched in partnership with Garmin, but directions are also provided by the smart application, offering routes by car, public transport and on foot.

Users also have options regarding the viewing mode for the map, with both standard mapping and satellite imagery, and live traffic status can be viewed for main roads.

> Users can share locations, and a voice navigation feature similar to Google Maps is available on smart phones

This application harnesses the technology of both Makani numbers and MGRS for locating and navigating. The values for these systems can be transformed to local and international coordinate systems, but the app also has a variety of search tools available to determine a location, including searching by the traditional addressing system. For the individual user, Makani numbers can be added as a location to the contact list on smart phones and points of interest, shops and services can all be located.

The Makani app has seen high adoption to date, downloaded more than 10,000 times on Google Play and gaining a 5-star rating in the Apple store. Future development will see Makani addresses also traceable on Google and HERE maps, which is anticipated to boost use and help Makani gain currency in everyday use.

The Makani system has quickly become a part of the official addressing system in Dubai, used by all government organisations, police, ambulance and companies, but its application doesn't end there. The precise navigation system means less time on the roads looking for a destination and more direct routes, which all contributes to reducing the proportion of vehicles on the road, reducing fuel consumption and carbon emissions. This all goes to prove that Makani is smart in more ways than one.

SMART BUILDINGS APP

PROMOTING THE ROLE OF BUILDING MANAGEMENT

BY ENG. AHMED SAEED AL BADWAWI

Dubai's green building regulations were launched in 2011. They initially applied to government buildings but expanded to include private residences in 2014. The Middle East currently has four well-established green building codes including Dubai Municipality's Green Building Regulations, the Abu Dhabi Urban Planning Council's Estidama; the Lebanese Green Building Council's ARZ; and GORD's GSAS: Global Sustainability Assessment System, in Qatar.

QUICK INFO

The app allows the user to view a model residential villa, explaining the green buildings code that are in place, their applicability and how they work..

> Dubai Municipality has been working to foster an understanding of sustainability among community members through seminars, lectures, educational campaigns and exhibitions.

The key process difference between conventional buildings and those that follow green building guidelines is the concept of integration, whereby a multi-disciplinary team of building professionals work together from the pre-design phase through post-occupancy to optimise the building for environmental sustainability, performance and cost savings. This process requires the collaboration of a variety of professionals and the awareness of the future building owner, hence the success of regulations is closely related to the level of awareness in their respective areas of application.

To maximise the effectiveness and reach of its regulations, Dubai Municipality has been working to foster an understanding of sustainability among community members through seminars, lectures, educational campaigns and exhibitions. To date, these activities have received a remarkable response and have covered a broad audience.

In 2013, a model called "green villa" was designed and built in accordance with the green building code and was then used in exhibitions and educational campaigns to explain the regulatory requirements in detail. In 2015, this idea was expanded into an app format, to provide an example of the application of the green building system in a practical, accessible, interactive and easy-to-understand manner.

The app allows the user to view a model residential villa, explaining the green building codes that are in place, their applicability and how they work. The objectives for this project were to disseminate information about the concept of green buildings; to explain the green building laws and how to apply them in a creative way; to promote the role of building management in spreading the concept of green culture; to prompt an intelligent, educational shift away from old building methods; and to ensure all segments of society had an understanding of green buildings.

Managed by Dubai Municipality's Building Department, the app was developed by an external supplier, with cross-department input into the project to ensure its success. The Smart Buildings App complements other strategic projects implemented by the Building Department of Dubai Municipality such as the consolidated "One Window Shop" to improve the building permit service; the Gate Building Plans project (BDG), which allows engineering drawings to be uploaded electronically and confined to one place within this system; and 10D which facilitates the seamless working of the One Window Shop.

Eng. Ahmed Saeed Al Badwawi

Head of the Research and Building Systems Section

Eng. Ahmed graduated with a Bachelor of Civil Engineering from the UAE University in 2002, and is now Head of Research and Building Systems Department at Dubai Municipality. He is also part of several internal committees such as the Sustainability Committee and the Legislation Reviewing Commission, in addition to his participation in several Commissions that represent the Municipality on federal and ministerial levels.

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Our Vision: Creating an excellent city that provides the essence of success and comfort of sustainable living

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SUSTAINABLE CONNECTIVITY

SELF-SUFFICIENT SMART PALMS

Through Smart Palm, the public will be able to benefit from free direct access to the internet while providing valuable public information covering a range of topics including weather forecasts and orientation guides.

With demand for public internet on the increase, Dubai is rolling out dozens of innovative Smart Palm stations that provide free wireless internet access in parks, beaches and other public locations. The UAE-made stations, standing six-metres tall in the shape of a palm tree, also have fast mobile phone charging stations and two screens on each palm offer weather information, local news, a navigation application, general Dubai information and a camera.

This initiative is in line with the UAE Government s establishment of 2015 as the Year of Innovation. Each Smart Palm is created using 3D printing technology, runs entirely on solar power and offers high-speed Wi-Fi with a range of 100 metres, supporting up to 50 users at a time. The eight phone and tablet charging points offer two-and-a-half times faster charging speeds than a regular plug and the service comes without a charge for users. There s also shaded seating, to allow users to comfortably enjoy the services on the beach. Most notably, as the palms are run entirely by an efficient solar-powered system, they are not only practical, but also sustainable.

The first Smart Palms were recently installed at Zabeel Park, Dubai World Trade Centre›s (DWTC) Convention Centre and on Umm Sequiem Beach and there are plans to fix more than 100 in parks, beaches and other locations over the course of the year, with the tree-like structures sprouting up in Dubai Creek Park, Al Mamzar Park and Al Barsha Pond Park.

"Dubai has developed an international reputation as a place for technology and innovation. Through Smart Palm, the public will be able to benefit from free direct access to the internet and valuable public information covering a range of topics including weather forecasts and orientation guides. Most importantly, these structures are entirely self-sufficient thanks to their mono crystal solar panels, which provide up to 21% efficiency," said H.E. Eng. Hussain Lootah, Director General of Dubai Municipality.

HERITAGE SOUKS

PRESERVING AUTHENTICITY

BY RASHAD BOKHASH

Historical market areas, known as souks, were, and continue to be, important trade zones in the Emirate of Dubai, where sales, purchase, import and re-export operations are carried out. These souks make a significant contribution to the local economy, as well as playing an important role in the culture of Dubai. Given this, Dubai Municipality's Architectural Heritage Department has been reviving the historical authenticity of the markets, to contribute to both the economy and the preservation of Dubai's heritage.

This project is being carried out continuously in stages, so as not to cause disruption to business in the souks, with the goal of preserving the traditional heritage of the marketplaces and sustaining the commercial concept particular to the Emirate. The initiative also ensures the longevity of the traditional architecture, preserving buildings and ensuring their continuing role within the local community. Additionally, maintaining the historical architecture plays a role in providing an environment for cultural heritage tourism.

The primary recipients of this redevelopment to date are the historical markets in Deira and Bur Dubai, which have been restored in stages via a highly technical engineering process, according to a methodology based on the work of the specialised global standards adopted by organisations such as UNESCO and ICOMOS. In commencing work in deliberate stages and aligning with technical and administrative standards in accordance with the requirements of ISO, the architectural legacy of these marketplaces is assured.

The process starts with historical documentation, interviews and related studies, moving on to developing a construction case study and analysis, with engineers developing the technical process steps through illustrated technical drawings for the design repair work. The final design has to allow for current usage requirements and adhere to architectural and construction standards, as well as sustainable electrical and mechanical engineering processes, while preserving traditional elements, such as the original building materials from the local environment. Once the implementation and restoration of the buildings commences, the work proceeds in accordance with the highest international standards and is documented for UNESCO and ICOMOS.

This restoration project plays an important role in preserving the cultural heritage of Dubai, while facilitating the ongoing use of these traditional marketplaces in a modern context.

Rashad Bokhash

Director of Architectural Heritage and Antiquities Department

Rashad has 23 years of experience in the fields of planning, directing, managing, modern supervision, conservation of historic buildings, museum designing and management, and landscaping projects. With his background in both architecture and conservation of historic buildings, he has supervised the conservation of more than 136 historic buildings in Dubai, the Emirates and abroad. He has also supervised the design and execution of more than 200 modern buildings including universities, colleges, public and leisure buildings, parks and community facilities.

DESERT ROSE

DUBAI WILL BE IN THE HISTORY BOOKS FOR A LONG TIME

BY ENG. ABDULLA MOHAMMED RAFIA
& ENG. DAWOUD ABDULRAHMAN ALHAJRI

According to H.H. Sheikh Mohammed bin Rashid Al Maktoum, Vice President and Prime Minister of the United Arab Emirates and Ruler of Dubai, "[The] history we are writing is what we achieve in the future and not what we achieved in the past." Given this, Dubai will be in the history books for a long time to come, particularly in regards to sustainability.

One project that is a clear indication of this is Desert Rose, a smart sustainable satellite city designed as national housing that provides the essence and comfort of contemporary living, while adopting the principles of sustainable development. The project was presented to His Highness in early 2014, and adopted for immediate implementation.

The city – which is anticipated to accommodate 20,000 plots for Emiratis, 10,000 plots for expatriates and can house around 160,000 inhabitants – is located on Dubai's urban fringe, between Al Ruwaya and Al Aweer, covering a total area of 14,000 hectares. The conceptual spatial planning and design of the smart satellite city resembles the Desert Rose plant, in line with the local environment and as a representation of sustainability.

The project takes an innovative approach to sustainable design, with coherent and interdependent components taking into account the natural setting; green development principles; diversity in housing provision; promotion of the economic base, quality of life and livability; environmentally friendly and healthy mobility networks; recycled sewerage water for irrigation; and innovative renewable energy sources.

Covering 4,000 hectares of land, the city will be served by a vibrant activity centre and will provide diverse, affordable and sustainable housing, distributed over 28 residential neighborhoods, with related facilities and services, including community facilities and services such as schools, hospitals, a post office, library, and so on. Importantly, the city will be founded on an environmentally friendly infrastructure, with attempts to achieve zero energy.

Plans for the settlement include a renewable-energy system and plants, targeting an anticipated capacity of 200MW where achievable; a sewerage recycling plant with a possible supply of 43,000 cubic metres of treated water for irrigation; and if determined feasible, an Eco Park for the recycling and treatment of solid waste. In addition, smart innovation is embedded in the concept, embracing three major inclusions: the socio cultural context; economic aspects, and the environmental aspect.

The smart innovation and sustainability intents include promoting a responsive spatial layout, with a sense of place and feeling of community and convenient spatial transition between public and private spaces. To this end, the mobility and accessibility system will offer a user-friendly, convenient, contemporary and sustainable road network, and public transport, including electric light rail, complemented by a network of bus routes and a series of eco-walks for pedestrians and cyclists, with intensive tree planting to provide deep shading and encourage healthy and pleasant mobility.

The city centre is set to include a linear activity spine, with a car-free outdoor pedestrian atrium served by the electric light-rail, which will be linked to the Dubai Metro network. All parking and vehicle access will be at basement level to eliminate congestion, while the spatial design of the atrium aims to reduce noise pollution and rationalise energy consumption. The atrium will be partially covered and adopt a natural ventilation system all year round, but will be partially air-conditioned during the extreme summer season.

Furthermore, Desert Rose will adopt the principles of transit-oriented development (TOD). The centre will contain affordable residential units for expatriates and the upper stories will stretch along the main pedestrian spine, served by the light-rail. The plans also include rationalising land-use by doing more with one land plot, such as installing solar panels on roofs and creating a green belt, as an environmental buffer against the desert environment, with further use for agriculture production.

Socio-cultural aspects will include the generation of local employment opportunities, and the design of neighbourhoods will take into account lifestyle, privacy and customs and the socio-cultural transformation.

Environmentally friendly services that adopt renewable-energy processes will be the norm, with eco-principles applied to public transport, street lighting, smart communication kiosks to charge mobile phones, electric vehicles for disabled access, bicycle rental stations and garbage compactors.

Naturally, all buildings will be developed according to Dubai Municipality's Green Building Regulation and Specifications 2010, in order for Desert Rose to positively contribute to the reduction of the carbon footprint. The project, to be built in phases, will undoubtedly contribute to Dubai's ambition to become one of the top 10 sustainable cities by 2020. The project has now finished the pre-design stage and is entering the design-development stage.

Eng. Abdulla Mohammed Rafia

Assistant Director-General for the Engineering and Planning Sector

He is also a board member of the Dubai World Trade Centre, the Dubai Green Economy Partnership, the Energy Service Company (Etihad ESCO) and the Demand Side Management (DSM) Committee of the Dubai Supreme Council of Energy (DSCE).

Eng. Dawoud AbdulRahman AlHajri

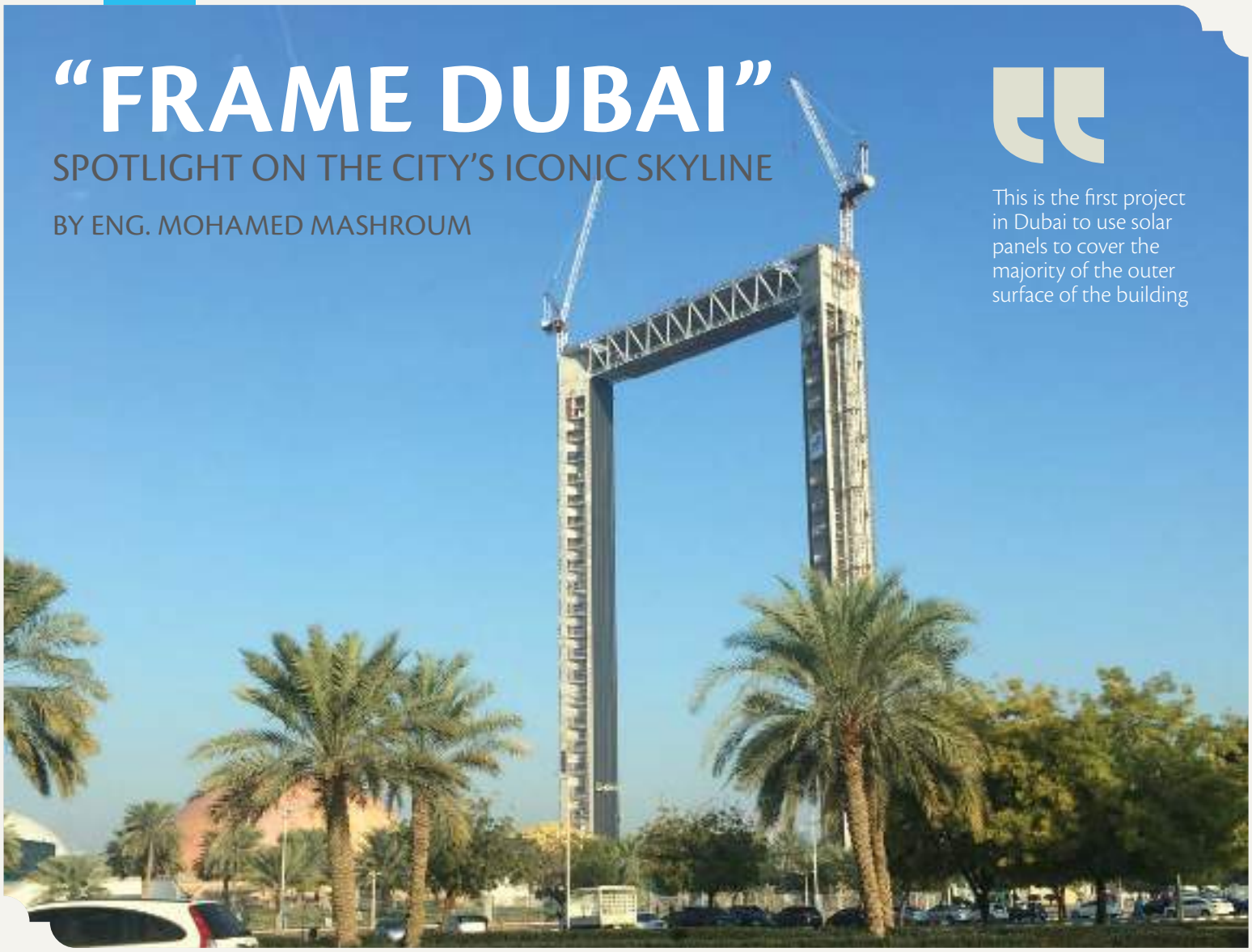
CEO - Planning Department at Dubai Municipality

Eng. Dawoud is specialized in the field of urban planning and development including major urban projects. His career began in 1993 as a town planner in the Planning Department, few years later he has been assigned as a Head of the Planning Execution Section. In 2014, as a result of the extensive experience in urban planning and city development he holds, he was promoted to be the CEO of the Planning Department.

"FRAME DUBAI"

SPOTLIGHT ON THE CITY'S ICONIC SKYLINE

BY ENG. MOHAMED MASHROUM



This is the first project in Dubai to use solar panels to cover the majority of the outer surface of the building

Dubai will soon be unveiling another iconic landmark, Dubai Frame, with construction on the AED 160-million project, which started at the end of 2013, close to completion.

The Dubai Frame project consists of two 150-metre towers connected via a 100-square-metre bridge, where ample room will be available for visitors to take snapshots of the city s panoramic view through the oversized rectangle, which will serve as a giant 150 metre by 93 metre viewfinder. A cafe will sit at the top of the structure and this is the first project in Dubai to use solar panels to cover the majority of the outer surface of the building, ensuring efficiency.

QUICK INFO 1

The window-frame-shaped project is located near the Star Gate games and rides area of Zabeel Park.

The window-frame-shaped project is located near the Star Gate games and rides area of Zabeel Park. The site for the landmark tourist and leisure attraction was chosen after extensive surveys of what location would offer the best views of both new Dubai and old Dubai through the frame. It is expected to attract two million visitors, joining Dubai's internationally recognised landmarks, such as the world's tallest tower, Burj Khalifa, and the seven-star hotel, the Burj Al Arab.

"The bridge was initially set to be completely made out of glass but, after careful consideration, it was decided to install a 25-square-metre glass panel in the middle instead. Some people may be afraid to look down, and we wanted to make this iconic building an enjoyable experience for all," said Moawya Abdul Rahman, Head of the Structural Engineering Unit at Dubai Municipality.

The final phase in Frame Dubai's construction includes panelling the photovoltaic tiles to produce solar energy. A glass elevator will offer unobstructed views as visitors travel up the sides of the frame to take in the bird's-eye view of Old Dubai, looking towards Al Karama, Umm Hurair, Bur Dubai and Deira, with the high-rise towers and development projects of New Dubai in the other direction providing a visible contrast, reflecting Dubai's unique blend of old and new.

The ground-level museum is set to showcase artefacts representing new and old Dubai and will be equipped with multimedia presentations telling the story of Dubai's rapid transformation from a small fishing and trading town by the sea to a modern metropolis.

Eng. Mohamed Mashroum

Head of the General Projects Department

Mohamed is also a member of the Municipality's Technical Committee. Through his work as Head of General Projects since 2008, Mohamed has overseen, designed, and executed more than 170 projects, including Birwaz Dubai, Dubai Safari, and Hamdan bin Mohamed Sports Complex Centre, as well as Al Fahidi Market (Souk Al Fahidi), the birds and pets market and a number of public parks.

FLAMINGOES ON THE HORIZON

THE WILDLIFE SANCTUARY AS A DIFFERENT SIDE OF DUBAI

BY ENG. SALEM MOHD. BIN MISMAR

Creative architecture, beautiful beaches and massive malls may be what Dubai is best known for, but there is another side to this booming city; the Ras Al Khor Wildlife Sanctuary, located at the head of the 14-kilometre Dubai Creek, covering an area of 620 hectares. The wetland reserve acts as a critical sanctuary for migratory birds along the East African-West Asian Flyway, including thousands of flamingoes.

Wetlands are a critical part of the natural environment. The benefits are well-documented and include climate regulation, flood control, carbon-sequestration, conservation of natural heritage and protection of shore-lines. Wetlands provide habitats for animals and plants and contain a wide diversity of life. Ras Al Khor Wildlife Sanctuary, the UAE's first Ramsar site, comprises valuable wetlands, including mudflats, mangroves, reed beds and areas of sabkha, and attracts over 20,000 individual birds from over 150 species out of which 88 are water bird species during peak migration. The area is an important brackish habitat and one of the few protected urban wetlands in the world.

QUICK INFO

Ras Al Khor Wetland Sanctuary attracts over 20,000 birds from over 150 species, out of which 88 are water bird species.

> Like many urban wetlands, the sanctuary faces environmental challenges, such as pollution and pressure from urban development

Like many urban wetlands, the sanctuary faces environmental challenges, such as pollution and pressure from urban development, and Dubai Municipality recognises the need to invest in wetland preservation.

To this end, a new Wetland Centre is under development. The vision is for Ras Al Khor Wildlife Sanctuary to become an internationally recognised site for best practice in wetland management, with a Wetland Centre that delivers communication, education, participation and awareness (CEPA), in line with Ramsar's guidelines, through close encounters with nature and the provision of engaging interpretation about the wetlands and the vital role they play.

The project involves designing new habitats and restoring degraded habitats across the site, as well as developing a visitor centre with trails, hides and outdoor interpretation. This will all be supported by an integrated management plan for the habitats, wildlife and people visiting the centre. Completed in last January, the Wetland Centre will provide a venue for school children to interact with the wildlife and an eco-tourism site for visitors to the Emirate. It will also serve as a centre of excellence for training.

The project will be showcased to representatives from 169 countries during the Meeting of the Conference of the Contracting Parties to the Ramsar Convention on Wetlands (COP13) to take place in Dubai in 2018.

Eng. Salem Mohd. Bin Mismar

Assistant Director-General for the Environment, Health and Safety Control Sector

Eng. Salem is the Assistant Director-General for the Environment, Health and Safety Control Sector of the Dubai Municipality since March 2008.

He is a graduate industrial systems engineer from the University of Southern California in Los Angeles, USA, in 1986.

FACT BOX

THE UAE AND WETLANDS

The Convention is an international treaty for the conservation and sustainable utilisation of wetlands, recognizing the fundamental ecological functions of wetlands and their economic, cultural, scientific, and recreational value. It is named after the city of Ramsar in Iran, where the Convention was signed in 1971.

The United Arab Emirates has been a party to the Convention since 2007 and has designated five wetland sites in the List of Wetlands of International Importance ('Ramsar Sites'), considered to be of high value to the country and the world because of the ecosystem services they provide. Although the United Arab Emirates is better known for being situated in one of the most arid regions of the world, the wetland ecosystem in the country is one of the most unique and diverse in the Arabian Pennisula. It includes marshes, vast tidal flats, fresh water aquifers, mangroves and coral reefs.

AMBASSADORS OF SUSTAINABILITY

DRIVING AWARENESS AND BUILDING A CULTURE OF SUSTAINABILITY

Dubai Municipality is dedicated to fostering positive change in public attitudes towards environmental issues

QUICK INFO

Ambassadors of Sustainability pool already has 120 qualified students as a result of the 2013 programme, during which more than 50 government and 25 private schools actively joined the initiative.

In recognition that the youth of today are the future of the nation, Dubai Municipality's Waste Management Department developed an innovative idea known as "Ambassadors of Sustainability". Now in its second year, this programme aims to enable a young, dedicated volunteer force to develop green initiatives in educational institutions across Dubai.

"Ambassadors of Sustainability is a unique program Dubai Municipality has been implementing in collaboration with educational institutions, aiming to train students who are interested in working for sustainable environment and waste management activities across the Emirate," explains Husain Gulam, Head of the Administrative Support Section at DM Waste Management Department.

The initiative taps into the youth sector in schools across Dubai, aiming to transfer knowledge and build capacity by encouraging students to implement sustainability projects. Dubai Municipality has developed separate training packages for secondary and higher secondary school students as well as for college students. At the end of the programme, participants become qualified as Ambassadors of Sustainability and are awarded with Ambassadors of Sustainability certificates.

Throughout the training, students are educated on how to carry out lectures and workshops on various environmental topics, while also participating in workshops on sustainable waste management by reuse and recycle methods. Students with an artistic edge are also trained on how waste items can be converted into useful objects. Post-training, the qualified students are deployed to conduct lectures and workshops and carry out field visits to targeted institutions, to continue spreading the word and motivating further participation in sustainable activities.

Dubai Municipality has trained hundreds of students to date and the Ambassadors of Sustainability pool already has 120 qualified students as a result of the 2013 programme, during which more than 50 government and 25 private schools actively joined the initiative. In addition to the students awarded with Ambassadors of Sustainability certification, approximately 3,000 students benefited from the workshops, with this number set to increase as the new batch of participants complete the current programme. The momentum is building, attracting a high number of students who are committed to spreading the culture of sustainability in matters related to environment, representing the wave of the future.

A number of new projects in sustainable waste management in the Emirate have come about as a direct result of the programme, including tyre parks and organic compost generation. In 2014, the first Ambassadors of Sustainability to be honoured was Kehkashan Basu, who presented her "Green Hope" team's sustainable project on promoting the role of students in eco-friendly waste management. It's this kind of thought leadership that Dubai Municipality aims to foster through the Ambassadors of Sustainability programme.

Initiatives such as Dubai Municipality's Ambassadors of Sustainability programme play an important role in driving awareness and building a culture of sustainability, in line with the directives of the leadership of Dubai on the adoption of environmentally friendly policies and strategies. Dubai Municipality is dedicated to fostering positive change in public attitudes towards environmental issues. There seems no better place to start than with the youth, who carry within the potential to continue the nation's strides towards becoming a healthy, happy, sustainable green economy.

SUSTAINABLE SCHOOLS, HOTELS AND MOSQUES

INVOLVEMENT OF ALL STAKEHOLDERS FOR TRUE SUSTAINABILITY

BY ENG. KHALID MOHAMED SALEH AL MULLA
& ENG. AHMED SAEED AL BADWAWI

Sustainability is not only a government policy mandate; it is also a community issue. For a city to be truly sustainable involves participation from all parts of society, including government, private sector, civic bodies and citizens.

Given this all-encompassing involvement and the global focus on sustainability, Dubai Municipality has completed two important research papers The first was on sustainable schools, looking into the development of new sustainable schools and the retrofitting of existing schools into sustainable schools, incorporating the principles of the green building code, while the second delved into the application of the building codes to sustainable Islamic hotels. Additional research addressed the concept of sustainable mosques.

The Sustainable Schools Initiative involves developing a basic guide for school administrators and consultants in the educational field, focusing on both the technical application of green principles to school buildings, and on building a green culture within schools and universities to create a generation focused on sustainability by developing sustainable behavior.

The importance of a healthy and sustainable environment for students is clear, and the proposed Sustainable Schools Initiative would be applied at both the structural and technical level, and the educational level. The aims include:

- To educate and sensitise school and university students to green building and sustainability issues in Dubai through educational campaigns and lectures.
- To identify and develop sustainable and innovative school standards, in both new and existing schools.
- To instil an understanding of green building systems and promote a culture of sustainable behaviour, based on the conservation of energy and natural resources.
- To highlight the role of Dubai Municipality in making Dubai a sustainable city at all levels.

The technical side of this initiative includes identifying standards directed towards the creation of sustainable schools and the rehabilitation of older schools, while the educational side includes awareness campaigns and periodic sustainability lectures and information sessions for students.

The starting point for the technical side would include appointing specialized engineers to attend training courses on green buildings, followed by the development of a sustainability guide for new schools. The next step would be to convert existing schools. On the educational side, the initiative would launch with the formation of sustainability teams in schools, after which awareness campaigns would be developed. Students would be involved in the Dubai Municipality activites and selected university students could participate in training at Dubai Municipality during the summer period. Naturally, all aspects of the initiative would be accompanied by comprehensive media campaigns to build awareness and measure impact.

The tourism sector in Dubai occupies a prominent economic position and plays an important role in Dubai's innovation and entrepreneurship strategies. Within this sector, Shari'a-compliant hotels provide accommodation services like any other hotel, while maintaining a focus on Islamic character and conforming to the teachings of Islam in terms of architecture, food and respect for privacy, amongst other principles.

To ensure these hotels also meet the principles of sustainability, the study focusing on this area is intended to develop guidelines taking into account the green building specifications issued by Dubai Municipality.

> Students would be involved in Dubai Municipality activites and selected university students could participate in training at Dubai Municipality during the summer period

Eng. Khalid Mohamed Saleh Al Mulla

Director of the Building Department

Eng. Khalid is also the Vice Chairman of the Green Building Committee amongst other appointments and the Chairman of the main committee for the improvement of the construction permit process in Dubai, as well as heading the team updating the building specifications.

He sees Dubai taking the regional lead in green buildings to become one of the most liveable and happy cities in the world.

Eng. Ahmed Saeed Al Badwawi

Head of the Research and Building Systems Section

Eng. Ahmed graduated Bachelor of Civil Engineering from the UAE University in 2002, and is now Head of Research and Building Systems Department at Dubai Municipality. He is also part in several internal committees such as the Sustainability Committee and the Legislation Reviewing Commission, in addition to his participation in several Commissions that represent the Municipality on federal and ministerial levels.

Islam places a strong emphasis on environmental resources, encouraging preservation, so a green guide for Islamic Hotels would ensure a complementary focus between the Islamic economy and the green economy, providing an understanding of the practical applications of Islamic hospitality services, with an emphasis on the principles of public health and safety and guidance on the most efficient, Shari'a compliant technologies available for energy management in hotels.

The concept of green mosques also constitutes an opportunity to implement the green building standards to ensure efficiency and environmental sustainability within these places of worship. The aim of these instructions is to provide a basic guide for consultants and workers in this field.

The main objectives of this initiative are to reduce energy consumption in mosques, ensure operational efficiencies, reduce energy consumption and reduce operating costs, while providing a healthy environment.

The application of green building principles to schools, Islamic hotels and mosques, in addition to government and private buildings as already mandated, is another example of Dubai's commitment to sustainability, while the educational component of the sustainable schools initiative ensures these sustainability principles are instilled in future generations.

FACT BOX
ARCHITECTURAL HERITAGE

Dubai Municipality organised the fourth International Architectural Conservation Conference and Exhibition under the patronage of H.H. Sheikh Hamdan bin Rashid Al-Maktoum, Deputy Ruler of Dubai, Minister of Finance and Chairman of Dubai Municipality under the slogan "Sustainable Heritage: Global Vision, Local Experiences".

The primary aim of the conference which was held in February 2016, is to exchange information, experiences and knowledge among researchers, professionals and local and international organisations dealing with sustainability and heritage conservation, and offer local practices of the concept of architectural conservation inspired by a global vision of sustainability. This emphasises the interrelationship between people, resources, environment and development, in recognition that cultural heritage should be preserved as an irreplaceable resource.

Rashad Bokhash

Director of Architectural Heritage and Antiquities Department

Rashad has 23 years of experience in the fields of planning, directing, managing, modern supervision, conservation of historic buildings, museum designing and management, and landscaping projects. With his background in both architecture and conservation of historic buildings, he has supervised the conservation of more than 136 historic buildings in Dubai, the Emirates and abroad. He has also supervised the design and execution of more than 200 modern buildings including universities, colleges, public and leisure buildings, parks and community facilities.

PRESERVING HISTORY

ENSURING THE ORIGINAL FABRIC OF THE AREA

BY RASHAD BOKHASH

In a joint initiative led by Dubai's Department of Tourism and Commerce Marketing (DTCM), Dubai Municipality and Dubai Culture, plans have been approved to rejuvenate and develop Dubai's Historical District, the oldest part of the city centred around Khor Dubai (Dubai Creek). This flagship project will transform the area into a leading culture and heritage centre in the region. Focused around four key districts – Shindagha, Bur Dubai, Al Fahidi and Deira – the concept plans to raise awareness of Dubai's rich history, particularly around trade, crafts and pearling. This will also allow UAE nationals to reconnect with their history and strengthen their national identity and values.

The phased development is planned to cover 1.5 square kilometres and will be based on five pillars: tradition – focusing on Emirati culture and drawing upon the stories of the area; heritage – protecting historical buildings; trade – preserving traditional markets (souqs) and reviving and celebrating traditional trade; community – sharing cultural experiences through restoring squares as gathering places for residents and promoting performing arts; and place making – ensuring the original fabric of the area is preserved and easy for visitors to navigate. The pedestrian areas will be tied together through historical stories lining the walkways that can be accessed through smart applications and a team of trained Emirati tour guides.

> Khor Dubai and the Historical District are the soul of the city, and define our cultural legacy and our Emirati heritage.

The initiative aims to further develop cultural tourism within the Emirate, to attract visitation and generate new cultural and commercial opportunities. The goal is to attract 12 million visitors to this historical district by 2020 and ultimately, to register Khor Dubai as a UNESCO World Heritage Site. To this end, all restoration work will follow the global standards adopted by organisations such as UNESCO and ICOMOS.

"Khor Dubai and the Historical District are the soul of the city, and define our cultural legacy and our Emirati heritage. Apart from having contributed to the evolution of the city as a global hub for business by promoting trade and commerce, our community today celebrates the cultural identity of Dubai and serves as one of the most inspiring art centres," says Abdul Rahman Al Owais, the UAE's Health Minister and Chairman of Dubai Culture & Arts Authority.

The redevelopment involves more than 60 discrete projects, including Al Shindagha Museum, which is set to feature 17 pavilions and contain over 50 collections of historical and cultural artefacts, making it one of the largest interactive museums in the region. Shindagha will feature floating exhibits housed in traditional pearling and trade boats and an outdoor majlis and multi-purpose performance centre. The square will showcase Emirati sea-faring song and dance and Emirati guides and master craftsmen will share stories and promote learning and understanding of historical crafts.

A promenade will connect the Shindagha area to the Al Fahidi district, enabling visitors to easily access the areas of the development on foot. Al Fahidi Fort will be restored as the central heart of the area and Deira's old watch towers and traditional stores will be reinstated in their original locations to revive the authentic feel of the district. A number of streets in Bur Dubai, Al Fahidi and Deira will be converted to pedestrian walkways to further facilitate access to the upgraded public areas, including Alsabkhah Square.

The initiative will see the area transformed over the next three years, with work on key projects beginning in February 2015.

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Director of Architectural Heritage and Antiquities Department

Rashad has 23 years of experience in the fields of planning, directing, managing, modern supervision, conservation of historic buildings, museum designing and management, and landscaping projects. With his background in both architecture and conservation of historic buildings, he has supervised the conservation of more than 136 historic buildings in Dubai, the Emirates and abroad. He has also supervised the design and execution of more than 200 modern buildings including universities, colleges, public and leisure buildings, parks and community facilities.

> In 2014, Dubai Municipality announced plans to spend AED 6 billion on transforming the Emirate into a green paradise by 2025

ZERO ENERGY PARKS

SELF-SUFFICIENT PUBLIC SPACES

BY ENG. MOHAMED MASHROUM

In line with Dubai's vision for 2020, to reduce energy consumption by 30%, Dubai Municipality has completed its first trial to operate environmentally friendly parks. The parks, which operate independently from the water and electricity grid, generate energy self-sufficiently from the sun through the use of solar panels.

The first to experience this eco-oriented redevelopment is Al Khazzan Park, located just before CityWalk shopping centre, between the first interchange on Sheikh Zayed Road and Al Wasl Road.

Al Khazzan Park is the first of its kind, operating entirely through solar energy collected through an area of more than 400-square-metres of solar-PV panels. The energy collected from the sun is used to provide electricity for the building operation, automatic irrigation systems and park lighting during the evening. Al Khazzan Park represents the first phase of part of a much broader initiative, spearheaded by Public Parks and Farms Department Director, Mrs Fatima Essa Al Muhairi, who is also the heading all activities to make Dubai's parks more environmentally friendly. She is supported by the Project Management Department, headed up by Mohamed Mashroum.

QUICK INFO

By converting to LED lighting, the park has reduced its annual energy consumption by 50%.

Covering over one hectare, Al Khazzan Park is now packed with greenery and hosts local plants, play areas for children and a picnic area for families, although the highlight for visitors is most likely the viewing deck, offering views of Burj Khalifa and the surrounding skyscrapers on Sheikh Zayed Road.

Brand Dubai, a subsidiary of the Government of Dubai Media Office, in collaboration with Dubai Municipality, gave the park a makeover as part of the "Dubai Speaks to You" initiative that aims to highlight the unique characteristics of Dubai as a culturally diverse city. The exterior features grass-covered walls and natural and artistic elements that replicate the park's theme.

"The lighting, the irrigation and the air conditioners in administration offices and security posts are all run by solar energy," explains Director of Parks and Horticulture Department at Dubai Municipality, Mohammed Abdul Rahman Al Awadi. The park features water taps with sensors, waterless urinals and a treated-water line for irrigation. In addition, energy-efficient LED's have been put in place in the service of the building and the exterior lighting. "It's a model for other parks," adds Al Awadi. By converting to LED lighting, the park has reduced its annual energy consumption by 50% and the implementation of an off-grid solar PV system has resulted in annual savings of 43,100 kilogrammes of carbon dioxide, the equivalent of 1,100 trees.

Naturally, there were a number of challenges that needed to be addressed in the park's eco-facelift. Among the challenges faced in the implementation phase was finding a space large enough to accommodate the solar panels that would be exposed to direct sunlight year long. The same standards set for the construction of green buildings were applied to this project, which has undoubtedly contributed to its success.

Eng. Mohamed Mashroum

Head of the General Projects Department

Mohamed is also a member of the Municipality's Technical Committee. Through his work as Head of General Projects since 2008, Mohamed has overseen, designed, and executed more than 170 projects, including Birwaz Dubai, Dubai Safari, and Hamdan bin Mohamed Sports Complex Centre, as well as Al Fahidi Market (Souk Al Fahidi), the birds and pets market and a number of public parks.

In 2014, Dubai Municipality announced plans to spend AED 6 billion to transform the Emirate into a green paradise by 2025. Approximately 7,000 hectares of green space is recorded in Dubai, which will be increased to more than 12,000 hectares in time for Dubai EXPO 2020 through various landscaping and horticulture projects. Al Khazzan Park provides a model for this ongoing green-space development, paving the way for a plethora of sustainable public spaces.

02 A SUSTAINABLE ENVIRONMENT

Dubai Municipality and the Environment

Dubai Municipality (DM) has had a focus on the environment for a long time, understanding the necessity of preserving a healthy environment to allow future generations to reach prosperity. On a broad scale, our entire life support system is dependent on the wellbeing of the planet and at the individual level, a healthy environment contributes to a healthy life, which in turn contributes to the health of a nation.

Within the environment sector, DM works on a variety of initiatives to reduce emissions and improve the overall environment, as well as contributing to Dubai's ambitions towards becoming a smart, sustainable city. This chapter outlines many of these initiatives, particularly focusing on green buildings, waste and waste water treatment.

DM's projects in green buildings include a partnership with Philips to transfer 262 municipality buildings to LED lighting and the Dubai Green Malls initiative, supporting retail outlets in achieving environmental sustainability. In addition, specific buildings, such as Sheikh Hamdan Sports Complex and Al Fahidi Souk, have been developed as examples of efficiency. Much work has gone into developing energy-efficiency guidelines for retrofitting existing buildings and Dubai Central Laboratory has been researching and evaluating green building material, coinciding with a study into environmentally friendly concrete.

In terms of waste, DM has developed a waste-management strategy, which also allows for waste-water reuse, and initiated appropriate irrigation systems. Additionally, bio-trickling odour treatment systems have been installed in Dubai's sewage treatment plants to increase efficiency and reduce operating costs.

Other environmental initiatives include developing an integrated management plan for wildlife and protected areas; putting an air quality strategy in place to help DM achieve its clean-air goals; and completing the 2014 Industrial Emission Inventory across the Emirate, to provide an updated emission profile for industries and support formulation of directives for regulated industries, aiming to monitor and reduce emissions in the long-term.

OVERVIEW

A SUSTAINABLE ENVIRONMENT

To ensure community buy-in and regard for the environment, DM has run several awareness campaigns, including the second phase of the My City, My Environment campaign, involving the provision of free recycling bins to support further segregation of waste. Other successful campaigns included the continuation of the Clean up the World campaign, one of the largest voluntary environmental initiatives in the UAE; Car Free Day, which sees an increasing number of commuters participating annually; and the Hand by Hand Towards Sustainability campaign, which builds awareness on simple energy-saving initiatives that can be instituted in the home and workplace.

Through Dubai Municipality's Sustainability Indicators, highlighted in the Strategic Plan 2013-2015, data was collected to assess achievement in the environmental sector. While targets were not met across all areas, there has been an overall improvement in soil and marine water quality and an increase in recycling in terms of construction, agricultural and municipal waste, with a significant increase in chemical processing of hazardous industrial waste and a corresponding reduction in this waste going to landfill. Overall, the amount of waste produced relative to GDP has decreased and there is a growing commitment to reducing environmental waste.

LEGEND

Real

Target

Quality of the Environment

Air Quality (no. of days air is clean vs. number of days with severe dust)

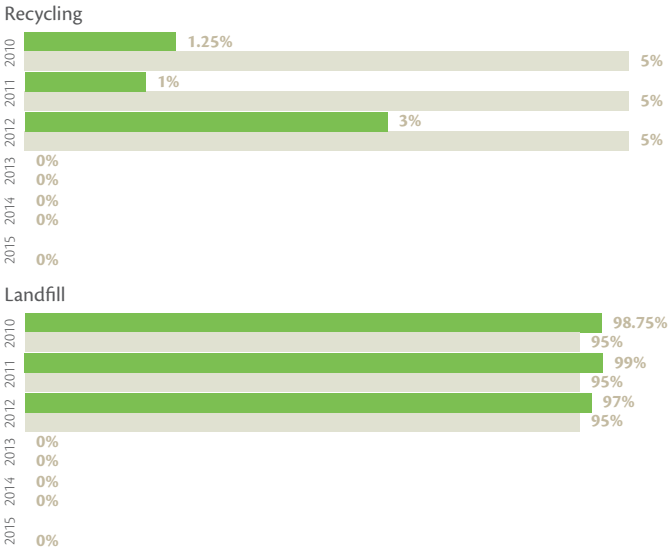
Soil Quality

Marine Water Quality

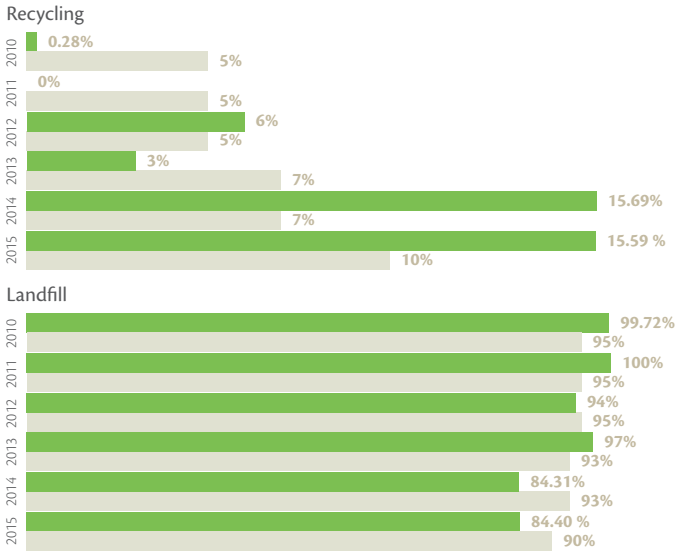
Groundwater Quality

Waste Treatment of Total Waste Produced in the Emirate

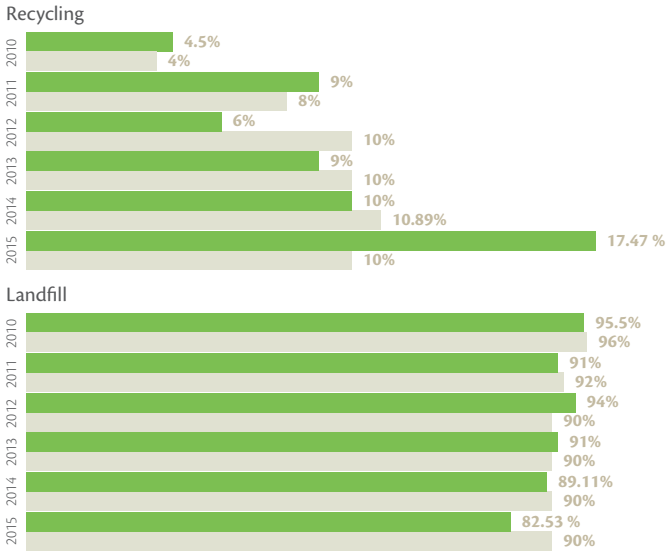
Construction Waste



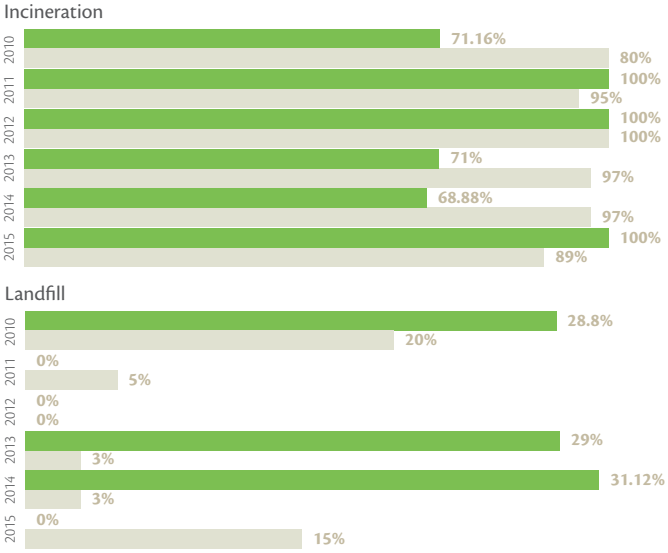
Agricultural Waste



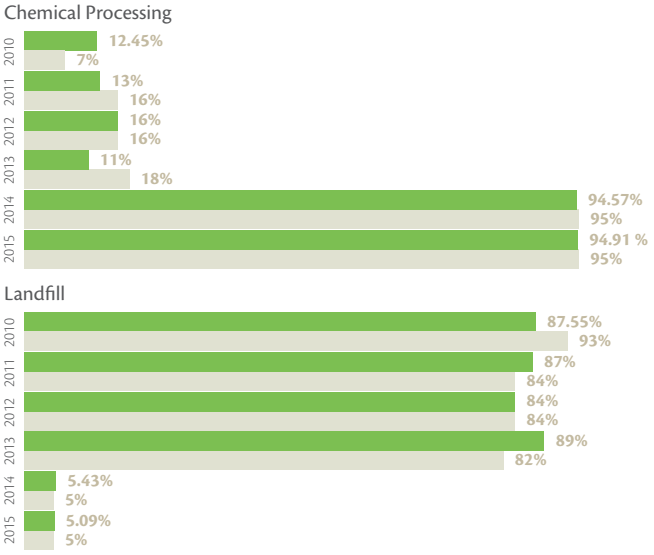
Municipal Waste (Domestic & Commercial)



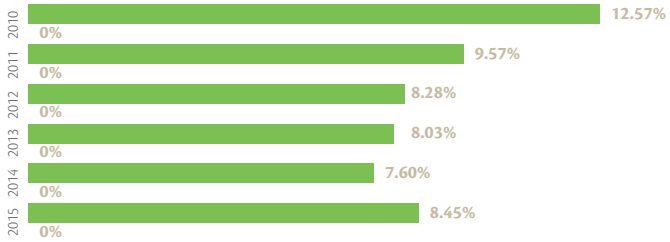
Medical Waste



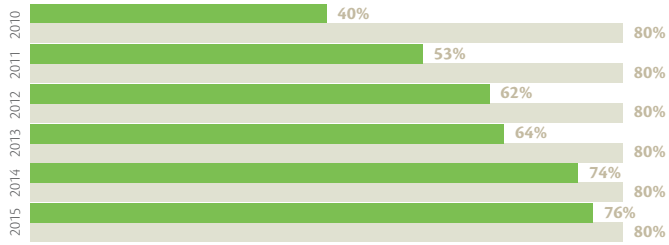
Hazardous Industrial Waste



Waste Produced Compared to GDP



Proportion of Commitment to Environmental Standards (tonnes/million dirhams a year)



Dubai Municipality's Environmental Sustainable Development Goals

The initiatives and success stories showcased in this chapter are also contributing to the achievement of a number of DM's 14 strategic sustainable development goals. In regards to the environment, the relevant goals include:

1. Encourage partnership between the public and private sectors and identify partnership-development projects that contribute to the Municipality's sustainability strategy. (Goal 14)
2. Prepare a media plan to raise awareness about the adopted policies in the Municipality related to sustainability and highlight its importance in the preservation of national income, public health and the environment and ensure the continuity of its application. (Goal 5)
3. Establish the necessary mechanisms to evaluate the current buildings in the Emirate of Dubai and the extent of realisation of the sustainability standards and following up on the application procedures of those mechanisms with the concerned parties. (Goal 6)
4. Suggest, coordinate and revise sustainability specific studies and research and the development of necessary programmes and plans to certify, publish and apply the resulting recommendations in coordination with the concerned parties. (Goal 3)
5. Identify all problems and solutions that come in the way of applying green building standards and the continuity of application. (Goal 7)

DM will continue to address issues regarding the environment, with the aim of contributing to global efforts to address climate change and enabling the Emirate to embark on a sustainable, low-carbon growth path for the future.

WASTE TO ENERGY

RENEWABLE ENERGY PROJECTS FOR THE ENHANCED SUSTAINABILITY OF DUBAI

BY ENG. MOHAMMED ABDULAZIZ NAJEM

Dubai is making great strides in the field of sustainability, in line with the Dubai Strategic Plan 2021, the UAE National Agenda 2021 and the Dubai Integrated Energy Strategy 2030. These plans aim to protect the environment and ensure sustainable development through projects and initiatives for the conservation of natural resources, rationalised consumption and the inclusion of alternate and renewable-energy resources in Dubai's energy mix.

In accordance with the objectives envisaged, Dubai Municipality is keen to enhance the sustainability of Dubai by embarking on a number of projects, programmes and initiatives, which aim to strengthen the Emirate s efforts in becoming a reference for sustainable cities.

The Applied Sustainability & Renewable Energy Department at Dubai Municipality is responsible for developing alternate energy sources through the implementation of projects for the sustainable management of waste, energy and the environment. In all endeavours related to waste to energy (WtE), Dubai Municipality collaborates with the Dubai Electricity & Water Authority (DEWA) and Dubai Supreme Council of Energy (DSCE).

The electricity generated from these projects, after meeting their own power requirements, will be fed into the DEWA Grid. The projects thus have a high significance in contributing to the scaling up of sustainable energy solutions, as well as achieving reductions in landfill requirements, the carbon footprint and mitigating the impacts of climate change, along with other environmental benefits.

SUSTAINABILITY AND INNOVATION

Dubai is widely acknowledged as a leader, aggressively pursuing the adoption of unique designs, features and enhancements in every field. Given this, Dubai Municipality is keen to develop innovative and sustainable concepts and designs for its WtE project to make it a world-class showcase, while being economically advantageous.

The upcoming WtE facility aims to be a unique facility with high standards of resource efficiency, thus becoming a regional showcase for research and development, training, demonstration and education of environmental and socio-economic benefits.

The facility will set the benchmark for all WtE plants in the future with incorporated innovative and creative aspects and micro and macro sustainability.

WASTE TO ENERGY PROJECTS

Rapid urbanisation, changing consumption patterns and a high standard of living have accentuated the problem of municipal solid waste management (MSW). Effective waste disposal is therefore critical in ensuring a safe and clean environment.

Recognising the magnitude of the problem and the future requirements, the Applied Sustainability & Renewable Energy Department at Dubai Municipality has undertaken several projects and initiatives to enhance the sustainability of the city.

Key projects undertaken include:

- Municipal Solid Waste (MSW) to Green Energy
- Land fill Gas to Green Energy
- Organic Waste to Green Energy
- Sewage Treatment Plant (STP) Gas to Green Energy

Eng. Mohammed AbdulAziz Najem

Director, Applied Sustainability & Renewable Energy Department

Mohammed Abdul Aziz Najem Al Awadhi holds a Bachelor of Science in Electronics Engineering from the Metropolitan State University, Denver, USA. With 26 years' experience in the Municipal waste-water treatment industry, including more than two years as an environment expert at the Office of the Director General, Mohammed continues to play an instrumental role in the development of Waste and sewage treatment plants in Dubai. In addition to his role as Director of the Applied Sustainability & Renewable Energy Department at Dubai Municipality, he is a member of the Dubai Supreme Council of Energy Board and Technical Committee, amongst others.

QUICK INFO

A plot size of 10,000 square metres will be charged AED 250 for treated irrigation water supply, whether used or not.

TURN THE TAP OFF ON WATER WASTAGE

MEASURED APPROACHES TO IRRIGATION PRACTICES

BY ENG. TALIB JULFAR

The geographical location of the United Arab Emirates makes it one of the most water-scarce countries in the world and with an exponentially growing population, it has one of the world's highest per capita water consumption rates of 550 litres per day.

The authority is determined to discourage Dubai residents from wasting irrigation water by putting a strict limit on the usage of treated wastewater for irrigating private land. Dubai Municipality aims to tackle this issue by limiting the use of treated water to five litres per square metre, per day. The authority intends to reach this goal by introducing new rules on landscape watering.

Due to the shortage of natural water resources, Dubai Municipality is urging all landscape companies and developers to plan for variations in water requirements during summer and winter months.

The authority has also decided to add a fixed monthly fee for Emiratis who use the treated water supply from the Municipality to water their gardens and landscapes. The old system of metering water usage will be replaced by a flat rate, based on land size by square metre. For example, a plot size of 10,000 square metres will be charged AED 250 for treated irrigation water supply, whether used or not.

With this rule, Dubai Municipality aims to instil water and energy conservation values amongst Dubai's dwellers.

The Municipality has also taken the initiative of implementing sustainable techniques in Dubai parks. These have helped reduce the carbon footprint and save around AED 3 million in electricity bills by reducing consumption by 5.5%.

To further curb water wastage, Dubai Municipality has deployed drones to survey and monitor large-scale landscape projects. Details such as water and fertiliser requirements, as well as decay, can now be captured with less effort and time.

With initiatives and regulations such as these in the pipeline, Dubai Municipality aims to raise awareness of water wastage amongst the cities residents one drop at a time.

Eng. Talib Julfar

Director of the Drainage and Irrigation Department

Eng. Talib was appointed as Director of the Drainage and Irrigation Department in 2003. Awarded a Bachelor Degree in Mechanical Engineering from Gonzaga University in the USA, he joined Dubai Municipality in 1989 as a fresh graduate and started his training at a sewerage treatment plant, where he practised in different fields, starting as a maintenance engineer before working as an operations engineer.

MANAGING WASTE

EFFICIENCY AND EFFECTIVENESS AS PRIME DRIVERS

BY ENG. SALAH ABDULRAHMAN AMIRI

Al Qusais landfill receives around 7,000 tonnes of municipal solid waste on a daily basis, with more than 1200 trucks delivering the waste to the landfill for disposal.

Waste remains one of the central issues within Dubai's sustainability ambition. The matter is high on Dubai Municipality's agenda, with various projects addressing the Emirate's waste management. Amongst these initiatives is a landfill gas-recovery system at Al Qusais landfill, one of the largest landfills in the Middle East, covering around two square kilometres.
Al Qusais landfill receives around 7,000 tonnes of municipal solid waste on a daily basis, with more than 1200 trucks delivering the waste to the landfill for disposal.

The Al Qusais landfill gas project is a certified Clean Development Mechanism (CDM) project, registered under the United Nations Framework Convention on Climate Change (UNFCCC) Kyoto Protocol - Project No. 8269 for the reduction of greenhouse gases (CH4). The project is unique, as it is implemented in the active landfill, with landfill operations and methane gas capture running simultaneously. The methane gas extraction equals approximately 60% in volume, due to state-of-the-art design. Completed in January, 2013, the project runs continuously, with an annual reduction of more than 350,000 tonnes of CO_2e. A General Electric Jenbacher 1MW gas engine is installed on site to supply power to the flare plants and Municipality site offices, making the site self-sustainable, with no external power source.

In addition, to address the issues surrounding high power consumption in drying sludge, a project was instituted to construct basins using solar energy, which provide the fuel used to reduce the wet sludge to landfill operations and allow the use of sludge as agricultural fertiliser. The technology for this project relies on exposing solid waste to solar radiation to ensure all bacteria are neutralised. Once the appropriate dryness ratio is achieved, the material is collected and packaged in preparation for sale.

While these projects have been implemented individually, they all lead to the same place: an efficient, effective waste-management system for the Emirate that contributes to a green, sustainable future.

Eng. Salah AbdulRahman Amiri

Asst. Director General for Environmental & Public Health Services Sector

Salah Amiri is an electromechanical engineer with 30 years of experience in Dubai municipality. He started his experience as an engineer till he became director of public transport department, for 12 years then transferred to be the director of Dubai central laboratory Dep. For six years. and after that promoted to assistant director for environmental and public health for the last 8 years dealing mainly with the infrastructure of sewerage, drainage and irrigation in emirate of Dubai, Greenery and landscape, cleaning and waste management, plus public health services as well.

Good air quality is a vital element in improving the status of the environment and human health.

AIR QUALITY STRATEGY

90% TARGET FOR 2021

BY ENG. SALEM MOHD. BIN MISMAR

QUICK INFO

In line with UAE National Strategy for 2021, and in order to protect citizens, residents and visitors from air pollution, the Environmental Planning and Studies Section (EPSS) of Dubai Municipality will develop an air quality strategy for Dubai for 2016-2021 that is geared towards achieving a sustainable environment.

The city of Dubai has experienced unparalleled economic development over the past two decades, which is expected to be sustained into the future, with the hosting of the Dubai Expo 2020 and other growth catalysts put forward by the leadership. With rapid development, as seen in many parts of the world, air pollution becomes an issue. This is largely due to emissions from anthropogenic activities, primarily from the transport, power and industry sectors. Air pollution's adverse impacts include health issues, such as respiratory ailments, and damage to the natural environment, which can lead to flow-on effects in the local economy.

In line with UAE National Strategy for 2021, and in order to protect citizens, residents and visitors from air pollution, the Environmental Planning and Studies Section (EPSS) of Dubai Municipality will develop an air quality strategy for Dubai for 2016-2021 that is geared towards achieving a sustainable environment. The strategy will provide a roadmap until the year 2021 for action plans to be implemented by all concerned parties, including the three main contributing sectors, with the intention of gradually reducing emissions from identified sources and achieving better ambient air quality in the Emirate, in compliance with a 90% good air-quality target for 2021.

This project will be based on analysis of the present situation and projection of Dubai's air environment, focusing on pollutants as provided in Federal Law No. 12 of 2006, namely, Carbon Monoxide (CO), Nitrogen Dioxide (NO_2), Ozone (O_3), Sulphur Dioxide (SO_2), Total Suspended Particles (TSP), Particulate Matter (PM10 and PM 2.5) and Lead (Pb). The project study will lead to a comprehensive air-quality strategic management plan, based on international best practices. It will involve partnerships between the concerned government agencies and private organisations and will result in requiring, encouraging and implementing cost-effective measures to reduce the emissions of air pollutants. This, in turn, will reduce the impact of poor air quality on public health and will be complemented by building public awareness and understanding of the importance of air quality.

In order to provide substantive information that will support the formulation of management strategy, in the first half of 2016, expert consultants were contracted to conduct a review and analysis of relevant local and national legislation on air pollution, concerning air quality and emission limits, standards and indexes, and relevant international guidelines, as well as analysing Dubai's ambient air quality and emission inventory records. Plans and programmes related to air-quality management that have been and are planned to be implemented by the concerned sectors will also be reviewed.

The aims are to establish annual targets as part of an emission load reduction plan for each sector until 2021, to meet existing or proposed revisions in the emission limits and standards, and to develop annual targets for improvements in Dubai's ambient air quality, via an action plan that will be implemented by each sector. In addition, an air-quality awareness programme will be developed for implementation by the concerned sectors and the Environmental Planning and Studies Section (EPSS) of Dubai Municipality. Recommendations will also be sought for revision of existing legislation, including emission limits, standards and indexes, if deemed necessary.

Eng. Salem Mohd. Bin Mismar

Assistant Director-General for the Environment, Health and Safety Control Sector

Eng. Salem is the Assistant Director-General for the Environment, Health and Safety Control Sector of the Dubai Municipality since March 2008.

He is a graduate industrial systems engineer from the University of Southern California in Los Angeles, USA, in 1986.

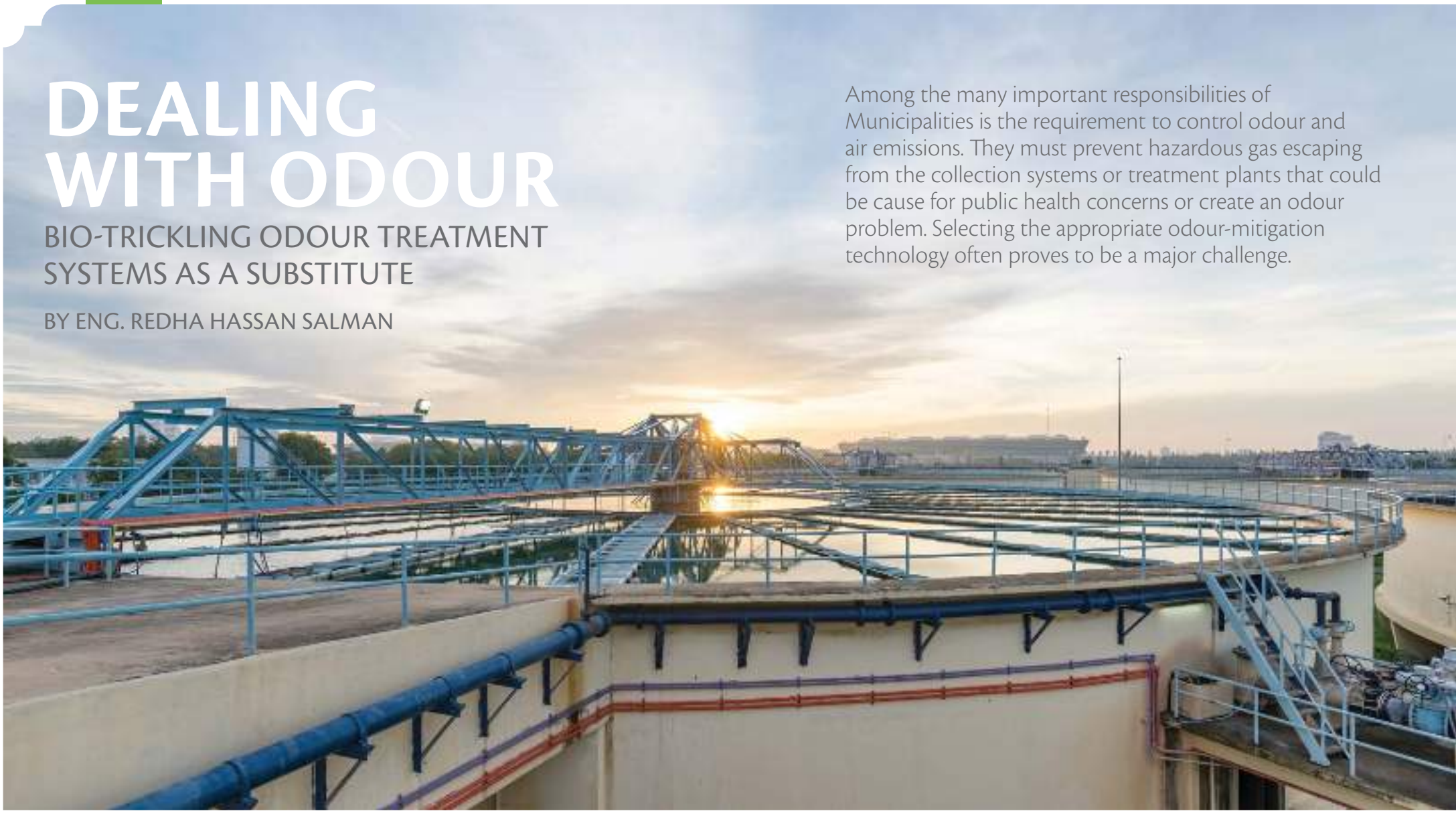
Good air quality is a vital element in improving the status of the environment and human health. Improving the air quality in Dubai will encompass environmental, financial and social benefits and promote sustainable development and economic growth, with a firm focus on the environment and human health.

DEALING WITH ODOUR

BIO-TRICKLING ODOUR TREATMENT SYSTEMS AS A SUBSTITUTE

BY ENG. REDHA HASSAN SALMAN

Among the many important responsibilities of Municipalities is the requirement to control odour and air emissions. They must prevent hazardous gas escaping from the collection systems or treatment plants that could be cause for public health concerns or create an odour problem. Selecting the appropriate odour-mitigation technology often proves to be a major challenge.



As part of Dubai Municipality's vision to opt for sustainable environmental solutions and reduce the operating costs associated with the operation and maintenance of chemical scrubbers in waste management at Al Aweer treatment plant, the Sewage Treatment Plants Department made the decision to install bio-trickling odour treatment systems as a substitute for the existing chemical scrubbers in the mechanical stage of sewage treatment.

Bio-trickling filtration is an air-pollution control technique that uses microorganisms to capture and biologically degrade process pollutants. The microorganisms live in a thin layer of moisture, a "biofilm", which surrounds the filter media. During the biological process, the polluted air stream slowly moves through the media bed. The contaminated air is diffused in the system and adsorbed onto the media biofilm. Here, microorganisms metabolise the air contaminates, producing metabolic byproducts.

The system extracts and collects foul air for subsequent treatment through a bio-trickling filter (BTF) prior to atmospheric discharge. Pollutant removal occurs as air is passed upwards through the media bed, while a liquid phase is trickled down through the bed.

The installed facility comprises a process air-handling system of three fans, where polluted air is drawn from the source by forced ventilation at a designed airflow rate and directed through the duct system to the odour control system. Within the water irrigation system, plant effluent (TSE) is used to irrigate the bio-trickling filter beds and 10 bio-trickling filter units are used to provide a suitable environment for the bacteria to degrade the contaminants.

Eng. Redha Hassan Salman

Director of the Sewage Treatment Plants Department

Eng. Redha assumed responsibility as Director of the Sewage Treatment Plant Department in December 2013. He holds two Masters' Degrees, the most recent in Environmental Evaluation from London School of Economics and Politics in 1999, along with an honours Masters' Degree from the University of Louisville in 1992, complementing his Bachelor of Chemical Engineering in 1990.

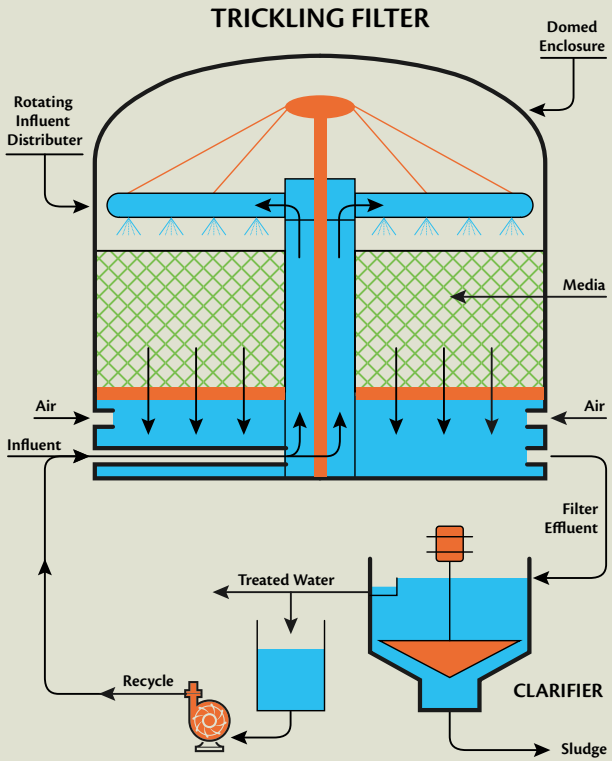
An online monitoring system is in place to observe performance and control the irrigation rate necessary to maintain the correct humidity for the biomass growth. Air flow, differential pressure, hydrogen sulphide inlet concentration and outlet concentration from each scrubber are monitored to ensure that each tower is meeting performance requirements. VOC's are monitored at the exhaust stack. The accumulated data is stored in the PLC database for system statistical analysis.

By instituting bio-trickling odour treatment systems, chemical consumption of Sodium Hydroxide (NaOH) has been eliminated, as opposed to prior consumption of almost eight tonnes per day, which contributes to savings of more than AED 7,500 per day and a carbon dioxide emission reduction of 3,600 tonnes annually. While these results may speak for themselves, the project was also rewarded with the Facilities Middle East Management Awards Sustainability Initiative of the Year award for 2015.

FACT BOX

ODOUR TREATMENT TECHNOLOGY

A bio-trickling scrubber is an odour treatment technology that utilises biological processes, as opposed to chemical processes, as the treatment mechanism. Bio-trickling scrubbers have grown in popularity as they have proven effective in wastewater treatment plant applications, even for high strength odorous air streams. The process involves spraying or re-circulating biologically active, nutrient-rich scrubbing solutions over an artificial media while odorous air is forced upward through the media bed. The benefits include lower operating and maintenance costs, ease of operation and maintenance, no ongoing chemical costs, storage or handling, and most importantly, biological air treatment is more environmentally friendly and safer than chemical treatment.



ROBUST EMISSION INVENTORY

ANNUAL EMISSION ASSESMENT

BY ENG. ALYA ABDULRAHIM AL HARMOUDI

One of the vital components of an air-quality programme is the availability of a robust emission inventory. To this end, Dubai Municipality has prepared an industrial emission inventory based on the figures from 2014. The emission assessment is an annual consolidation of estimated and reported emission data from industries as required under Article 15 of UAE Cabinet Decree No. (12) of 2006 and pertinent provision of Local Order 91/61. Aside from providing an updated emission profile across industries, the report supports the formulation of directives for the regulated industries to reduce and monitor emissions in the long-term.

This in-house programme will result in AED 200,000 of annual savings on consultancy services.

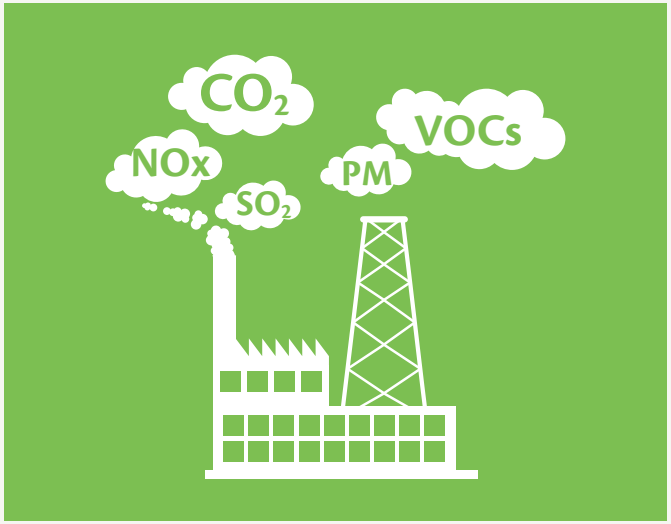
Consistent with the pollutants regulated under the UAE Cabinet Decree, this inventory focuses on primary air pollutants such as Carbon Monoxide (CO), Nitrogen Oxide (NOx), Particulate Matter (PM), Sulfur Dioxide (SO_2) and Volatile Organic Compounds (VOC) based on the pollution load from major industries and power generation, as reported by these industries and power-generation facilities for 2014.

The emission inventory was completed through the collection of emission data from industries and power generation facilities for the year 2014. The current estimated emissions from these sources revealed a total of 54,374 tonnes of air pollutants, excluding CO_2. The largest quantity is Nitrogen Oxides (NOx) with a share of 46% (25,121 tonnes), followed by Sulfur Dioxide (SO_2) at 35% (19,434 tons), Carbon Monoxide with a contribution of 13% (7,084 tonnes), Volatile Organic Compounds (VOCs) at 4% (2,204 tonnes) and Particulate Matter (PM) sharing the least at 2% (890 tonnes). Assessment of pollution load in terms of tonnes per year was done using process data and fuel-consumption rates for each industrial facility. For this inventory, 315 stacks were evaluated coming from emission sources including cement, iron and steel production, chemical manufacturing, glass production, the paper, galvanizing, food and beverage industries, paint production, wood processing, petroleum refineries and power-generation facilities. The number of emission points was considered an appropriate representative sample to determine the overall emission profile across industries and power-generation facilities.

The 2013 *Air-Pollution Guidebook* of the European Environment Agency (EEA) was used to verify emission factors suited to the specific industry to determine the estimates of emissions of Carbon Monoxide, Nitrogen Oxide, Sulfur Dioxide, Particulate Matter and Volatile Organic Compounds for facilities with limited information in their inventory reports.

The salient considerations in the implementation of air-pollution control for industries and power-generation facilities revolves around understanding the environmental pollution-load contribution, the implementation of emission limits, cooperation across industries and partnerships with major stakeholders to develop strategic air-quality programmes consistent with the UAE's Air Quality Strategy 2021.

With this initiative, Dubai Municipality's Environment Department was able to develop robust information for use in the approval of directives for targeted major industries to initiate emission-reduction programmes, monitor emissions and communicate best practices for effective air-pollution control management. This in-house programme will result in AED 200,000 of annual savings on consultancy services. In addition, as part of a proposed project to be implemented this year, an action plan will be updated and prepared in cooperation with the industries and power-generating facilities. The Environment Department will continue to work with industries on standardising reporting and quantifying emissions and involving development companies and related local authorities in the implementation of strategic air-quality programmes.



Eng. Alya AbdulRahim Al Harmoudi

Head of the Environment Department

Since December 2013, Eng. Alya has been the Director of the Environment Department. A civil engineering graduate from the University of the United Arab Emirates, Alya began her career with the Ministry of Public Works and Housing in 2001. She joined the Municipality in 2005 as a Senior Coastal Engineer and was later promoted to Head of the Coastal Zone and Waterways Management Section before taking up her current position.

> Dubai adheres to global standards when it comes to a cleaner and greener environment. As we move forward to host Dubai Expo 2020, our aim is to make Dubai clean and green.

SPREADING THE WORD

INTRODUCING THE BEST PRACTICES FOR CLEANLINESS AND MAKING DUBAI A GREENER CITY

QUICK INFO

The campaign drive has now been expanded across the Dubai neighbourhoods of Jumeirah 1, 2 and 3, Al Safa 1 and 2, Umm Suqueim 1, 2 and 3, Al Manara, Umm Al Sheif and Al Barsha 2 and 3.

Making a city sustainable takes more than government directives. A participatory approach is necessary to ensure buy-in from all stakeholders, including businesses, government and consumers. With this in mind, Dubai Municipality has launched a number of consumer campaigns to raise awareness and encourage participation in the creation of a green, sustainable future for Dubai.

A year ago, Dubai Municipality launched the My City, My Environment campaign in line with the green vision of the leaders of the nation. The campaign aimed to educate UAE residents about the importance of waste management and source segregation and to encourage a behavioural shift in residents in terms of proper waste management. After a successful two-week awareness campaign, developed as a pilot project, the Waste Management Department at Dubai Municipality launched the second stage, which covers more areas of Dubai, focusing on the collection and segregation of recyclable waste at source, thus reducing waste to landfill. The expansion builds on the positive response from residents in the initial campaign, continuing the momentum created through prior environmental efforts.

The drive has now been expanded across the Dubai neighbourhoods of Jumeirah 1, 2 and 3, Al Safa 1 and 2, Umm Suqueim 1, 2 and 3, Al Manara, Umm Al Sheif and Al Barsha 2 and 3. "The campaign aims at introducing the best practices for cleanliness and making Dubai a greener city. It also emphasises Dubai Municipality's continuous efforts on high quality services to keep the city clean," says H.E. Eng. Hussain Nasser Lootah, Director General of Dubai Municipality.

The door-to-door waste collection and recycling service for residents is a unique initiative that educates the public and encourages recycling of household waste in an efficient manner. Each household in the designated areas will be given two 240-litre colour-coded bins, with clear instructions to assist with correct waste separation. Green bins are provided for recyclables such as plastic containers, cardboard and newspapers, while black bins are designated for general waste. General waste is collected on a daily basis and recyclables on alternate days.

The programme is introduced by volunteers, who visit every household in the identified areas to explain the process. Residents are also informed about the campaign through a range of communication tools, including public education activities, road-shows, radio talk shows, posters and banners. It is anticipated that the second phase of this initiative will ultimately lead to a Dubai-wide campaign.

In the first three years of the initiative, a total of 13,591 tonnes of waste was recycled, commensurate to an average of 9.92% of waste recycling annually, which is a commendable figure considering that the 15 areas where the project was implemented had no prior knowledge or experience of on-site waste segregation. This quantity of waste being diverted from disposal led to the preservation of 33,977.5m^3 of landfill space. Most importantly, the initiative began the cultural change process in regards to sustainability.

"Dubai adheres to global standards when it comes to a cleaner and greener environment. As we move forward to host Dubai Expo 2020, our aim is to make Dubai clean and green," says Eng. Abdul Majeed Al Saifaie, Director of the Waste Management Department of Dubai Municipality. Another of these recycling initiatives is the Umm Suqeim Recycling Centre. Built as part of the My City, My Environment project, the centre covers various locations such as Umm Suqeim 1, 2 and 3, Al Manara and Um Al Sheif and provides recycling containers with separate bins for plastics, metal, paper and cardboard.

In the first three years of the Initiative, a total of 13,591 tonnes of waste was recycled, commensurate to an average of 9.92% of waste recycling annually.

QUICK INFO

In Dubai alone, more than 2,000,000 cars are on the road daily.

Such initiatives play a leading role in encouraging the public to get into the habit of recycling, which ultimately assists in developing a more environmentally sustainable city. The Municipality plans to continue to encourage recycling throughout the city, with the aim of recycling three-quarters of Dubai's refuse by 2018.

A further awareness campaign entitled Clean up the World, also aims to spread environmental awareness. The week-long campaign operates under the slogan "Our Place, Our Planet, Our Responsibility" and is held in partnership with the United Nations Environment Programme (UNEP). Globally, Clean Up the World engages an estimated 35 million volunteers in 130 countries each year, making it one of the largest community-based environmental campaigns in the world. It inspires and empowers community groups, schools, businesses, and local governments to carry out activities that address local environmental issues.

Campaign activities in Dubai include cleaning public places in the Emirate, such as beaches, parks and Dubai Creek, with the participation of companies, schools, organisations, government departments and individuals. Dubai Municipality provides the equipment for participants in the campaign, which saw over 40,000 volunteers register.

This year also saw the return of the annual Car-Free Day on February 4, 2015 in an attempt to raise environmental awareness, encourage public transport use and reduce pollution and traffic., the sixth year of the initiative coinciding with the UAE's National Environment Day. Officials at Dubai Municipality estimated that around 30,000 vehicles stayed off the roads, with 300 government offices and private companies participating in the green drive.

Vehicles are the main source of air pollutants, accounting for 15-20% of CO_2 emissions worldwide. In Dubai alone, more than 2,000,000 vehicles are on the road daily, exceeding the road capacity network and creating the potential for an increased number of accidents, not to mention the effect of air pollutants on public health.

Number of Entities Participated 2010-2015

The Car-Free Day is designed to encourage residents to use the excellent public-transport infrastructure in place across the Emirate and reduce emissions. Up until 2015, the reduction in carbon dioxide emissions through the six editions of the initiative reached 140 tonnes. One tonne of these emissions exceeds the size of a double-decker bus.

The 2015 Car-Free Day initiative drew the attention of H.H. Sheikh Hamdan bin Mohamed bin Rashid Al Maktoum, Crown Prince of Dubai. The participation of H.H. in the event, along with the Director General of Dubai Municipality and other government organisations in the Emirates had a great impact in raising public awareness of this initiative.

This annual event has been organized for six consecutive years, and the number of entities participating has increased drastically. Also, on February 4, 2015 an exhibition was held in the parking lot of the Dubai Municipality main building to showcase eco-friendly cars, products, projects and research regarding environment-friendly practices.

This initiative presented a great opportunity to highlight the commitment of all stakeholders towards preserving the environment and adopting environment-friendly practices.

The Building Department at Dubai Municipality also launched a campaign, with the title Hand in Hand towards the sustainability of Dubai. This campaign is designed to educate Dubai's population on the importance of green buildings and the impact on health, society and the economy and saw two education platforms being run, at Mirdif City Centre and the main entrance to Dubai Municipality.

The initiative included the distribution of leaflets and publications, such as colouring books for children, to introduce the concept of building sustainability to visitors and a detailed explanation of the green house model and the rules and regulations of green buildings. Visitors were invited to sign a pledge to maintain the sustainability of Dubai, with 10,059 signatures gathered. This was followed by a seminar on sustainable households, attended by 250 people.

All of these initiatives are promoted under the idea that enhancing the city is a group effort. In this way, Dubai Municipality works hard to connect with all members of the community to share the environmental message and create a pollution-free Emirate.

A HOME FOR DUBAI'S WILDLIFE

HOW DUBAI IS COUNTERACTING URBANISATION TO PRESERVE ROOM FOR OUR NEIGHBOURS

BY ENG. SALEM MOHD. BIN MISMAR

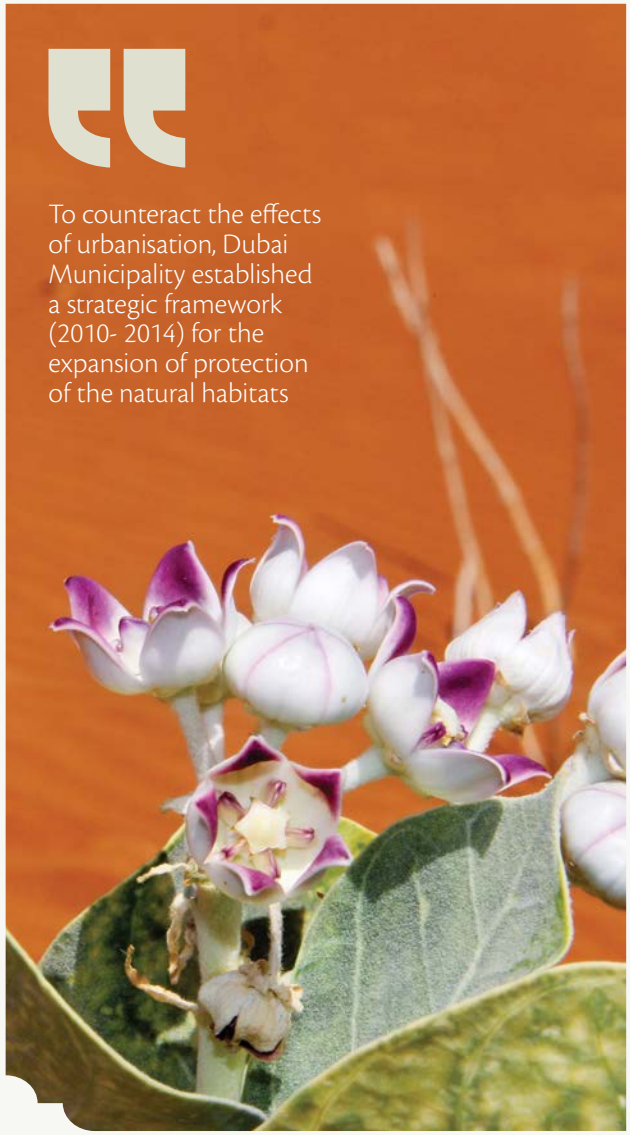
Over the past century, ecosystems all over the world have been subject to substantial degradation. As a consequence, biodiversity, both marine and terrestrial, is being lost at rates not seen before in human history. This also applies to the UAE and Dubai.

These protected areas cover 659.79 square kilometres; approximately 16.5% of Dubai's total area of 4000.78 square kilometres

The key drivers of ecosystem degradation are the same in Dubai as in many other parts of the world, with the most relevant being the rapid population expansion of both people and livestock. Overgrazing by domestic livestock is the most serious threat to Dubai's natural desert environment, apart from the direct destruction of habitats. Dubai has experienced massive urbanisation over the past decades, with severe consequences for the natural environment. Most urbanisation in Dubai has been carried out along a broad coastal strip and this has been, and continues to be, the major driver of biodiversity loss. The continuing development of the road network, especially in more remote areas, has likely to lead to the further destruction and deterioration of habitats, both directly and indirectly.

To counteract the effects of urbanisation, Dubai Municipality established a strategic framework (2010- 2014) for the expansion of protection of the natural habitats. As a result of these efforts, six new protected areas were declared in 2014 by a decree issued by H.H. Sheikh Mohammed bin Rashid Al Maktoum, UAE Vice President, Prime Minister and Ruler of Dubai, comprising Almarmoum Conservation Reserve, Dubai Desert Conservation Reserve, Al Wohoosh Desert Conservation Reserve, Ghaf Nazwa Conservation Reserve, Jabal Nazwa Conservation Reserve and Hatta Mountain Conservation Area. With this announcement, the total number of designated protected areas has reached eight, in addition to Ras Al Khor Wildlife Sanctuary and Jebel Ali Marine Sanctuary. These protected areas cover 659.79 square kilometres; approximately 16.5% of Dubai's total area of 4000.78 square kilometres.

In order to understand the current status of biodiversity in Dubai, baseline surveys are planned, to report on the results of a comprehensive, integrated environmental biodiversity and socio-economic study of each protected area, the surrounding environments and ultimately, the entire Emirate. The intended outcome is to produce geographically referenced, scientifically valid and comprehensive abiotic, biological and socio-economic information to aid in the preparation of comprehensive environmental management plans (EMPs) for each of the protected areas. Such information includes the flora, fauna, geology, waters, climate and other properties of the physical environment; the prevalent ecological processes in operation; the key ecosystem services (e.g. carbon sequestration, spawning grounds, wastewater treatment and so on); and the demographics of existing settlements near the protected areas.



Of particular importance is information pertaining to climate change. The data will improve knowledge of the natural environment and contribute to informed planning, design and decision-making processes, so that the potential adverse environmental impacts of proposed and existing projects and activities are understood and avoided or mitigated as early in the decision-making process as possible.

This will result in a reduction in the extinction of threatened and vulnerable species and the provision of reference sites for the evaluation of threats to biodiversity. During the conservation planning stage, management plans for species with international conservation concerns, particularly those that are classified as critically endangered, endangered and vulnerable, will also be developed.

Improving the engagement and education of the community concerning issues of biodiversity conservation is a further aim. Additionally, the project will strengthen the collaboration between the government and private sectors in the management of protected areas and biodiversity conservation.

Eng. Salem Mohd. Bin Mismar

Assistant Director-General for the Environment, Health and Safety Control Sector

Eng. Salem is the Assistant Director-General for the Environment, Health and Safety Control Sector of the Dubai Municipality since March 2008.

He is a graduate industrial systems engineer from the University of Southern California in Los Angeles, USA, in 1986.

NEW RULES IN 2016

THE INTRODUCTION OF MANDATORY ENERGY-EFFICIENCY GUIDELINES AND RANKINGS (AL SA'FAAT)

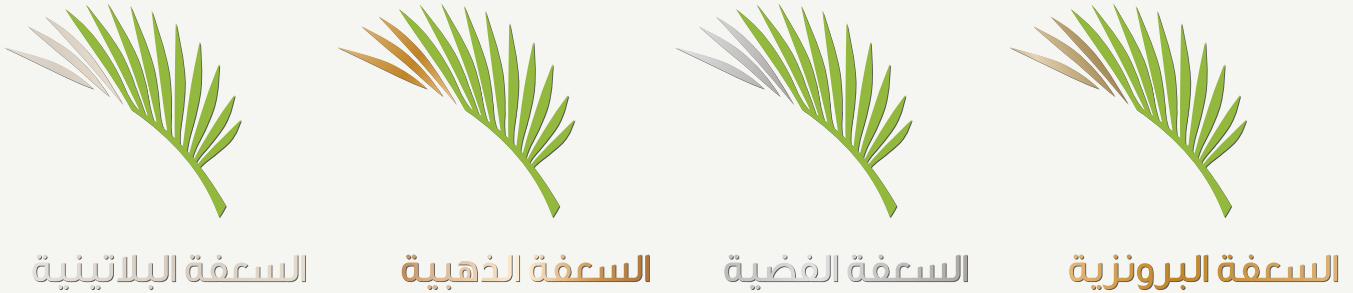
BY ENG. KHALID MOHAMED SALEH AL MULLA

QUICK INFO

The UAE has the eighth-largest stock of LEED-rated buildings outside the United States, at an impressive 3.1 million square metres.

If Dubai's economy continues to grow at its current speed, the city will soon be faced with a challenge that the majority of developing economies also encounter; the requirement to ensure that the pace of continued structural expansion does not exceed regional energy resources. Add environmental regulations into the equation and the cost of economic expansion could be significantly increased, should all considerations become an afterthought to regional prosperity. Dubai Municipality has been quick to foresee this approaching concern and has put together a functioning and sustainable energy-supply structure, which will identify measures to address energy-demand issues.

As part of this project to convert Dubai into a fully sustainable city, Dubai Municipality is planning to introduce a new ranking system (Al Sa'faat) that will be utilised to score or rate a building's total energy efficiency. This new ranking system will be implemented for both commercial and residential properties and has been accredited by H.H. Sheikh Mohamed bin Rashid Al Maktoum, Vice President and Prime Minister of the UAE and Ruler of Dubai, along with the green building evaluation guidelines. As with all large-scale energy conserving projects undertaken in densely populated cities, the success of the system will require full cooperation from Dubai's residents and in particular, building owners and developers.



The Green Building Regulations and the new ranking system are widely considered to be one of the most important pieces of legislation adopted by the government to protect the environment and its natural resources, as well as to ensure people's health and welfare. The regulations were written after extensively researching and studying several international green buildings rating systems and adopting those that suit the UAE's environment, economy and culture. The green building regulations and specifications encourage all developers to build toward a greener tomorrow, safeguarding the Emirate for future generations and at the same time mitigating any negative impacts on occupants' health. They address aspects of green building design including ecology and planning, building vitality and recourse effectiveness in terms of water, electricity, materials and waste.

Thus far in Dubai, companies looking to prove a building's green credentials have generally adopted the US Green Building Council's Leadership in Energy and Environmental Design (LEED) standards. As a result, the UAE has the eighth-largest stock of LEED-rated buildings outside the United States at an impressive 3.1 million square metres. In addition, Dubai's existing building guidelines recommend detailed and practical techniques and solutions to be implemented in order to achieve the strategic goals of Dubai in terms of saving energy and protecting environmental resources for the use of professionals concerned with green buildings and sustainability.

QUICK INFO

There are an estimated 120,000 existing buildings in Dubai and many of these were built before any energy efficiency or sustainability regulations were in place.

The Government quickly recognised, however, that energy efficiency in buildings should not be limited to new buildings. There are an estimated 120,000 existing buildings in Dubai and many of these were built before any energy-efficiency or sustainability regulations were in place. Retrofitting of existing buildings represents one of the fastest ways to reduce overall energy intensity, along with providing opportunities for green businesses. Existing buildings consume the highest amount of energy for services such as HVAC, domestic hot water, lighting, cooking, laundry works and other facilities within the buildings. This high energy consumption is due to a number of factors, such as the original building designs being based on different parameters and wear and tear on the buildings and equipment.

In order to comply with Dubai's strategic green building and sustainability goals, these buildings will be retrofitted to meet the new regulations and address world-wide environmental concerns. The ultimate aim is to improve the energy performance of all such buildings. Retrofitting offers opportunities to upgrade building fabric and install more energy-efficient HVAC and lighting plants in cases where the plant has reached the end of its useful life or the building fabric is in poor condition, with an ongoing impact on the buildings' energy consumption. It also offers opportunities to extend the lifespan of the buildings.

The level of retrofitting may include replacing carpets, partitions, light fittings, boilers, heat emitters, the entire cooling system or the ventilation system; removal and replacement of finishes and insulation on outer walls; fitting false ceilings, raised floors and new internal walls; adding air conditioning units; replacing control systems and fitting electronic Building Management Systems (BMS). This can apply to the whole building or only part.

The guidelines include the key techniques needed to maximise the use of energy resources, while providing the desired environmental conditions and services inside the building at the lowest cost. Frequently used techniques include the use of thermal insulation; waste heat recovery; appropriate cooling systems; improved controls for cooling and lighting; optimum start/stop controls; and comprehensive building energy management systems.

Dubai Municipality will commence this ambitious retrofit project by firstly checking each existing building in Dubai and ranking it based on the Dubai Municipality's Green Building Regulations. These regulations were initially introduced for government buildings in 2010, becoming mandatory for all new buildings in 2014. The ranking system is divided into four categories and will be introduced from October 16, 2016, according to H.E. Eng. Hussain Nasser Lootah, Director General of Dubai Municipality.

The anticipated results in addition to those of the Green Buildings project, which aims to reduce electricity consumption by 20%, water consumption by 15% and carbon dioxide emissions by 20%, include a 34% saving in energy consumption and a corresponding reduction in carbon-dioxide emissions of 7.3 million tonnes within five years. This reduction is the equivalent of planting 36 million trees. To put this in perspective, this number of trees would fill an area 40 times the size of Za'abeel Park.

Eng. Khalid Mohamed Saleh Al Mulla

Director of the Building Department

Eng. Khalid is also the Vice Chairman of the Green Building Committee amongst other appointments and the Chairman of the main committee for the improvement of the construction permit process in Dubai, as well as heading the team updating the building specifications.

He sees Dubai taking the regional lead in green buildings to become one of the most liveable and happy cities in the world.

THE FIRST GREEN SPORTS COMPLEX

OLYMPIC PERFORMANCE IN EFFICIENCY

BY ENG. MOHAMED MASHROUM

Dubai continually aspires to become a city that offers residents the best living conditions in the world. To contribute to achieving this dream, Dubai Municipality has dedicated itself to fulfilling its responsibilities within the Dubai Plan 2021 of the Executive Council to create a smart and sustainable city.

In line with this aim, H.H. Sheikh Hamdan bin Mohammed bin Rashid Al Maktoum, Crown Prince of Dubai and Chairman of the Dubai Executive Council, launched the first sustainable sports building in the region, the Hamdan Sports Complex, which was built at an estimated cost of AED 1.1 billion.

The sports facility, which was developed by the General Projects Department of Dubai Municipality, is a multi-purpose stadium located off Dubai Bypass road on a sprawling 61 acres of land. The Olympic worthy aquatic centre, claimed to be one of the world's best indoor aquatic facilities, will be used to host world swimming champions during the 10th FINA World Swimming Championships, being held for the first time in the MENA region.

The project is unique in its architectural designs, which meet the highest international standards and specifications. While undertaking the project, the Municipality took into consideration the characteristics of the area and the ease of entering and exiting, as well as access to major roads.

مجمع حمدان الرياضي
HAMDAN SPORTS COMPLEX

QUICK INFO

The Hamdan Sports Complex was built at an estimated cost of AED 1.1 billion.

The centre joins the list of innovative landmarks that can be seen around Dubai. Built in the form of a golden teardrop, the two-tier facility boasts an Olympic standard 50-metre pool, alongside an additional 50-metre pool featuring a moveable floor.

Besides being one of the most modern sporting facilities in the world, the Hamdan Sports Complex is designed to accommodate 15,000 spectators and host 10 Olympic sports, including basketball, handball and volleyball, plus aquatic sports.

The facility brings together a range of energy-saving technologies, from the overall structure to the mechanically controlled swimming pool features and the temperature and humidity controlled areas. Techniques that have been implemented in the project have led to electricity savings of 7.94 MWh, which represents 68% lower consumption than conventional systems. This figure translates to financial savings of AED 34.44 million on the initial construction costs and AED 12.74 million in annual savings on utility bills. In addition, CO_2e emissions are being reduced by 5.2 tonnes per hour in regards to water, with a total saving of 377.4 cubic metres per day, equivalent to AED 1.388 million per year.

Eng. Mohamed Mashroum

Head of General Projects Department

Mohamed is also a member of the Municipality's Technical Committee. Through his work as Head of General Projects since 2008, Mohamed oversaw, designed, and executed more than 170 projects, including Birwaz Dubai, Dubai Safari, and Hamdan bin Mohamed Sports Complex Centre, as well as Al Fahidi Market (Souk Al Fahidi), the birds and pets market and a number of public parks.

PAINTING THE TOWN GREEN

TACKLING GREEN BUILDINGS

BY ENG. ABDULLA MOHAMMED RAFIA

A built environment can have deep negative or positive impacts on the natural environment, as its well as inhabitants. Hence, the world is quickly accepting the idea of green buildings – a sustainable concept that heightens the positives and mitigates the negatives throughout the lifecycle of a building.

The planning, design, construction and operation of a green building comprise several considerations that focus on aspects of sustainability, such as energy usage, water usage, indoor environment quality, material selection and the building's effect on the environment.

The UAE Vice President, Prime Minister and Ruler of Dubai, H.H. Sheikh Mohammed bin Rashid Al Maktoum, implemented green building specifications on all buildings in Dubai as per the highest international standards in line with the Dubai Strategic Plan 2015. These standards have been modified in order to adapt to local conditions and keep Dubai a green and healthy city.

The purpose of setting these standards is to improve the performance of buildings in Dubai by reducing the consumption of energy, water and materials, thereby improving public health, safety and general welfare. Green building design also helps minimise the need to utilise municipal resources and utility supplies.

The standards have been created to support Dubai's Strategic Plan to create a modern green city as well as to leverage Dubai's infrastructure to meet the requirements of future green developments.

Although Dubai's new constructions are in line with sustainability principles, older buildings pose a bigger challenge. Dubai Municipality has created a sustainability checklist that must be fulfilled by these pre-green-era constructions. If a building fails to meet these standards, it will be subject to retrofitting procedures.

To further heighten this green wave, the Buildings Department of Dubai Municipality, along with Ajman University of Science and Technology, is developing detailed specifications of the best thermal insulation methods for different building types. Of the total energy, 70% is used by air-cooling systems and the collaborative recommendations of these knowledge bodies in technical, practical and economic terms are aimed at reducing this energy wastage.

In 2003, the Buildings Department issued a special resolution on the application of thermal insulation specifications for buildings, but buildings built before this still consume large amounts of energy.

This year, Dubai Municipality is ensuring that every building in the Emirate follows the new and approved specifications for thermal insulation systems. These systems are designed to reduce energy consumption in air-conditioned buildings. Building owners will be required to abide by minimum requirements designed for the purpose of reducing power loads, which require minimal heat transfer. This takes into consideration specifications for ceilings, wallpaper, windows and glass.

Dubai Municipality firmly believes that the vision to convert Dubai into a green city can be manifested at an expedited speed if every entity involved in building the Emirate is dedicated to the same cause. Thus, the Municipality has distributed a circular to all consultancy offices, contracting companies, concrete factories and suppliers on the use of eco-friendly materials and green concrete.

المباني الخضراء
أسلوب حياتنا الجديد

QUICK INFO

The decision to only use green concrete in Dubai's construction industry has been mandatory since 1st April 2015.

The new standard is expected to leverage Dubai Municipality's efforts to improve the quality of buildings and accelerate continuous development of the latest technologies in the construction sector, in line with the strategic objectives of the Government of Dubai's and its transformation into a green city.

The Emirate plunged into the matter when the concerned authorities noted that manufacturing a tonne of Portland cement results in the emissions of a staggering 1.1 tonnes of carbon dioxide and 164 kilogrammes of dust. These harmful by-products affect global warming, wreak environmental damage, and give rise to respiratory medical issues such as asthma, ossification pneumonia, lung cancer, kidney failure and other serious diseases.

This decision to only use green concrete in Dubai's construction industry has been mandatory since 1st April 2015. All new buildings, consulting offices, contracting companies and concrete factories are now technically and legally responsible for the implementation of this decision, each within its jurisdiction and responsibilities.

The beginning of the 21st century marked the start of the green era, with developed nations taking the lead. Unlike most developing countries, the UAE's rapid pace of development has succeeded in putting it at the forefront of this green revolution in the region, accounting for more than two thirds of the 1,236 LEED-rated projects in the GCC.

Among such projects is Al Khazzan Park. This newly renovated park is now entirely powered by solar energy systems and uses artistic elements that echo Dubai's approach to preserving nature. By converting to LED lighting, the park has reduced its annual energy consumption by 50% and the implementation of an off-grid solar-PV system has resulted in annual savings of 43,100 kilogrammes of carbon dioxide, equivalent to 1,100 trees.

At the same time, Al Fahidi Souk in Bur Dubai has achieved full compliance with Green Building Regulations in preparation for its grand opening. Its energy saving systems, natural lighting arrangements, eco-friendly building materials and insulation methods make it an exemplary green development. Techniques such as the solar water-heating systems and skylights, which allow natural daylight to penetrate the structure, and light colours on the structure's exterior decrease heat absorption, thereby reducing cooling demands. These are projected to result in 45% energy savings and 20% water savings compared to conventional systems.

The UAE is putting the green economy at the top of its agenda at all levels, and is pushing for a rapid and competitive transition. The city's application of the highest standards of sustainable development and genuine interest in clean, pollution-free structures suggest that Dubai's future in building shines a bright green.

Eng. Abdulla Mohammed Rafia

Assistant Director-General for the Engineering and Planning Sector

He is also a board member of the Dubai World Trade Centre, the Dubai Green Economy Partnership, the Energy Service Company (Etihad ESCO) and the Demand Side Management (DSM) Committee of the Dubai Supreme Council of Energy (DSCE).

A GUIDING LIGHT

LIGHTING UPGRADES FOR ENERGY DEMAND REDUCTION

BY ABDULAMIR R. FADHLANI

In support of the Dubai Supreme Council of Energy's Demand Side Management initiative, Dubai Municipality, as one of the largest governmental institutions, and driving the growth and evolution of the Emirate of Dubai and as such, is determined to be a leader in terms of environmental efficiency, also determined to decrease its carbon footprint and contribute to transforming Dubai into one of the most sustainable cities in the world.

To this end, Dubai Municipality assessed its own assets in 2015 to determine what could be done to reduce energy consumption. While many Middle Eastern businesses opt for beginning these efforts with HVAC optimisation or entire building refurbishment, Dubai Municipality acknowledged that lighting upgrades are quick and can have an immediate impact on overall sustainability, in addition to offering tangible benefits.

QUICK INFO

Using the intelligent lighting system, the Municipality will be saving 6,200 tonnes of CO_2 emissions per year, with a return on investment of over 20%.

The intelligent lighting systems allow Dubai Municipality to save 10.5GWh in lighting energy consumption

This led to the signing of a Memorandum of Understanding (MoU) between Dubai Municipality and Philips Lighting for cooperation on sustainability initiatives across Dubai, and specifically in transforming the Municipality's 262 buildings from conventional lighting infrastructure to energy-efficient LED solutions. LED lighting has been recognised as generating a greater light output per watt of energy, providing a higher level of light quality, producing immediate savings in energy and maintenance costs, and having a longer lifetime than standard lighting systems.

To kick start the transformation process, plans were put in place to begin refurbishing the first 15 buildings, which would then allow for assessing actual energy savings and other benefits of a new lighting system. After an energy audit, the Philips team designed a lighting concept using the most innovative LED lighting technology. The project comprised of CoreLine and GreenSpace luminaires that produce a crisper, brighter and better colour rendering light and importantly, save more than 50% on the electricity load.

The intelligent lighting system allows Dubai Municipality to save 10.5GWh in lighting energy consumption, and correspondingly, 6,200 tonnes of CO_2 emissions per year, with a return on investment of over 20%. In addition to savings from energy efficiency, the long lifetime of LED lighting reduces maintenance costs and the improved light levels across the buildings have increased both employee and customer happiness.

The project has been a winner all round, with Philips and Dubai Municipality winning the Lighting Project of the Year Award at the Middle East Electricity Awards in March, 2015. "We are very proud to be working with Dubai Municipality to transform Dubai into the most sustainable city in the world. The Municipality realised that reducing energy consumption through lighting is a quick win with substantial returns for Dubai from both an environmental and financial perspective," says Rami Hajjar, General Manager of Philips Lighting in the Middle East.

This initiative is just one of a number of examples of how technical solutions can be implemented throughout Dubai Municipality assets in order to contribute a sustainable, green economy. It is a guiding example of how the forward thinking Emirate is supported by Dubai Municipality's efforts.

Abdulamir R. Fadhlani

Head of Maintenance and Facilities Section in the Maintenance Department

Abdulamir started his career with Dubai Municipality as an electrical engineer in their electrical section. In 2004 he was promoted as Head of Section after the creation of the new general maintenance department.

DUBAI CENTRAL LABORATORY

POWERED BY A BRIGHT IDEA

BY ENG. HAWA ABDULLAH AL BASTAKI

An ongoing project at the laboratory is the certification of solar heaters for pools, which ensures a significant rationalisation of electric power

The definition of green building is generally accepted to be the practice of creating structures and using processes that are environmentally responsible and resource-efficient throughout a building's life-cycle. The use of green building materials and products ensures reduced energy consumption and environmental consideration, with a lower carbon footprint. In general, the advantages include reducing waste, pollution, and the impact on the local environment, efficiently using energy, water, and other resources and protecting occupant health, thereby improving productivity, ensuring that all stakeholders benefit.

To help manifest this in practical terms, the Dubai Central Laboratory Department has established a new facility for testing green materials. The laboratory assesses different characteristics such as physical, chemical, mechanical, thermal, aging, solar and light properties of green materials against internationally approved specifications, with tests based on the latest technology, performed by trained staff.

A pioneer in the region, the laboratory performs tests on different types of green materials, such as thermal insulation materials, paints and coatings, concrete, recycled material and different types of heat-insulating bricks. The laboratory is also able to conduct fire tests according to international standards, using advanced, precise equipment. An ongoing project at the laboratory is the certification of solar heaters for pools, which ensures a significant rationalisation of electric power, as only efficient heaters are certified as conforming to the requirements. This provides suppliers and manufacturers with guidelines, to ensure they meet the necessary requirements and adhere to relevant legislation.

Dubai Municipality has been motivated to devise alternative renewable-energy processes to fuel these tests. In line with the concept of "A Green Economy for Sustainable Development" forwarded by H.H. Sheikh Mohammed bin Rashid Al Maktoum, Vice-President and Prime Minister of the UAE and Ruler of Dubai, Dubai Central Laboratory is utilising solar energy for the operation of equipment used in the laboratory.

In the first stage of this initiative, the equipment has been successful in converting solar energy to electrical energy to power the devices used in green-material testing. The devices combined emit only 138 kilogrammes of carbon dioxide per month, which is the equivalent of nine trees annually. This is a remarkable figure given the magnitude of the centre.

The solar power utilisation is in line with the UAE's social and economic commitment towards sustaining a greener and healthier environment and reducing carbon emissions. Apart from the environmental benefits, the use of solar power also increases the life expectancy of the equipment and helps save on electricity costs.

Clean, bright and free solar energy is one source of renewable energy that the world is not short of. And with the sun rising and shining consistently on the UAE, it is safe to say that this project is sure to blaze the trail for solar projects in the future.

Eng. Hawa Abdullah Al Bastaki

Executive Director of the Dubai Central Laboratories Department

Dubai Central Laboratories is under the aegis of Dubai Municipality's Engineering Materials Section. Eng. Hawa has worked for more than 20 years in this field, acting as Director and Head of Strategic Planning of the Quality Management Department at Dubai Municipality. She has also been Chairman of the Supervisory and Regulation Bureau, and Quality Control Engineer for the Building Research Department. Additionally, she has headed a number of the higher control committees and excellence and quality programmes.

FROM THE BOTTOM UP: GREEN CONCRETE

MORE GREEN FOUNDATIONS

BY ENG. AIDA ABDULRAHIM AL HARMOUDI
& ENG. AHMED SAEED AL BADWAWI

الخرسانة الخضراء لمستقبل أكثر استدامة

Green Concrete for a Sustainable Future

In a booming city, the construction industry is often one of the mainstays. Dubai is no exception, with much of the Emirate's infrastructure, residential developments and office buildings springing up within the last few decades. Naturally, this fast-paced construction has required large quantities of concrete.

From April 2015, all new buildings in Dubai have been required to use green alternatives (GGBS and Fly Ash) to replace Portland cement (OPC), the major component of concrete mix that has been found to emit toxic gases. Each tonne of OPC produced generates more than one tonne of carbon dioxide (CO_2) and other toxic gases, leading to an increase in global warming; increased environmental damage; and an increase in respiratory diseases such as asthma and pulmonary ossification, as well as lung cancer, kidney failure and other serious diseases.

Dubai Municipality (DM) has made it mandatory for all building construction stakeholders to use green alternatives, which improve the concrete's characteristics and extend building service life.

This creative idea won first place in the UK Ideas Conference 2015, as the best idea that serves society in the environmental protection and sustainability field, also winning the Creative Idea Award in the Dubai Government Excellence Programme.

Given this, DM is conducting an environmental impact study of ready mixed concrete in the Emirate. DM developed the study to address the lack of a tool for assessing and measuring the environmental footprint of different types of concrete admixtures and to ensure the availability of alternatives. DM also wanted to ensure that creativity and innovation was not discouraged because of the mandatory use of specific raw materials, and that this would not lead to price increases.

The evaluation systems project of the environmental impact of concrete mixes provides the opportunity for the use of raw materials with a proven sustainable environmental impact and materials that ensure a lower carbon footprint.

The project covers industry-wide research on the environmental impacts of ready mixed concrete produced in Dubai. A sample constituting around 20% of the ready mixed concrete plants in operation, located in different areas within

Dubai, will be part of this research. 15 concrete mix designs will be included, covering a wide range of concrete grades.

A Life Cycle Inventory (LCI) data-collection questionnaire will be developed, which will include information about total concrete production over the reporting period, total transportation distance from material source to plant, total water use, plant operating energy consumption, fleet fuel use, air and water emissions and solid waste.

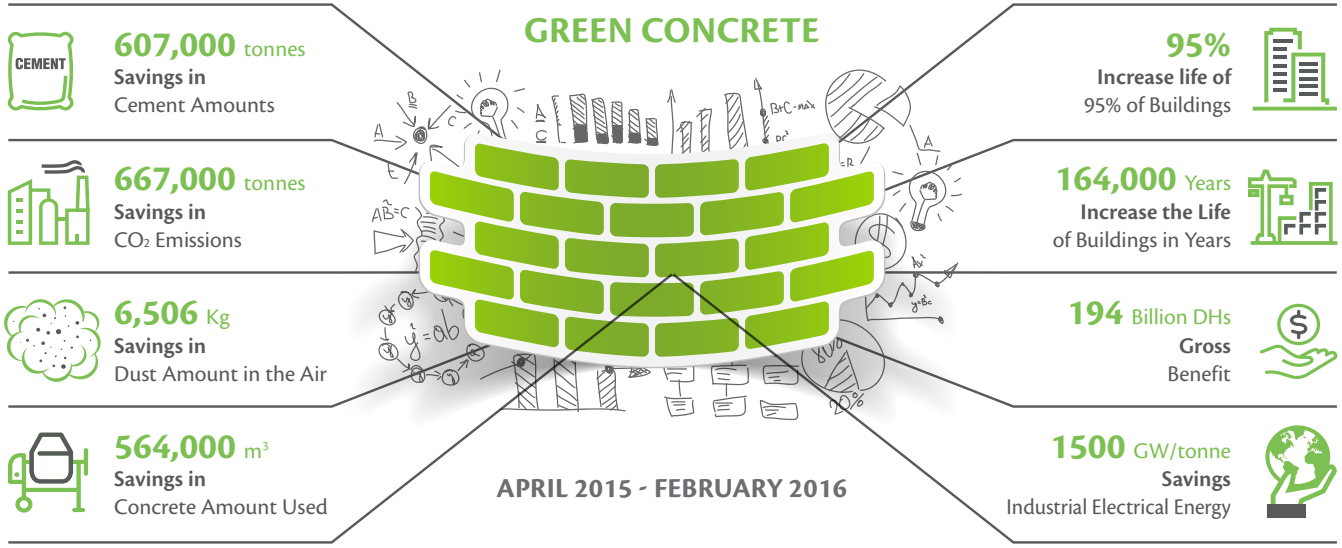
The questionnaires will be reviewed and verified by a third party. Based on the LCI results, the third party will construct an average set and modelling of life cycle inventory flow data for the production of one square metre of each mix as per the Carbon Leadership Forum Product Category Rules (PCR). The PCR enable quantification and reporting of the environmental impacts associated with the production of concrete from cradle-to-gate.

After modelling is complete, a Life Cycle Assessment (LCA) report will be prepared. The LCA is a compilation and evaluation of inputs, outputs and the potential environmental impacts of a product system throughout its life cycle. The report will be reviewed by Dubai Municipality and verified by the National Ready Mixed Concrete Association – NRMCA (the EPD Program Operator).

Eng. Aida AbdulRahim Al Harmoudi

Head of the Consultants and Contractors Prequalification Section

Since December 2013, Eng. Alya has been is the Acting Director of the Environment Department. A civil engineering graduate from the University of the United Arab Emirates, Alya began her career with the Ministry of Public Works and Housing in 2001. She joined the Municipality in 2005 as a Senior Coastal Engineer and was later promoted to Head of the Coastal Zone and Waterways Management Section before taking up her current position.



Finally, an Environmental Product Declaration (EPD) will be prepared and submitted to the EPD Program Operator (NRMCA) for verification and registration.

The industry wide EPD (Dubai-EPD) will be the baseline for the concrete mixes produced in Dubai to meet green concrete requirements.

The declared values will constitute the maximum environmental impact a concrete mix may produce. This EPD baseline will offer the chance for ready mixed concrete plants to compare their mixes against the baseline in terms of environmental impact. This will provide a solution for plants that would like to propose different mix designs other than those specified in DM Circular 202, provided they have lower environmental impact than the values declared in the Dubai-EPD.

Eng. Ahmed Saeed Al Badwawi

Head of the Research and Building Systems Section

Eng. Ahmed graduated Bachelor of Civil Engineering from the UAE University in 2002, and is now Head of Research and Building Systems Department at Dubai Municipality. He is also part of several internal committees such as the Sustainability Committee and the Legislation Reviewing Commission, in addition to his participation in several Commissions that represent the Municipality on federal and ministerial levels.

03 A SUSTAINABLE ECONOMY

OVERVIEW

A SUSTAINABLE ECONOMY

Dubai Municipality Targets

Dubai Municipality (DM) has a number of economic targets, both internal and external, in regards to building a strong community and Emirate. DM is constantly seeking to improve the way things are produced and distributed, in recognition that trade and business are vital for stability and contribute to low crime levels and cultural, scientific and technological progress. Economic stability is thus essential in ensuring a prosperous, and happy society.

Within the economy sector, Dubai Municipality works on a number of initiatives to reach the community and achieve economic targets, as well as bolstering Dubai's ambitions of being a smart sustainable city. This chapter outlines many of these initiatives, including the Dubai Green Economy Partnership (Dubai GEP), Demand-Side Management Strategy, E-Servicing, Private Sector Investment and Legislation Procedures.

The Dubai GEP highlights the role of innovation in the green economy, aiming to encourage investment in the latest clean technologies, innovative business practices and government policies to help reduce the carbon footprint and assist in establishing Dubai as a green economy hub. DM projects in this area include initiatives on green concrete and a 3D software platform that allows for an easy understanding of green building regulations. Beyond clean technology, private-sector investment is an important component of the economy in a broader sense, and DM has developed a number of strategies to encourage significant private-sector investment to contribute to the nation's economic health.

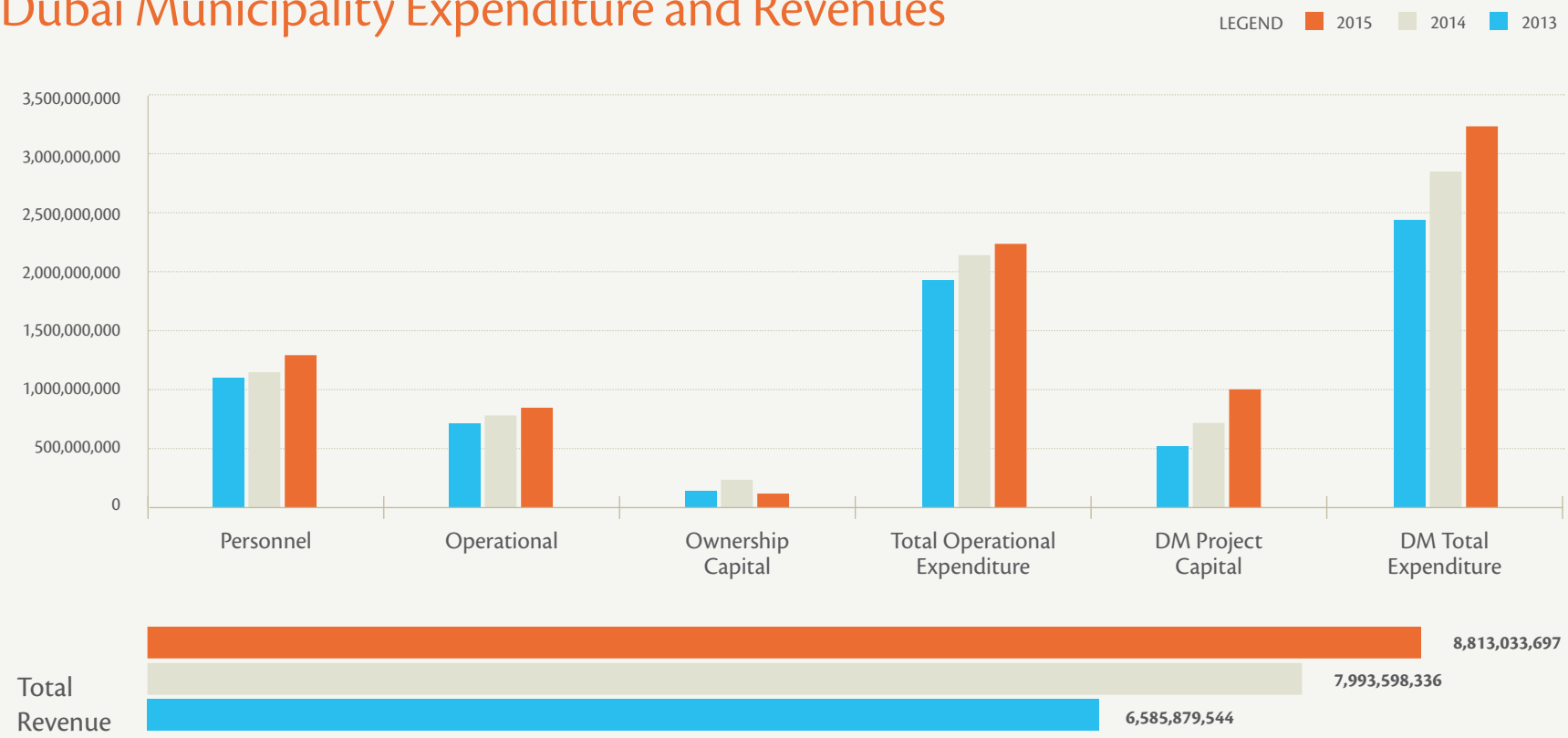
DM also recognises that it is important to modify consumer demand for energy through various methods such as financial incentives and behavioural change through education. Demand-Side Management initiatives include the application of waste-to-energy technology and reducing waste overall, in line with the objectives of the National Agenda 2021.

In the move towards smart-city status, DM has also been developing e-services. These portals are designed to bring the services and information of government entities under one umbrella, with the aim of providing quick and easy access to the service seeker. It's all about developing the mechanism to provide government services through innovative channels in a customer-centric manner, with hundreds of DM services now online and thousands of registered users utilising these services.

None of these projects could be successful without an accompanying legislative framework, and DM is progressively developing relevant legislation and updating exisitng legislation to ensure success.

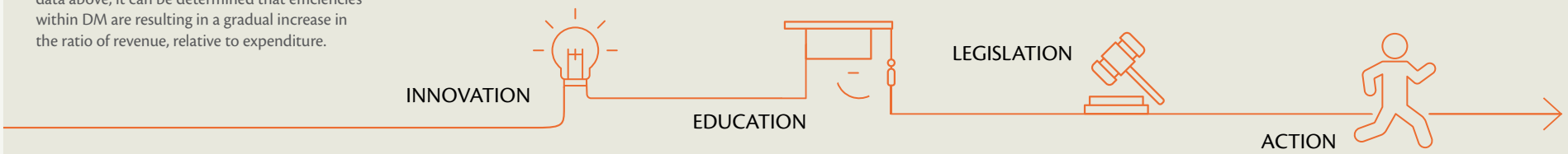
Through Dubai Municipality's Sustainability Indicators, highlighted in the Strategic Plan 2013-2015, data is available on DM's internal economic performance. This can be seen in the following graphs, illustrating expenditure and revenues.

Dubai Municipality Expenditure and Revenues



Through the initiatives and success stories showcased in this chapter and the expenditure data above, it can be determined that efficiencies within DM are resulting in a gradual increase in the ratio of revenue, relative to expenditure.

DM will continue to play a leading role in supporting the growth of the economy of the Emirate through innovation, education, legislation and action.



THE DEMAND SIDE OF THINGS

AN INTEGRATED STRATEGY TO COVER ALL POSSIBLE APPROACHES

BY ENG. ABDULLA MOHAMMED RAFIA

Demand side management (DSM) concerns the modification of consumer demand for energy, through methods including financial incentives and behavioural change through education, amongst others. Generally, the goal of demand side management is to encourage the consumer to use less energy during peak hours, or to move consumption to off-peak periods. Peak demand management can play an important role in balancing demand to gain efficiencies within energy networks.

QUICK INFO

On the supply side, the goal is to diversify the energy mix with 25% from solar, 7% from clean coal, and 7% from nuclear by 2030. The extended goal is 75% solar by 2050.

In Dubai, the Demand Side Management Strategy is part of the Dubai Integrated Energy Strategy 2030 (DIES), which is driven by the principles of sustainability and environmental protection. Both the DIES and DSM were initiated in response to a projected increase in demand for energy, which would require significant supply capacity build-up. Demand-side targets have been clearly established within the DIES to address this issue, and include a 30% demand reduction in electricity and water consumption, compared to Business As Usual (BAU) scenarios by 2030. On the supply side, the goal is to diversify the energy mix with 25% solar share, 7% from clean coal, and a 7% nuclear share by 2030. The extended goal is 75% solar by 2050.

This strategy fits within both the National and Dubai Agendas, promoting energy conservation by affecting consumption behaviour. This has the knock-on effect of creating additional jobs and capabilities through efficiency initiatives, such as energy efficiency services, and it supports energy security by inducing lower dependency on external supply and, therefore, less exposure to price volatility. In addition, the strategy supports safety and the environment, through the introduction of modern equipment and best practices, and it promotes the creation of a smart city by introducing and extending the use of new technologies, resulting in positioning Dubai to become a role model in energy efficiency and security.

The DSM strategy is one of the main areas of focus for the DubaiSupreme Council of Energy and the involved government entities, which include Dubai Municipality, along with Etihad Energy Services, RSB, ESMA, RTA and DEWA. The DSM strategy comprises nine main programmes, supported by eight implementation mechanisms, all with the ultimate goal of making Dubai a role model in energy efficiency through the implementation of cost-effective electricity and water demand saving measures and the development of a green service market.

The nine programmes are: building regulations, building retrofits, district cooling, standards and labels for appliances and equipment, water reuse and efficient irrigation, outdoor lighting, power and water tariffs, demand response, and Shams Dubai. Dubai Municipality has primary responsibility for building regulations, water reuse and efficient irrigation and outdoor lighting, the latter in conjunction with RTA. The eight implementation mechanisms for all responsible entities are: institutional setting and capability building; policies and regulations; information systems; public awareness; governing by example; technologies and studies; financing mechanisms; and measurement and verification.

As regards building regulations, DM's goals are to implement the existing green-building code and introduce updates to enforce more stringent energy efficiency regulations, resulting in total power savings comprised of at least 32% water savings and at minimum of 28% electricity savings at building level, compared to BAU scenarios by 2030. DM is also responsible for introducing a labelling scheme for buildings. Buildings are the main drivers of consumption and the DSM programmes prescribe significant actions to improve the asset base. DM will play an important role in these improvements, through these efforts in promoting effective building regulations and initiating building labelling.

The goals for water reuse and efficient irrigation incorporate reductions in the use of desalinated water for irrigation through promoting efficient landscaping practices and irrigation technologies, with 80% of green areas to be efficiently irrigated, and maximising the use of treated sewage effluent (TSE), with the goal of 100% of public areas irrigated with TSE. The use of TSE as a water and nutrient source in agricultural irrigation is widely recognised as a viable alternative to desalination or the use of groundwater reserves, contributing to water conservation and sustainability.

In terms of outdoor lighting, RTA is responsible for street lighting, while park lighting falls under DM's remit. The aim is to use more efficient lighting fixtures, including retrofitting 75% of existing outdoor lights with LED alternatives. These LED alternatives are more eco-friendly, consuming up to 90% less power than incandescent bulbs, resulting in a dramatic decrease in power costs. Money and energy is also saved in maintenance and replacement costs, due to the long lifespan of LED lights. The implementation of a switch-off programme, which will apply to 100% of residential areas, will generate further power savings.

These initiatives, paired with projects within the other six programmes, are set to have a significant impact on power and water consumption by 2030 and are already meeting initial savings targets in preparation for a strong ramp-up in the coming years. The anticipated savings by 2030 are forecast at 19 TWh and 47 BIG, along with 10.7Mn tonnes of CO_2 emission reductions and a 4.6GW peak load reduction.

The next phase of action within the DSM Strategy, up to 2022, will include the introduction of the building labelling scheme managed by DM, progressive deployment of tariff and demand response programmes, further implementation of water reuse and efficient irrigation programmes, and the continued roll-out of lighting replacements. The period from 2022 will see the building code and tariffs revisited and progressive updates issued to the standards for appliances. Periodic review of the strategy will ensure that all of the initiatives are progressing towards the 2030 targets.

Demand for any commodity can be modified by the actions of market players and government. Demand side management, effectively initiated and implemented, is guaranteed to influence the demand for energy. DM, along with all of the entities involved in applying the components of the DSM strategy, will continue to apply best-practice to DSM to ensure the goals of the DIES are met by 2030.

Eng. Abdulla Mohammed Rafia

Assistant Director-General for the Engineering and Planning Sector

Eng. Abdulla is also a board member of the Dubai World Trade Centre, the Dubai Green Economy Partnership, the Energy Service Company (Etihad ESCO) and the Demand Side Management (DSM) Committee of the Dubai Supreme Council of Energy (DSCE).

THE GOALS IN DUBAI

THE DUBAI GREEN ECONOMY PARTNERSHIP AIMS TO STIMULATE THE GROWTH OF A GREEN AND SUSTAINABLE ECONOMY IN DUBAI

BY ENG. ABDULLA MOHAMMED RAFIA

The Dubai Green Economy Partnership (GEP) is an initiative launched in 2012 by H.H. Sheikh Hamdan bin Mohamed bin Rashid Al Maktoum, Crown Prince of Dubai and Chairman of the Executive Council. The Dubai GEP initiative was inspired by the long-term national Green Economy for Sustainable Development Strategy launched by H.H. Sheikh Mohammed bin Rashid Al Maktoum, Vice President and Prime Minister of the UAE and Ruler of Dubai, to position Dubai firmly amongst global cities leading the transition to the global green economy. The Dubai GEP aims to stimulate the growth of a green and sustainable economy in Dubai, strengthening the Emirate's position as a leader as regards the green economy. As a founding member of the Dubai GEP, Dubai Municipality (DM) is fully committed to supporting and realising this goal.

The Dubai GEP is the first multi-stakeholder and cross-sector partnership to sustain focus on a green and low-carbon economy in the Middle East, with the founding members coming from both public and private sectors. Early in 2015, the Dubai Supreme Council of Energy (DSCE) formalised a strategic partnership with DM to promote Dubai's vision, strategy and achievements to an influential global audience and forge world-class partnerships to help build capacity through projects, event platforms and green trade missions, amongst other activities and programmes, in line with the Green Growth Strategy.

A few months later, the Dubai GEP unveiled a comprehensive strategy at WETEX 2015, to strengthen Dubai's shift towards a green economy. The strategy is led by partnerships and innovative clean technologies centred on innovation, development and smart technologies that support the Dubai Plan 2021. The Dubai GEP's strategy relies on cooperation between its founding members, including DM, and a sustainable business framework that centres on three key pillars that tie in with DMs strategic outlook: a green economy innovation centre, a gateway for green investment and trade, and an effective communication strategy.

The Dubai GEP plans to take the role of strategic partner in research projects on topics such as green jobs, and facilitate the green-economy transition by assisting companies to adopt green technologies within their businesses frameworks. The central mission for the partnership and all of its members is to promote green trade and investment in regional markets and accelerate the adaptation of green technologies, products and services worldwide, in order to enable Dubai and the UAE economy to grow sustainably, an aim that aligns with DM's goals.

Along with Dubai GEP's comprehensive strategy that links the green economy with clean technologies while promoting green trade and investment in Dubai, a number of initiatives have been put in place to foster forward-looking approaches. These include a partnership with CleanTech San Diego to give green technology innovators in Dubai access to the companies and service providers under the CleanTech umbrella. CleanTech San Diego is a non-profit membership body that positions the greater San Diego region as a leader in the clean-technology economy. The organisation focuses on fostering collaborations across the private-public-academic landscape, leading advocacy efforts to promote cleantech priorities, and encouraging investment, making them a natural partner for the advancement of the green economy. The core cleantech activities in Dubai involve renewable energy, energy-saving technologies, water treatment and efficiency, waste management and recycling, and green building, with DM, along with several other government entities, acting as one of the regulators.

Dubai GEP also established a new event on the green calendar, with the biannual Green Leadership Series (GLS) focusing on innovation. The GLS is a series of events aimed to deliver green-economy best practice to the market, also providing a forum for discussion and knowledge-sharing and a common ground for industry. During the May 2015 GLS, DM presented its initiatives regarding green concrete and the 3D software platform developed to enable an easy understanding of green building regulations. Other projects presented at the GLS included the Global CleanTech Innovation Programme by the United Nations Industrial Development Organisation (UNIDO); DEWA's smart grid and electric-vehicle charging stations; and ABB's solar plane initiative, which enabled a historic solar-powered flight around the world to depart from Abu Dhabi.

Another initiative saw Dubai GEP create a Green Dubai Map to help users locate sites, businesses and establishments of interest in the green economy. The aim is to put the spotlight on green activities in Dubai and help residents and visitors get the most out of their Dubai experience, while keeping the eco-footprint small. Given DM's responsibilities in regards to urban development and green spaces, the Green Dubai Map initiative is a positive step towards educating consumers on the virtues of these eco-friendly locations and businesses.

The Dubai GEP also launched the Green Deal, a crowd-sourcing platform dedicated to green initiatives that facilitates UAE residents' smooth adoption of green products. The platform allows end users to review and purchase environmentally-friendly products or services from a single point, eliminating the challenges and barriers that consumers face in transitioning to green products and services. Additionally, Dubai GEP conducted a research project on green technologies for investors, with the goal of facilitating the decision by multinationals to set up headquarters and regional offices in Dubai. The report provides an overview of the regulatory system, statistics and sector gaps in terms of investment opportunities.

In 2016, the Dubai GEP is continuing to work on enabling change that will assist Dubai's transformation into a green city through the active engagement of its members, which will involve frontline public and private sector organisations including DM, as well as the DSCE, the Dubai Department of Economic Development, DEWA, the Roads and Transport Authority, Dubai FDI, EnPark, Pacific Controls, Dubai Carbon Centre of Excellence, Etihad ESCO, Emirates Global Aluminium and the Emirates National Oil Company.

The focus continues to be innovation, as none of the objectives in the strategy can be achieved without innovation and the associated research. The world is changing rapidly and it's vital to keep pace and embrace new technologies, products and services. The green economy is recognised as the largest sector in the world advancing innovation, together with the IT sector and the Dubai GEP is aware of the opportunities this presents in linking the green economy and clean technologies, while continuing to promote green trade and investments in Dubai. DM is firmly committed to achieving the goals of the Dubai GEP and will continue to contribute to efforts, both as part of this partnership, and as part of the broader Dubai Government, to promote the green economy.

Eng. Abdulla Mohammed Rafia

Assistant Director-General for the Engineering and Planning Sector

Eng. Abdulla is also a board member of the Dubai World Trade Centre, the Dubai Green Economy Partnership, the Energy Service Company (Etihad ESCO) and the Demand Side Management (DSM) Committee of the Dubai Supreme Council of Energy (DSCE).

PECHA KUCHA

EXPLORING THE FUTURE OF DUBAI'S SUSTAINABLE BUILDINGS

BY ENG. MAITHA AL MAZROEI

Dubai Municipality is keen to promote knowledge and exchange in the field of city planning and infrastructure development. Given this desire to harness new and innovative ideas in the field of engineering, Dubai Municipality has organised Pecha Kucha 20x20 engineering chat initiatives for two years in a row, in 2015 and 2016. The most recent was under the title "Exploring the Future of Dubai's Sustainable Buildings."

> The population of the Emirate is anticipated to expand to 3.3 million by 2021 and 5.2 million people by 2030 and sustainable buildings will play a crucial role in the long-term economic viability of Dubai.

20 images X 20 seconds

QUICK INFO

Pecha Kucha 20x20 is a simple presentation format where presenters show 20 images, each for 20 seconds, and the presenters talk in line with the imagery shown on screen.

Pecha Kucha is a presentation style devised by Astrid Klein and Mark Dytham of Klein Dytham Architecture, with the first Pecha Kucha Night held in Tokyo in 2003. Since that time, it has spread to 900 cities around the world.

Pecha Kucha 20x20 is a simple presentation format where presenters show 20 images, each for 20 seconds, and the presenters talk along to the images. This gives the presenter 6 minutes and 40 seconds in total, ensuring a concise, visually intriguing presentation.

The recent event, coordinated by the Buildings Department of Dubai Municipality and held at Zabeel Park, was attended by H.E. Eng. Hussain Nasser Lootah, Director General of Dubai Municipality, and Eng. Issa Maidour, Deputy Director of Dubai Municipality, along with a number of management-level participants.

Within the presentation, Eng. Abdulla Rafia, Assistant Director General for the Engineering and Planning Sector and Head of the Sustainability Committee in Dubai Municipality, said Dubai needs approximately 3,500 housing units annually to keep pace with population growth in the Emirate, according to a study prepared by the Municipality. The population of the Emirate is anticipated to expand to 3.3 million by 2021 and 5.2 million people by 2030 and sustainable buildings will play a crucial role in the long-term economic viability of Dubai.

The Government has set a target for clean energy to provide 7% of the total energy used in 2020, increasing to 25% in 2030 and 75% in 2050. This, along with the strategic objectives of the Municipality in cutting carbon emissions by 15% by 2021, and reducing the demand for energy and water by 30% by 2030, means building sustainably is an issue that needs addressing. In addition, the Ministry of Infrastructure Development prepared a study in order to reduce energy consumption in 3,200 federal facilities, including mosques, health centres, schools and other public buildings.

The population is estimated overall to spend 90% of their time in buildings, whether offices, public facilities, or homes, meaning buildings are responsible for 80% to 90% of Dubai's total energy demand. This makes them a natural focus for the Municipality, which is concerned with reducing consumption and consequently reducing carbon emissions.

For Dubai to become a truly sustainable city, it is necessary to rationalise energy use, increase the percentage of renewable energy in the energy mix, reduce waste production, and increase recycling, which will lead to a reduction in the carbon footprint of the city. This will ensure the city is both smart and sustainable in the long term.

Within this framework, Dubai Municipality has developed a number of programmes and initiatives designed to transform Dubai into a sustainable city, including the Green Building initiative, launched in 2011, which is responsible for providing 20% of energy requirements. This initiative is mandatory for all new buildings in 2014. The Smart City project and sustainable Desert Rose city development are further examples of projects that will assist Dubai in achieving its sustainability ambitions.

Eng. Maitha Al Mazroei

Senior Green Building Engineer

Eng. Maitha, holder of an Architectural Engineering degree from the University of Sharjah in 2013, is now completing her Masters' study at the British University in Dubai, majoring in sustainable buildings. She won the award for best young engineer in 2015 for her contribution to the dissemination of Sustainable Community Culture in the Middle East Electricity Exhibition. Maitha has provided more than 16 feasible proposals for Dubai Municipality, such as the first Green Building Application.

10D

REVOLUTIONISING THE WAY BUSINESS IS DONE

BY MOHAMED AHMED SALEH & EBTISAM AL AMERI

Visitors to Dubai Municipality offices have decreased from 500 visits per day in 2014, to 75 visits in 2015

The 10D project was devised by Dubai Municipality to provide information and effective partnership with customers throughout the building permit process, via the provision of 10 easy channels that enable the customer to participate in checking applications and the final decision process, while ensuring the highest levels of transparency and governance. This is all achieved through an electronic system and video conferencing as part of a drive to reach the goal of zero visits to the Municipality's offices, thereby reducing the carbon footprint, and ensuring the provision of all of the necessary information for the permit process in one easy-to-access format.

The 10 channels are:

- Appointment with an official
- Appointment with DM engineer
- Decide about engineers' comments
- Evaluate DM's engineers
- Clarification on comments
- Video conference
- Hot desk
- Frequently Asked Questions (FAQs)
- Ask an engineer
- General appointment with engineers

QUICK INFO

Dubai Municipality customer complaints have halved and satisfaction has been rated as 83.16%, up from 75.23% in 2014.

One of the primary problems with the previous system was the appointment process. Appointments are the core of the relationship between DM engineers and customers, providing a forum to discuss building projects and permit applications. With approximately 52,000 appointments booked annually, a quarter of which were cancelled, this is a time consuming process for both Dubai Municipality and the contractors involved and involved a significant amount of road travel, unnecessarily increasing the carbon footprint.

The 10D system was built internally through the efforts of the Building and IT Departments, starting as a 2D system and expanding to 10D, with plans to develop it to 14D in the near future. Of particular importance are the three channels developed to provide information channels for customers – FAQs, ask an engineer and meet an engineer. Developed with the highest levels of transparency in mind, once the appointment system is opened for a booking, customers can view the results and book an appointment with the concerned official. In addition, customer involvement within the process is encouraged, with customers required to make a decision on each comment from Dubai Municipality. The comments can be accepted or not accepted and then discussed further. Cross evaluation has also been incorporated into the system, with customers rating the engineers after each video-conference meeting and engineers also evaluating each customer. Video conferencing was instituted for all meetings to reduce the time and travel commitment required on both sides.

The next phase of development will see two new channels added, with four suggestions already received from employees. In addition, communication with service providers such as Etisalat and DEWA is under process to make the procedures seamless.

The results speak for themselves. Visitors to Dubai Municipality offices have decreased from 500 visits per day in 2014, to 75 visits in 2015. The time spent by customers in discussing engineering notes has seen a dramatic reduction – down to an average of 1.87 hours per permit in 2015, from 16.3 hours in 2014. The total distance travelled by customer for permit purposes has been entirely eliminated, down from 7.6 million kilometres in 2014, also making a contribution to reducing the carbon footprint.

The total expenses related to permits has also decreased, from a total of AED 66 million annually to AED 2.8 million, representing significant savings. Reviewing applications was taking on average six days per application. This is now down to one day. The time spent waiting for an interview, which was previously half an hour, is now down to zero as well, and service delivery time has decreased from 25 to 15 minutes, with processing time down from seven hours to zero.

The efficiency in the system has allowed engineers to increase productivity, dealing with 1056 appointments in 2015, up from 859 in 2014. The service is also available 24 hours a day, as opposed to five hours daily in the past, increasing accessibility. Perhaps most importantly, customer complaints have halved and satisfaction has been rated as 83.16%, up from 75.23% in 2014.

There is no doubt that the 10D project has simplified the permit application process, increasing efficiency in service delivery on all levels. With further development planned, this bodes well for the future of the system in revolutionising the way business is done and contributing to Dubai's sustainability.

Mohamed Ahmed Saleh

Building Expert, Dubai Municipality

Mohamed has Masters in Architectural Engineering and is currently responsible for various aspects of buildings in the Municipality, such as design, supervision, bids, building regulations, town planning regulations, engineering checking, adjudication, TQM and e-government. However, his main area of expertise is building permits and regulations.

Ebtisam Al Ameri

Head of the Major Projects Unit

Ebtisam graduated with a Bachelor's Degree in Architectural Engineering from the United Arab Emirates University in 2004 and worked in several positions, such as Architectural Engineer and Head of Architectural Audit in 2010. She was then appointed in 2014 as Head of the Major Projects Unit and Deputy Head of Building Permits in 2016, until the return of the unit's head.

SMART DRAWINGS

A SMART ECONOMIC AND ENVIRONMENTAL SOLUTION

BY LAYALI ABDULRAHMAN AL MULLA

The smart drawing initiative is linked with the newly instituted building permit service processes, and together these initiatives contribute to Dubai Municipality's goal of "creating an excellent city that provides the essence of success and comfort of sustainable living."

The initiative has seen paper drawings transformed to be electronic and placed on a central server, shared by customers and government entities, and available 24/7. The shared server has enabled the Municipality and its partners to achieve a "One Window Shop", saving time, costs and CO_2 emissions for all involved, decreasing the carbon footprint, while also creating an archiving process for engineering plans.

One of the goals of the initiative has been to merge 10 entities and create a central database for all building drawings, converting drawings from photocopied to electronic format in the process. The initiative is ongoing, with 70% of the entities now linked to the smart drawing system. This saves time and effort for consultants and contractors, who previously had to move between entities to complete the necessary processes, often travelling vast distances by car, increasing CO_2 emissions in the process.

QUICK INFO

In 2009, Dubai was ranked 54. With continual improvements in processes that facilitate investment, Dubai ranked fourth in 2015.

In addition, the server contributes to the sustainability goals of the Dubai Government by eliminating paper printing, and further reducing the CO_2 emissions related to the prior process. The database is available for engineers to access at any time, facilitating the process of reviewing drawings, and has meant a significant reduction in the number of customers reviewing drawings within the Dubai Municipality offices, as well as in other departments. This has contributed to reducing the number of days required to complete the building permit application, which is down to one day per permit, as opposed to the previous average of six days.

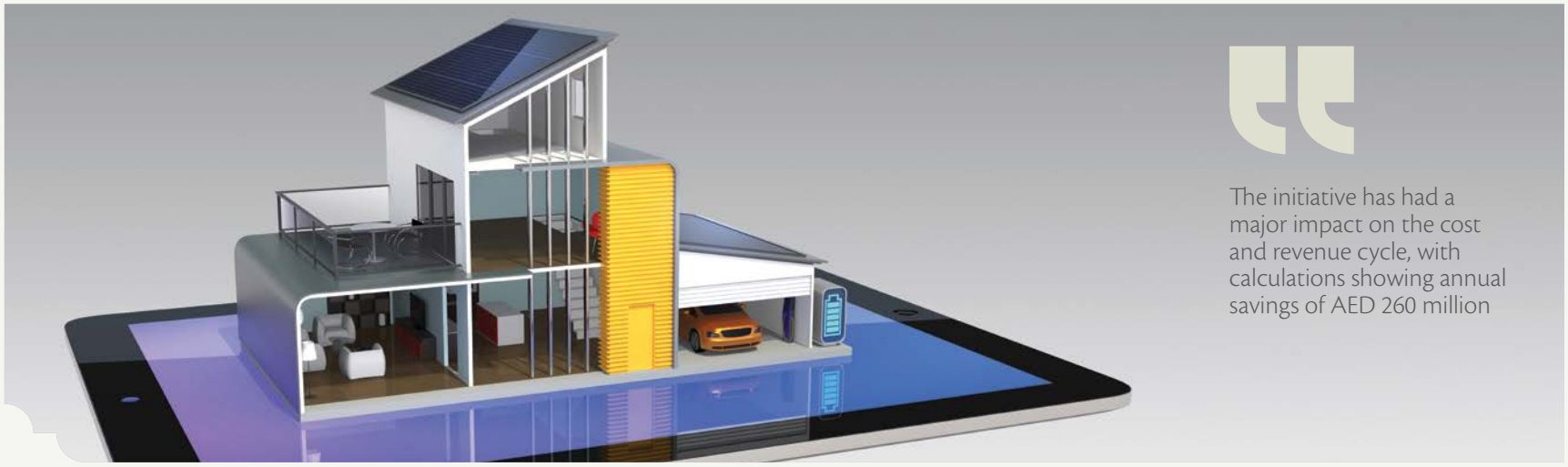
The initiative has had a major impact on the cost and revenue cycle, with calculations showing annual savings of AED 260 million, due primarily to the reduced number of days required to complete the building permit process. This has contributed to Dubai's promotion up the ranks of the World Bank Competitiveness Index. In 2009, Dubai was ranked 54. With continual improvements in processes that facilitate investment, Dubai ranked fourth in 2015.

Prior to this reformation, multiple visits were required to Municipality offices for submitting drawings, payment of fees and deposits, receipt of the returned drawings, processing and so on. In 2014, this totalled 484,000 visits. The new efficiencies have resulted in a reduction of 96%, with only 19,000 visits in 2015.

For consultants, the savings are clear, estimated at AED 158 million annually, in addition to eliminating 125,000 kilometres of road travel, 264 work days and 37.34 tonnes of CO_2 per year. It's no surprise that customer satisfaction has increased to 88%. In addition to the reduced impact on the carbon footprint, other environmental impacts include annual savings of 16,000 ink jet refills and 3.3 barrels of oil. The knock-on savings include eliminating the need for 6,400 kilogrammes of solid waste recycling, saving another 13 tonnes of CO_2 per year. The reduction of 200,000 printer work hours per year also saves 30,000 kilowatts of power, among other benefits.

The building drawing system can be seen as the base for the ICT and smart-city system. Its virtues are many, including the capability for any size and number of standard drawings, as well as 3D drawings, all of which can be uploaded at the same time. There is built-in flexibility in uploading, downloading and making modifications and the working environment is available 24/7, with recourse to dynamic drawing and archives. Furthermore, the system is adaptable, to allow for improvement and continuous development.

This integral part of the building permit process has so many benefits, both direct and indirect. Put simply, it makes economic and environmental sense.



> The initiative has had a major impact on the cost and revenue cycle, with calculations showing annual savings of AED 260 million

Layali AbdulRahman Al Mulla

Head of Building Permits Section, Dubai Municipality

Layali graduated from the United Arab Emirates University in 2004, with a Bachelors Degree in Architectural Engineering and join the Municipality in 2005, where she has progressed through several engineering positions until becoming Head of Building Permits in 2014. Layali is also a part of several internal and external committees.

ONE WINDOW SHOP

A COMPREHENSIVE AND FLEXIBLE ACCOMMODATION FOR ALL BUILDING-PERMIT REQUIREMENTS

BY ENG. KHALID MOHAMED SALEH AL MULLA

Given Dubai's ambitious infrastructure and building expansion requirements, the construction industry is an important economic sector, as in many other countries, impacting both directly and indirectly on investment. For this reason, it has been designated as one of the World Bank's focuses in regards to measuring the ease of investment. Given this importance, Dubai Municipality has taken steps to accelerate the issuance of building permits, to aid the sector in overcoming the barriers to development.

QUICK INFO

The One Window Shop has reduced the number of steps required for license applications to just one and subsequently reduced the license issuance period from an average of 35 days to only three days.

To this end, Dubai Municipality instituted work-flow procedures to provide this service through a single window, developing an electronic system to meet the optimisation requirements of all partners. The comprehensive system simplifies the permit process and staff have been trained to carry out the new tasks and coordinate with partners to ensure the success of the application. The system also receives engineering plans electronically, reducing the amount of paperwork and simplifying archiving, and is connected to DEWA to facilitate seamless construction processes.

The One Window Shop has reduced the number of steps required for licence applications to just one and subsequently reduced the licence issuance period from an average of 35 days to only three days. In financial terms, it saves an estimated AED 2 million annually in government departments due to organisational efficiency, along with material savings of AED 4 million per year on the municipal archive process. Consultants' offices also reap the benefits, with savings estimated at AED 50,000 per year, per office, due to the elimination of government department visits. This has also served to reduce the carbon footprint by 1000 tonnes per year.

This newfound efficiency within the building permit and archiving process not only adds up to big savings. It is also smart business, boosting Dubai up the international competitiveness ladder.

It saves an estimated AED 2 million annually in government departments due to organisational efficiency, along with material savings of AED 4 million per year on the municipal archive process.

The issuance of building permits in the Emirate previously involved a complicated process, requiring separate approvals from different government departments as a prerequisite to obtain a building permit. The process was not only complicated, but also necessitated large volumes of paperwork, which across the industry amounted to more than one million documents. It was estimated that the back-and-forth process resulted in more than 750 kilometres of travel, wasting more than 75 work hours in the process and causing lags of approximately 100 days. Besides a decline in customer satisfaction, on a broader scale, the process was contributing 1200gm of carbon to the carbon footprint for every licence request. Overlapping procedures, duplication and unclear processes, along with the lack of a central database of information was leading to inefficiency, with duplicate governmental expenses reaching up to AED 3 million.

In recognition of these issues, Dubai Municipality made a concerted effort to overhaul the building-permit process and create a "One Window Shop". This unified electronic window is comprehensive and flexible enough to accommodate all of the building-permit services and government departments involved in the licencing process.

Eng. Khalid Mohamed Saleh Al Mulla

Director of the Building Department

Eng. Khalid is also the Vice Chairman of the Green Building Committee amongst other appointments and the Chairman of the main committee for the improvement of the construction permit process in Dubai, as well as heading the team updating the building specifications.

He sees Dubai taking the regional lead in green buildings to become one of the most liveable and happy cities in the world.

E-SERVICES

FURTHER STEPS TOWARDS A SMART AND SUSTAINABLE DUBAI

BY ABDULLA ALI MOHAMMED AL SHIZAWI

To complement its existing e-services and further its commitment to the smart city concept, Dubai Municipality's Building and Dubai Central Laboratory have issued Sand Transfer Regulations and Instructions, with the sand transfer permit application available online through the Building Department's website . The sand transfer permit applies to any organisation wishing to transfer sand, with the sites and lands specified on the permit. The application of a specific mechanism for the issuance of permits to transport sand is part of the Building and Environment Department's monitoring of the sand transfer process, to protect natural resources and rationalise consumption through recycling the excavated sand by such means as transferring it to factories, coastal beaches, backfilling dangerous sites, land levelling and so on.

All sand transport vehicles must have a copy of the sand transfer permit and vehicles are required to comply with the site instructions for the site which the sand is transferred to. Both the contractor and the transportation company must ensure that the sand quantity which has been loaded in the trucks is equal to the approved quantity and each vehicle must leave the site with a copy of the supply notice, mentioning the shipment transfer data. This encourages contractors to take full responsibility for the process of loading and transporting sand from projects to the specified locations in accordance with the details on the sand transfer permit.

Abdulla Ali Mohammed Al Shizawi

Head of the Engineering Supervision Section, Dubai Municipality

Abdulla, holder of a Bachelor Degree in Engineering Management, joined the Municipality in 2001 as an Engineer in the Building Department and has, since then, progressed through several managerial positions until his recent appointment as Head of the Engineering Supervision Section in the Buildings Department in 2014.

Along with monitoring sand transfers, the sand permits ensure contractors follow environmental controls to maintain general cleanliness and ensure the excavated sand is not mixed with debris. Furthermore, this allows for regulation of truck traffic in compliance with the laws stipulated by the Road and Transport Authority and Dubai Police, as all vehicles must use a direct trip route from the site the sand will be transferred from to the final site, contributing to reducing the carbon footprint.

This is one more step on the road to a sustainable, smart city, and another exemplary service provided by Dubai Municipality.

> The sand permits ensure contractors follow environmental controls to maintain general cleanliness and ensure the excavated sand is not mixed with debris.

ACCREDITATION BODIES

A SUSTAINABLE ECONOMY THROUGH ACCREDITATION

BY ENG. NOAF AHMED AL-NAQBI

Governments in developed countries are constantly aiming to reach the highest security, health, safety and environmental standards across all sectors, in order to contribute to a sustainable economy. An important element of this is the reduction of accidents and errors, fraud and other improper practices that threaten the living environment of the population. One effective methodology that helps in this regard is concerned with the evaluation of products and services, to ensure conformity with approved specifications and standards, as set by market regulators.

Due to the nature of the work of government departments – legislation, supervision and coordination – opportunities for field work are limited, which constitutes a challenge in maintaining global standards in product and service evaluation, which constantly change. In Dubai, this is particularly difficult as commodities are imported from numerous markets and sectors.

In recognition of these challenges, the Dubai Accreditation Department (DAC) was established in Dubai Municipality (DM) as per Administration Decision 38/2008. Working under the vision "We Accredit - World Recognise", the department is responsible for regulating and enhancing the quality of the practices of conformity assessment bodies (CABs) operating in the Emirate.

> Conformity assessment bodies are vital in ensuring that the ensuing evaluations meet high enough standards to ensure conformity of the products and services to global specifications and recognised standards.

DAC provides accreditation services to all types of conformity assessment bodies, including laboratories, inspection bodies and certification bodies. In addition to accreditation, DAC is responsible for registration services for these assessment bodies, including issuing No Objection Certificates and Permits to Practice, and for arranging proficiency testing programmes for laboratories and training for conformity assessment bodies' staff on various international standards such as ISO 17025, ISO 17020 and ISO 17021.

DAC is therefore the official body in the Emirate of Dubai responsible for assessing and accrediting the competence of organisations in the field of calibration, testing, inspection and certification of management systems, products and personnel, according to international standards. In 2009, DAC itself sought international recognition in order to facilitate cross-border trade and eliminate technical barriers to trade. DAC is now an ILAC Mutual Recognition Arrangement (MRA) signatory in the field of testing and calibration, the first in the Middle East, with a quality management system that is in accordance with international standard ISO/ IEC 17011. In 2012, DAC received International Laboratory Accreditation Cooperation (ILAC) for accreditation of inspection bodies according to ISO 17020, along with other accreditation and recognition.

Accreditation of these conformity assessment bodies is vital in ensuring that the ensuing evaluations meet high enough standards to ensure conformity of the products and services to global specifications and recognised standards. Accreditation has been shown to increase market confidence, as it ensures that the assessment bodies are in line with international best practices. It also holds international value as recognition of products and services facilitates access to the world market and strengthens both trust and trade between countries. This can assist with the creation of and access to new markets, strengthen diversification of the sectors and enable competitive market sectors.

DAC's aims for the future include expanding accreditation to further sectors that support sustainability, including energy, climate-related projects, infrastructure and land use and resource management, amongst others.

Eng. Noaf Ahmed Al-Naqbi

Head of Certification Bodies Accreditation Section

Eng. Noaf obtained her Masters in Business Administration and Bachelors of Science in Chemical Engineering from the American University of Sharjah, United Arab Emirates. She is currently holding the position of Head of Certification Bodies Accreditation Section in Dubai Accreditation Department in Dubai Municipality. Prior to her recent post, she was the Head of the Assistant Director General's Office in the General Support Services Sector; Chemical Engineer & Excellence Coordinator in Dubai Central Laboratory, and Chemical Engineer in the Cosmetics Testing in Dubai Central Laboratory.

CERTIFICATION BODIES

RIGOROUSLY ASSESSING BUILDINGS AGAINST INTERNATIONAL STANDARDS BODIES

BY ENG. AMEENA AHMED

In support of the Dubai Government's sustainability goals, Dubai Municipality has initiated a project to provide a new service – the adoption of certification bodies to initiate integrated energy-management systems and the requirements of sustainability in the evaluation of buildings.

Buildings are responsible for approximately 60% of the world's consumption of electricity and a third of global greenhouse gas emissions, resulting from energy use. Dubai is no exception and Dubai Municipality is developing a number of initiatives to address this concern. As one of the roles of Dubai Municipality is to develop legislation in the field of energy conservation for both government and private buildings, it is necessary to audit the current stock of buildings across the Emirate.

The adoption of certification bodies aims to encourage private-sector participation in implementing audit visits to these buildings, with the audits based on international standards for energy management and greenhouse gases and domestic legislation. This will allow assessment of these buildings and the development of plans to reduce consumption through a classification system.

The comprehensive study started at the beginning of 2015 and the service will launch at the end of 2016. There are a number of components involved, including developing the current specification requirements and incorporating new requirements for buildings, energy systems, electrical systems and materials.

The certification bodies will scrutinise specific buildings, including hotels and administrative offices, and develop priority plans for the application of these requirements, also identifying the procedures and other requirements necessary for implementation and the competencies of technicians and other resources.

The development of certification bodies allows Dubai Municipality to use these bodies as a mechanism to assess the situation, and a rating system for agencies can be initiated. The bodies will conduct periodic visits, annually as a minimum, to assess buildings to ensure they meet the certificate requirements and technical experts will be included in the evaluation process.

This will ensure that buildings are assessed thoroughly against rigorous standards, with the audits checking on the availability of power-management systems and commitment to the relevant legislation in this way. The building classification will be determined based on the criteria specified in the requirements.

This project will generate a number of benefits, including increased revenues and the opportunity to invest in the Emirate's labour force with the opening of a new field. Continuous assessment and monitoring of the buildings in the Emirate will result in reduced annual energy consumption and a corresponding reduction in greenhouse gas emissions, amongst other environmental benefits, and the social benefits include the opening of areas of work for people with expertise in the energy market.

Buildings are responsible for approximately 60% of the world's consumption of electricity and a third of global greenhouse gas emissions, resulting from energy use.

Eng. Amina Ahmed

Director of the Evaluation Accreditation Department

Eng. Amina is also the Vice President of the Arab Bureau of Adoption and the Commission on Accreditation of Islamic countries.

Amina has held several technical and leadership positions throughout her career path in the government of Dubai , and was appointed as the Director of Evaluation Accreditation Department in early 2008.

STIMULATING PRIVATE-SECTOR INVESTMENT IN WASTE MANAGEMENT

TOGETHER FOR A CLEAN AND GREEN DUBAI

BY ENG. ABDULMAJED AL SAIFAIE

In order to establish environmentally friendly waste management processes, Dubai Municipality has formed a team tasked with stimulating private sector investment in the management and treatment of waste. The ultimate goal for this initiative is to encourage the private sector to invest in waste management.

This project involves a number of processes. Initially, the team will be working on policies to stimulate private-sector involvement and investment in waste management, which will involve reviewing and updating existing legislation governing the management of waste from the production process until disposal. Further, the team will perform an assessment of existing experiences with the private sector and review their current contracts, detailing the obstacles and problems faced by the sector in investing in this field. Understanding the barriers will allow an in-depth understanding of the changes needed to ensure waste-management services are viable investments.

An inventory of existing services and activities, as well as new proposals in the management and treatment of waste, will be compiled and utilised to attract qualified investors. The data and information collected will be used in the preparation of technical and economic feasibility studies.

The team will then prepare requirements and technical specifications for specific services and activities to be presented to private-sector companies for investment. These will specify mechanisms and identify support elements that can be provided by the Waste Management Department to the companies interested in investment in this field.

Moving forward, DM's team will prepare promotional programmes to induce proposed investment opportunities and attract potential investors. This introductory presentation will be reviewed by H.E. Eng. Hussain Nasser Lootah Director General of Dubai Municipality, for the purposes of adoption and provision of the necessary requirements.

The final task will be to prepare an action plan for implementation and establishment of investment projects and opportunities that are selected on a priority basis. The implementation of the action plan will be executed gradually, in stages.

The team will also decide on offers received by DM for investment in waste management. It will send viable offers to the DM Properties, Rent and Investment Commission in order to get the approval of the Director General and award the project to the investor.

The overarching aims of this project are to contribute to achieving zero-waste landfill and to upgrade the management of existing projects; and to stimulate the private sector to establish joint investment projects with DM in the field of waste management.

Efficient waste management can only be achieved with the participation of a range of stakeholders, ranging from government entities to the private sector and the general public. With this initiative, Dubai Municipality is encouraging such involvement, to ensure that a clean, green Dubai is a priority for all.

Efficient waste management can only be achieved with the participation of a range of stakeholders, ranging from Government entities to the private sector and the general public.

TEAM MEMBERS

Waste Management Department	Head of Department	Abdulmajeed Abdulaziz Saifaie
Assets Management Department	Head of Section	Faridoon AbdulRahman Mohammed
Waste Management Department	Head of Section	Yaqoob Mohammed Al Ali
Waste Management Department	Head of Section	Naji Mohammed Saeed Al Radhi
Waste Management Department	Head of Section	Imad Juma Mohammed
Assets Management Department	Quality Specialist	Mohammed Abdulfattah Mohammed Arabiat
Waste Management Department	Senior Cleaning Services Officer	Ehab Abdul Fattah Ahmed Ali

Eng. Abdulmajed Al Saifaie

Director of the Waste Management Department

Eng. Abdulmajed is the Director of the Waste Management Department at Dubai Municipality. He has been working with Dubai Municipality for the past 24 years and has headed the Waste Management Department since 2010. Prior to this, he was Director of the Sewage and Irrigation Network Department. He holds a Bachelors degree in Electrical Engineering from the University of Oklahoma, USA.

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H.E. Eng. Hussain Nasser Lootah
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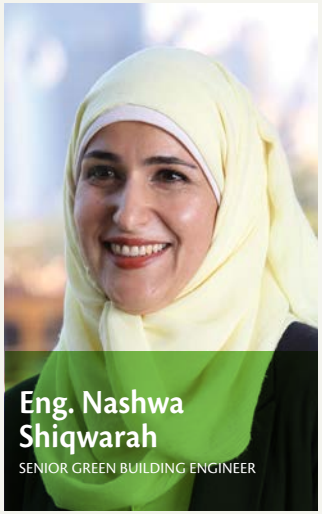

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NOTE: Listed in alphabetical order.

Whilst we have now reached the end of this report, surely this is not the end of our efforts towards sustainability. In fact, we at Dubai Municipality believe that the journey toward sustainability is never ending. Moreover, a journey not possible without the cooperation, participation and engagement of the city's citizens, the people!

Eng. Abdulla Mohammed Rafia,
Assistant Director of Dubai Municipality

We have had a great number of successes in implementing sustainable practices and initiatives, and will continue to strive in this area with the goal of securing a smart, sustainable Emirate into the future.

H.E. Eng. Hussain Nasser Lootah,
Director General of Dubai Municipality

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Our Vision: Developing a happy and sustainable city

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