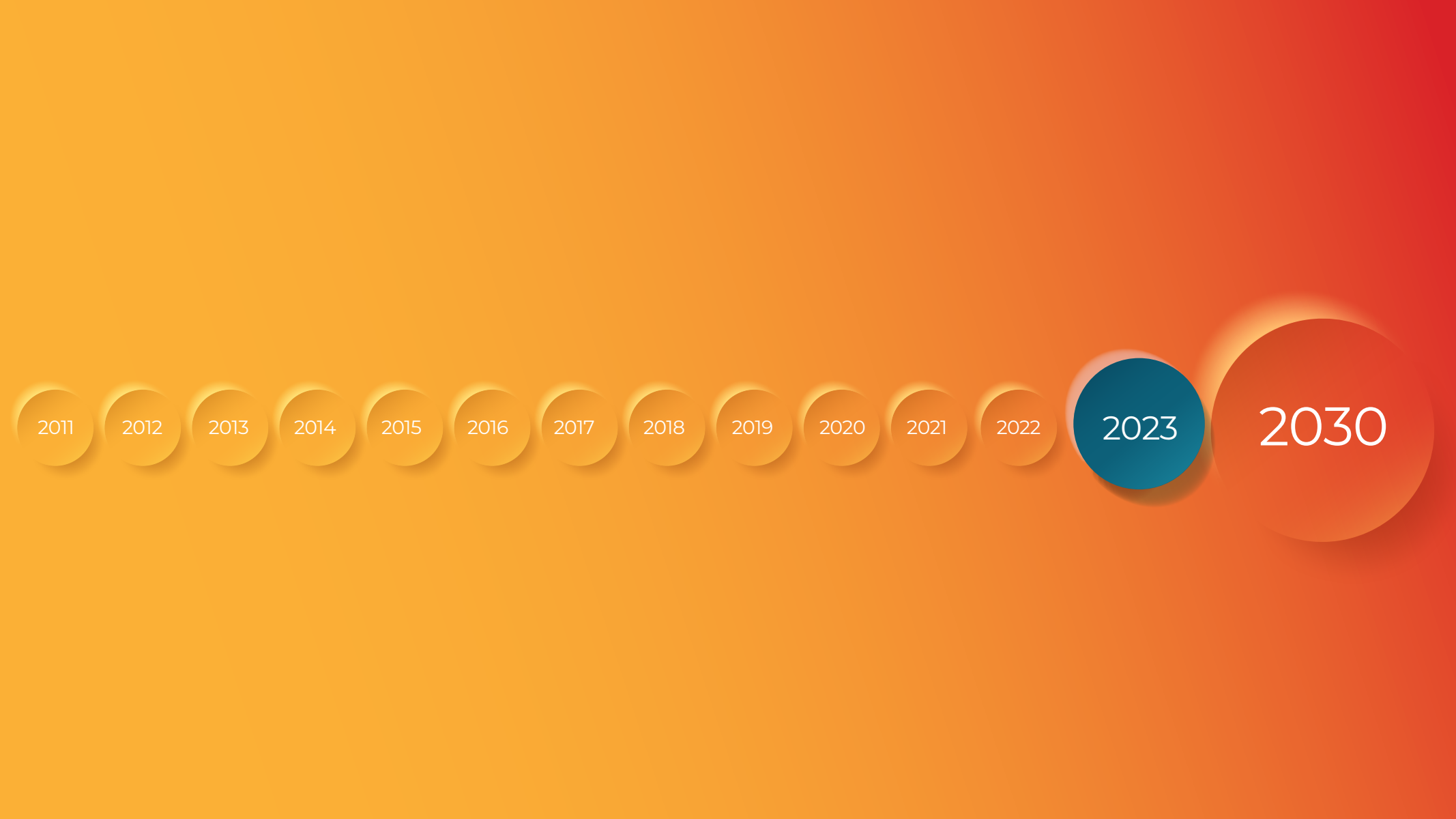
حكومة دبي
GOVERNMENT OF DUBAI

المجلس الأعلى للطاقة
Supreme Council of Energy

Dubai Demand Side Management Strategy

2023 Annual Report


2011
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2021
2022
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2030

H.H Sheikh Mohamed bin Zayed Al Nahyan

President of the United Arab Emirates

H.H Sheikh Mohammed bin Rashid Al Maktoum

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

ABOUT THE DUBAI SUPREME COUNCIL OF ENERGY

المجلس الأعلى للطاقة
Supreme Council of Energy

The Dubai Supreme Council of Energy was formed in August 2009 under Law 19 of 2009, issued by His Highness Sheikh Mohammed bin Rashid Al Maktoum, Vice President and Prime Minister of the UAE, and Ruler of Dubai. His Highness Sheikh Ahmed bin Saeed Al Maktoum was appointed Chairman for the Council, His Excellency Saeed Mohammed Al Tayer as Vice Chairman, and His Excellency Ahmad Al Muhairbi as Secretary General.

The Council consists of the following members: the Director General of the Department of Petroleum Affairs, the President and Chief Executive Officer of DUBAL Holding, the Chief Executive Officer of Emirates National Oil Company and a single representative from the Dubai Supply Authority, Dubai Petroleum Establishment, Dubai Municipality, Dubai Nuclear Energy Committee and Roads and Transport Authority.

The Council has an Advisory Committee from competent and specialised workforce.

The Governing body seeks to ensure that the Emirate's growing economy will have sustainable energy while preserving the environment. The Authority is developing alternative and renewable energy sources for the Emirate, while increasing energy efficiency to reduce demand.

Under the visionary guidance of His Highness Sheikh Mohammed bin Rashid Al Maktoum, the Dubai Integrated Energy Strategy 2030 was developed in 2010 and deployed in 2011 to set the strategic direction of Dubai towards securing sustainable supply of energy and enhancing demand efficiency (for electricity, water and transportation fuel).

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1 DSM DIRECTORATE FOREWORD

DSM DIRECTORATE FOREWORD

This report presents the progress and performance of the Dubai Demand Side Management (DSM) Strategy 2030 for 2023.

The DSM Strategy plays an important role in the sustainable growth of Dubai and is evermore important in light of the UAE's Net Zero by 2050 commitment.

The strategy aims to deliver 30% annual savings in electricity and water by 2030 compared to the business as usual consumption, as well as fuel savings from efficient vehicles.

By the end of 2023, the DSM Strategy implementation resulted in 9.7 TWh of annual electricity savings and 18.8 billion imperial gallons of annual water savings, corresponding to 15.9% and 12.4% of the baseline consumption, respectively. The achieved electricity and water savings surpass the set targets for the year.

As most programmes are rapidly expanding, the results show a substantial growth from the savings achieved in 2022, an increase of 20% for electricity and 17% for water.

Avoided cost in generation capacity and natural gas consumption from DSM electricity and water savings since the initiation of the strategy in 2011, are estimated at around AED 14.6 billion.

These important achievements are a combination of efforts from all programme owners and their commitment to the annual goals and road map that extends throughout the year 2030.

2 OBJECTIVES AND SCOPE OF THIS REPORT

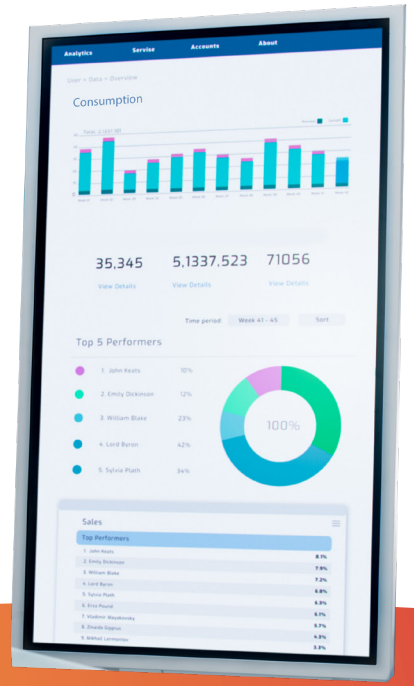
OBJECTIVES AND SCOPE OF THIS REPORT

The objective of this report is to present the progress and performance of the Dubai Demand Side Management (DSM) Strategy 2030: a strategy spearheaded by the Dubai Supreme Council of Energy (DSCE), implemented by key government entities in Dubai. The report comprises a description of the DSM Strategy, and a presentation of the achievements in 2023.

It highlights achievements in electricity and water savings attained from implementing DSM programmes in comparison with pre-set target savings, along with other performance indicators, such as reductions in per capita consumption and monetary benefits of the strategy.

Data presented in this document are the result of a reporting system that the DSCE maintains in collaboration with the DSM programme owners: Dubai Electricity and Water Authority, Dubai Municipality, Roads and Transport Authority, the Regulatory and Supervisory Bureau for Electricity and Water in Dubai, Etihad Energy Services, Ministry of Industry and Advanced Technology (MoIAT) and Dubai Free Zone Council (DFZC).

Note that the results reported are based on the most recent data available at the date of report publication. As DSM measurement and verification is a continuous improvement process, annual reports may include changes in reported historical figures year to year.



3 CONTEXT AND OVERVIEW OF THE DSM STRATEGY

3.1 POLICY CONTEXT

The Demand Side Management (DSM) Strategy is part of the Dubai Integrated Energy Strategy (DIES) 2030, whose main goals are to secure Dubai's uninterrupted energy supply and moderate its growing electricity and water demand (see exhibit 1).

Optimising energy demand is a strategic priority for Dubai to reduce the need for next generation capacity and free up resources for strategic investments that promote economic growth. At the same time, DSM supports the growth of a green economy and the creation of green jobs and evolution of green job growth aligns with smart city objectives through the employment of smart technology, and contributes to a safer environment by reducing carbon emissions.

Exhibit 1: Demand Side Management Strategy as part of the Dubai Integrated Energy Strategy 2030

The DSM Strategy was first introduced in 2013 and updated in 2019. In January 2020, H.H. Sheikh Ahmed bin Saeed Al Maktoum, Chairman of DSCE issued "Directive No. 1 of 2020 on the Updated Dubai Demand Side Management (DSM) Strategy 2030" (see exhibit 2), launching implementation.

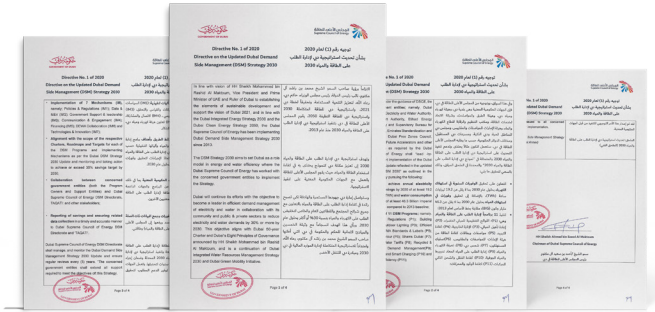


Exhibit 2: DSCE Directive No.1 of 2020 on the Updated DSM Strategy 2030

Building on the successful implementation of the strategy for the last 10 years, DSCE embarked on a second update in June 2023. The update aims to extend the horizon of the DSM Strategy to 2050 in light of UAE and Dubai's Net Zero commitments and adapt to changes in the energy efficiency landscape in Dubai, UAE and globally. The Update will also review implementation progress to date and focus on addressing gaps, challenges and untapped potential. The DSM Strategy 2050 will be announced in the first half of 2024.

3.2 DEMAND SIDE MANAGEMENT STRATEGY AND TARGETS

DSM Strategy

The DSM Strategy 2030 reinforces Dubai's goal of becoming a leader and role model in energy and water efficiency and comprises eleven programmes that address different aspects of electricity and water consumption in Dubai. Programmes are supported by seven implementation mechanisms, to stay on track through policies and regulations, data and measurement and verification, government support & leadership, boost programmes through communication & engagement, and financing, and accelerate Dubai's translation into a smart city (see exhibit 3 and 4).

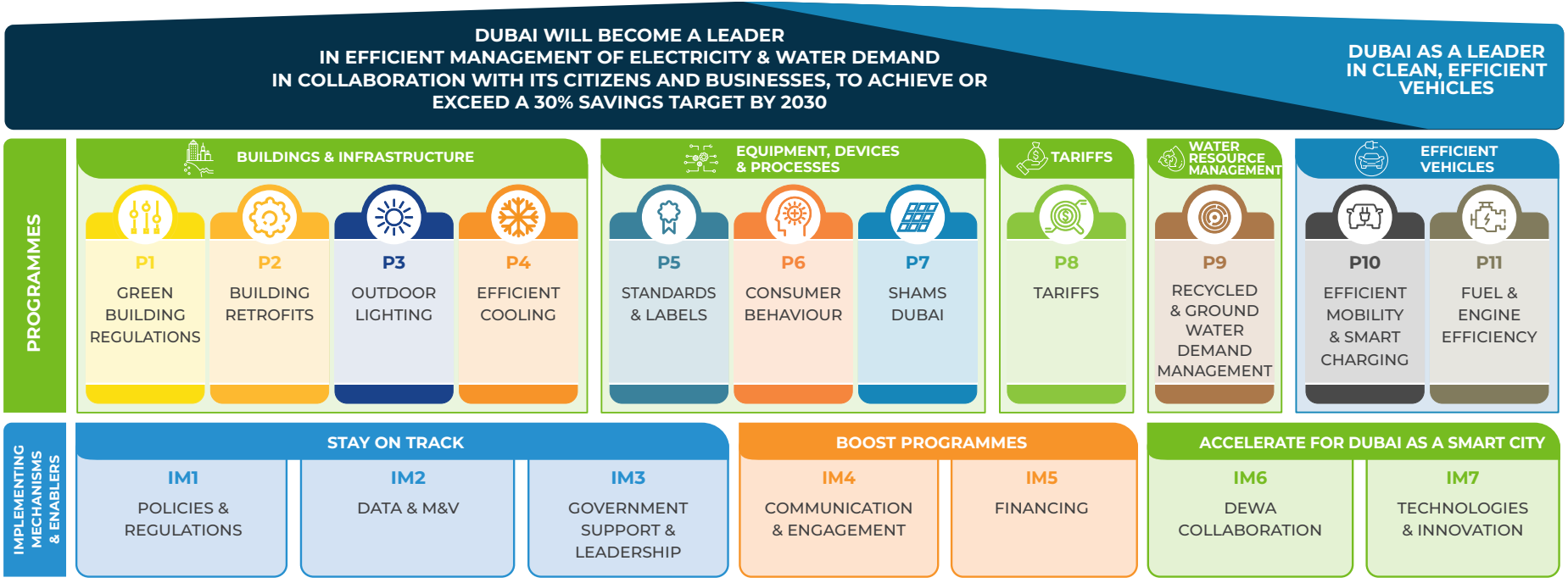


Exhibit 3: Architecture of the Dubai Demand Side Management Strategy

	Programme	Scope
1	Green Building Regulations	Increase energy and water efficiency in new buildings through building regulations and compliance (positioning Dubai to transition towards NZEB in the long-term)
2	Building Retrofits	Retrofit existing building stock & infrastructure with electricity & water efficiency measures
3	Outdoor Lighting	Adopt high efficiency lighting in public spaces in Dubai
4	Efficient Cooling	Promote efficient cooling technology use in Dubai buildings
5	Standards & Labels	Drive adoption and compliance with Minimum Energy Performance Standards (MEPS) and labels for airconditioners (ACs), home appliances and industry equipment in Dubai
6	Consumer Behaviour	Engage main user groups (residential and commercial) in electricity and water conservation through the promotion of smart devices and appliances delivered through new business models in Dubai
7	Shams Dubai	Promote use of building-level solar energy systems across Dubai building stock
8	Tariffs	Adjust tariff structure to be cost reflective, promote energy efficiency and give the right signal to reduce consumption
9	Recycled & Ground Water Demand Management	Promote recycled and ground water management based on network expansion and use of recycled water in line with the Integrated Water Resource Management Strategy (IWRMS)
10	Efficient Mobility and Smart Charging	Encourage the uptake of efficient mobility and smart charging in Dubai
11	Fuel & Engine Efficiency	Promote efficiency and demand abatement of transportation (fossil) fuels in Dubai

Exhibit 4.A: Scope of the Dubai Demand Side Management Strategy programmes

	Implementation Mechanism	Scope
1	Policies and Regulations	Enforce policies and regulations to drive the implementation of the updated DSM Strategy
2	Data and M&V	Ensure proper measurement, evaluation and monitoring of DSM savings to assess performance against targets. Consider the implementation of verification element
3	Government Support and Leadership	Ensure that Government entities lead-by-example the implementation of the updated DSM Strategy
4	Communication and Engagement	Develop and execute general and targeted information campaigns as well as education, home reporting and labelling schemes to change consumers' behaviour
5	Financing	Develop financing mechanisms that support the implementation of DSM initiatives in Dubai
6	DEWA Collaboration	Leverage DEWA's activities in developing Smart Grid capabilities, consumer analytics, sustainable consumer behaviour and technology research
7	Technologies and Innovation	Introduce and localize new efficient technologies and conduct key studies for DSM and enable DSCE to play a leadership role in supporting Dubai overall sustainability and smart cities strategy

Exhibit 4: B. Dubai Demand Side Management Strategy Implementation Mechanisms

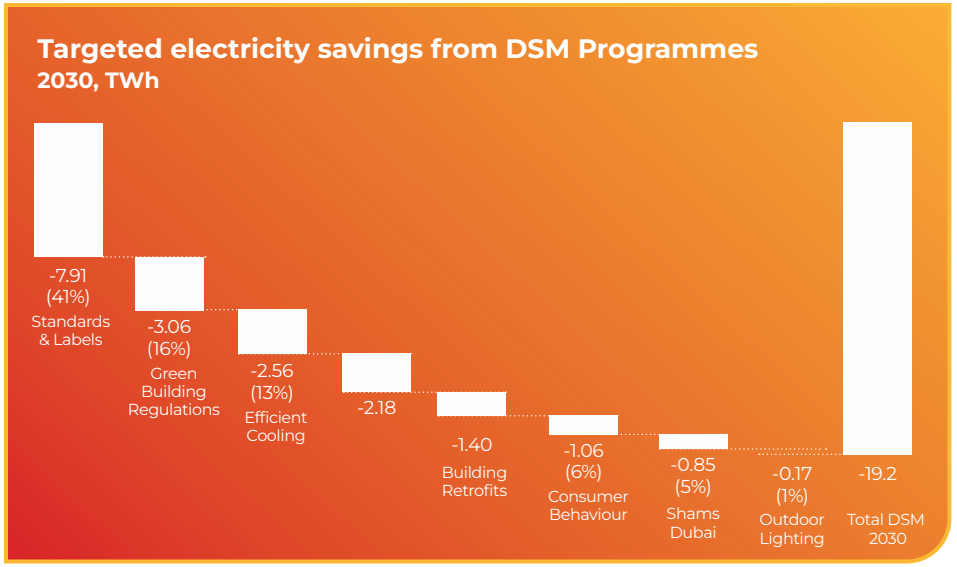
DSM Targets

The Government of Dubai remains committed to achieving ambitious electricity and water savings by implementing the 11 DSM programmes. Dubai targets overall electricity savings of about 19.2 TWh and water savings of 46.3 billion imperial gallons, which correspond to 30% savings versus business as usual by 2030 (see exhibit 5).

THE DSM STRATEGY TARGETS

30% SAVINGS BY 2030

VS. BUSINESS AS USUAL



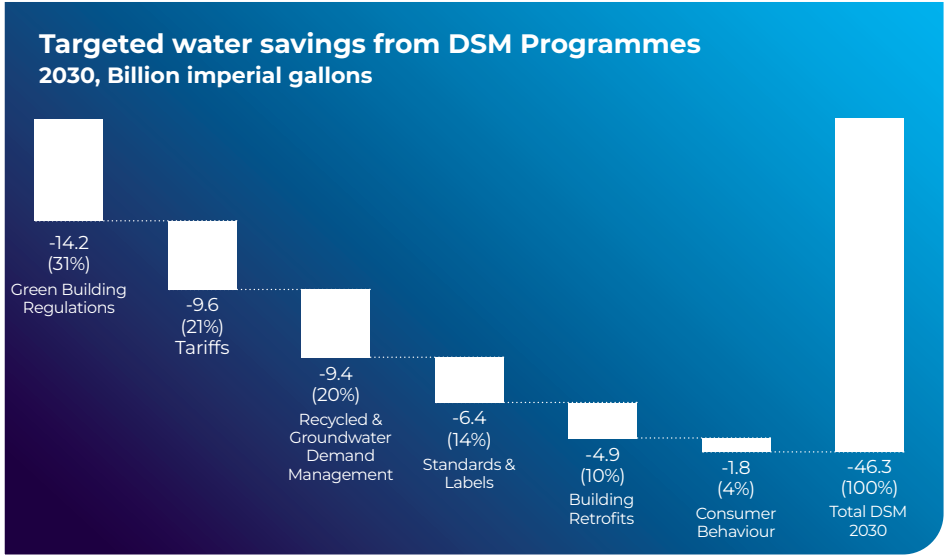


Exhibit 5: Electricity and water saving targets of the Dubai Demand Side Management Strategy 2030

3.3 INSTITUTIONAL FRAMEWORK

Exhibit 6: Governance structure of the Dubai Demand Side Management Strategy

The DSM Strategy is managed by the DSCE, the policymaking entity for Dubai's energy sector. The DSCE is chaired by H.H. Sheikh Ahmed bin Saeed Al Maktoum and comprises top executives from key Dubai entities

HE Ahmad Al Muhairbi
Secretary General, DSCE
Chairman

Faisal Ali Al Rashid
DSM Senior Director, DSCE
Vice Chairman

Dr. Waleed Al Nuaimi
CEO, Etihad Energy Services
Member

Joyce Honeine
Acting Director, DSM PMO, DSCE
Member

Dr. Yousef Al Saadi
Director, Conformity Affairs, MoIAT
Member

Yousef Al Marzooqi
Director, Standards & Regulations, MoIAT
Member

Saeed Safar
Director, Waste Strategy & Projects, DM
Member

Meera Muhsen Alameri
Head of Research and Building Systems, Dubai Municipality
Member

Ramiz Alaileh
Executive Director
RSB Dubai
Member

Mohammed Al Shamsi
Chief Officer, Climate Change & Sustainability, DEWA
Member

Sultan Al Zaabi
Sr. Manager, Demand Mngmt & Tariff, DEWA
Member

Talha Al Banna
Head of Asset & Property Management, JAFZA
Member (on behalf of DFZC)

Hamad Al Shehhi
Director of Roads, RTA
Member

Samer Khoudeir
Chief Sales and Marketing Officer, Empower
Member

Alia Busamra
Chief Sustainability & Climate Change Officer, ENOC
Member

The DSCE DSM Directorate manages the implementation of the DSM Strategy and provides implementation support to Programme Owners.

Programme Owner or Owners, is/are assigned for each DSM programme, and is/are responsible for executing the programme and managing its day-to-day operations. The entities are selected based on mandate and reach, and focused on delivering results and addressing challenges specific to the programme (see exhibit 6). In addition, support entities are also assigned to programmes as needed.

4 DSM STRATEGY PERFORMANCE

4.1 ELECTRICITY AND WATER SAVINGS

Overall Savings

The Demand Side Management (DSM) Strategy continues to produce positive results in 2023. At the end of 2023, DSM programmes have exceeded both electricity and water targets and saved 9.7 TWh of electricity and 18.8 billion imperial gallons (BIG) of water. Compared to business as usual consumption, which is the reference for the 30% by 2030 target, those savings represent 15.9% and 12.4% of the total baseline consumption for electricity and water, respectively (see exhibit 7).

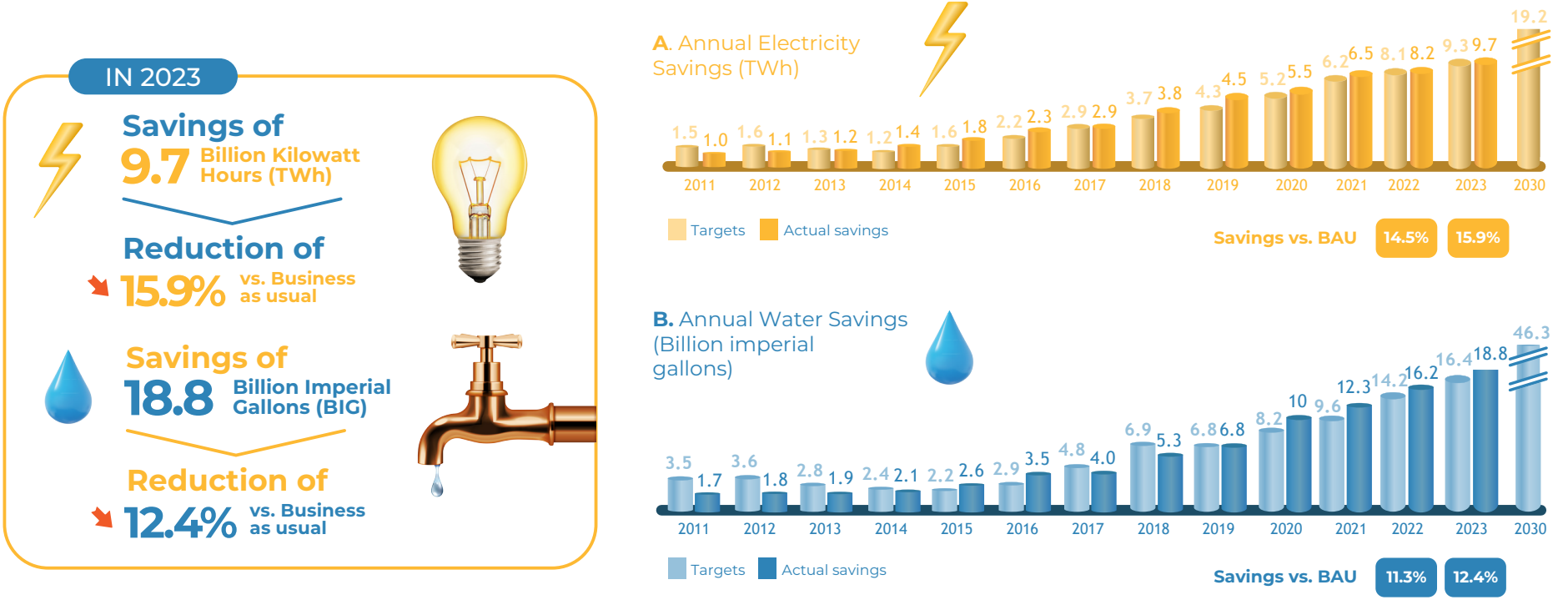


Exhibit 7: Actual annual savings achieved from the implementation of the Dubai Demand Side Management Strategy programmes, versus target savings (A. Annual electricity savings B. Annual water savings)

Contribution of DSM Programmes to Savings

In terms of programme contribution to savings, contribution from individual DSM programmes continues to increase, as compared to 2011, where all savings were attributed to tariffs. In 2023, standards and labels and green building regulations are the largest contributors to DSM savings accounting for more than 57% of electricity savings and 72% of water savings (see exhibit 8).

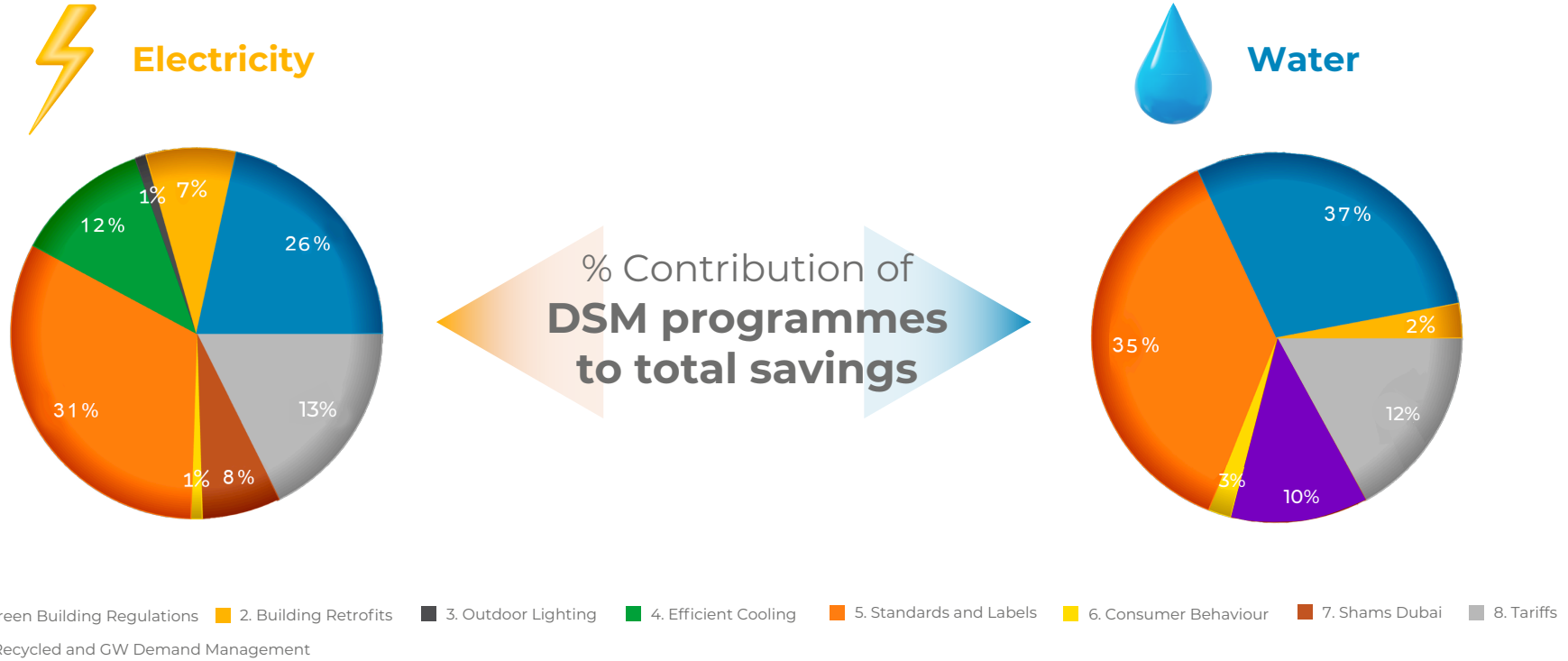


Exhibit 8: Contribution of programmes to the total Dubai DSM Strategy savings (in %, 2023)

A. Annual Electricity Savings by DSM programme

DSM Programme	2023 Savings (GWh)	2023 Target (GWh)	2023 Savings vs. Target	2022 Savings (GWh)	2023 vs 2022 Savings (%)	Comments
Green Building Regulations	2,550	1,113	129%	1,954	30%	Savings based on commissioned green building data received by DM, Trakhees, DSO and DDA
Building Retrofits	709	716	-1%	670	6%	Savings result from electricity retrofits executed by Etihad Energy Services (Etihad ES) and accredited energy services companies (ESCOs) in Dubai
Outdoor Lighting	63	75	-16%	59	7%	Savings include outdoor lighting installations and retrofits executed by RTA, Dubai Municipality (DM), and selected Free Zones. Deviation from target due to missing data from some Free zones for 2023
Efficient Cooling	1,159	830	40%	1,099	5%	Savings based on data received from the five main district cooling operators in Dubai through RSB
Standards and Labels	3,030	3,868	-22%	2,499	21%	Savings result from enforced energy efficiency standards by MoIAT for unit air conditioners (mostly), indoor lighting, refrigerators, washing machines, dishwashers and water heaters.
Consumer Behaviour	106	417	-75%	82	28%	Savings result from DEWA My Sustainable Living Programme (MSLP), smart devices part of the programme (owned by Etihad ES) not yet activated resulting in deviation from target
Shams Dubai	813	431	89%	668	22%	Savings result from connected capacity of 600 MW as of end of 2023
Tariffs	1,252	1,879	-33%	1,161	8%	Savings results are due to a) targets that assume a tariff update in 2021, which did not happen and is not planned in the foreseeable future, b) other programmes producing higher than forecasted savings
Total	9,680	9,328	4%	8,193	18%	
Total vs. BAU	15.9%			14.5%		

Exhibit 9.A: Actual annual electricity savings by programme of the Dubai Demand Side Management Strategy in 2023

Note: Results reported are based on the most recent data and knowledge available; historical results may be altered due to changes in assumptions and/ or new data availability.

B. Annual Water Savings by DSM programme

DSM Programme	2023 Savigs (MIG)	2023 Target (MIG)	2023 Savings vs. Target %	2022 Savings (MIG)	2023 vs 2022 Savings (%)	Comments
Green Building Regulations	7,010	3,264	115%	5,144	36%	Savings based on commissioned green building data received by DM, Trakhees, DSO and DDA
Building Retrofits	462	1,368	-66%	432	7%	Savings based on water retrofits carried out by Etihad ES and accredited-ESCOs; 2023 target not met due to slowdown in retrofit projects and low focus on deep water retrofits in retrofit projects
Standards and Labels	6,667	3,364	98%	6,249	7%	Savings attributed mostly to water fixture standards
Consumer Behaviour	496	726	-32%	416	19%	Savings result from DEWA My Sustainable Living Programme (MSLP), smart devices part of the programme (owned by Etihad ES) not yet activated resulting in deviation from target
Tariffs	2,221	5,869	-62%	2,248	-1%	Savings results are due to a) targets that assume a tariff update in 2021, which did not happen and is not planned in the foreseeable future, b) other programmes producing higher than forecasted savings
Recycled & GW Demand Management	1,961	1,788	10%	1,747	12%	Savings from water efficiency measures applied to the irrigation of public landscapes by Dubai Municipality, use of treated water instead of desalinated water in other applications such as district cooling
Total	18,817	16,377	15%	16,237	16%	
Total vs. BAU	12.4%			11.3%		

Exhibit 9.B: Actual annual water savings by programme of the Dubai Demand Side Management Strategy in 2023

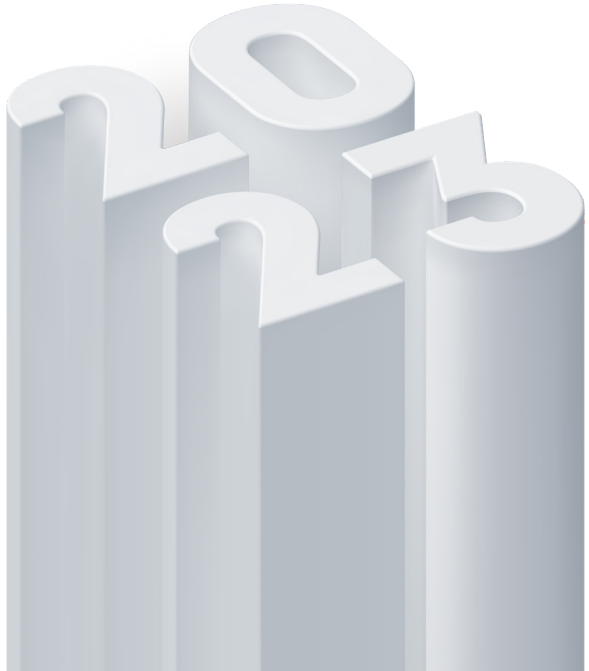
Note: Results reported are based on the most recent data and knowledge available; historical results may be altered due to changes in assumptions and/ or new data availability.

Reduction in Consumption per Capita

Per capita consumption confirms the positive impact of the DSM programmes. Looking at long term trends, since the inception of the DSM Strategy, consumption per capita has decreased by 14% for electricity and 18% for water compared to 2010 consumption (baseline).

1. Annual population used in the calculation is an estimate of the average Dubai population taking into account residents of Dubai, and a weighted contribution from people working in Dubai but residing in neighbouring emirates and from tourists.

2. Total consumption used is the consumption at end-user level and excludes power stations and desalination auxiliaries, as well as losses in the transmission and distribution networks.



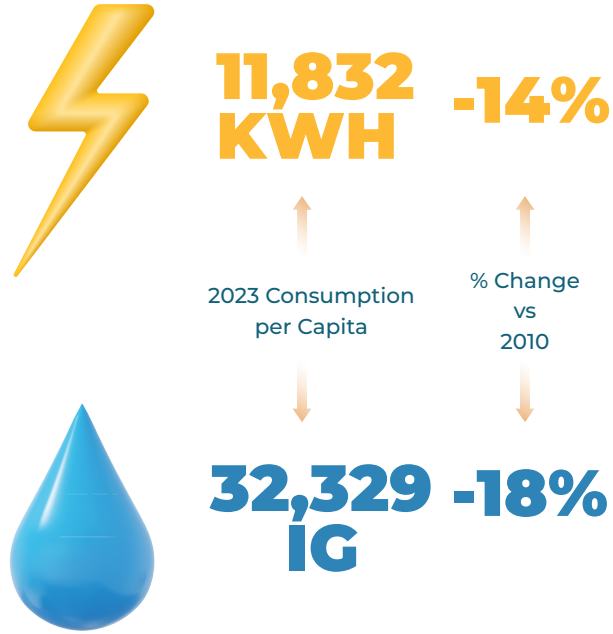


Exhibit 10: 2023 Electricity and water consumption per capita, change vs. 2010

4.2 Oil Equivalent Savings and Carbon Abatment

Oil Equivalent Savings

Electricity savings translate to oil savings by reducing the overall demand for fossil fuels. While the UAE and Dubai primarily rely on natural gas for electricity generation, efficient energy use decreases the total energy demand, indirectly conserving oil used in other sectors. In fact, to date, the DSM strategy has resulted in savings equivalent to 11 Millions Tons of Oil.

SINCE 2011

11 **Million tons of oil Equivalent Saved through the DSM Strategy**

Reduction in Carbon Emissions

An important impact of savings on electricity and water consumption is the reduction in carbon dioxide (CO2) emissions resulting from avoided electricity and water generation, which today relies in large part on non-renewable sources. In fact, since 2011, the DSM strategy implementation has resulted in 21.5 Million Metric tons of avoided CO2 emissions equivalent to 2 Million cars taken out of Dubai roads for 2 full years.

SINCE 2011

Avoided CO_2 Emissions
(in Million Metric Tons)
21.5 Million Metric Tons of CO_2

Equivalent to
2 Million cars taken out of Dubai roads for **2 full years**

4.3. Cost Savings

Savings in electricity and water consumption from the DSM Strategy lead to economic savings in the form of avoided cost and freed up resources that can be diverted to other purposes.

The benefits of the DSM Strategy are determined as part of a Total Resource Cost (TRC) Test, i.e., from the perspective of all participants, including DSM programme owners (with DEWA as both utility and programme owner), implementing entities (developers, ESCOs, district cooling operators), and end users (DEWA customers).

Reduced demand in electricity and water since strategy initiation in 2011 and up to 2023, translate into approximately AED 14.6 billion: AED 2.9 billion of avoided capital investments and AED 11.7 billion of avoided operational costs. This is the equivalent of 9 x 200MW open cycle turbine units and more than 442,000 million standard cubic feet of natural gas.

Since 2011

Saved

14.6 Billion AED in operational costs and capital investments

Equivalent to

442,000 Million Standard Cubic Feet (MSCFT) of natural gas

9 x 200 Megawatt open cycle gas turbine units

In addition to its direct benefits, the DSM Strategy brings several indirect benefits to Dubai. This more extended set of advantages includes, environmental conservation, positive impact on residents' health, job creation, reinvestment of saved resources, and higher attractiveness to investors resulting from a more sustainable and efficient city.

With all the valuable environmental, socio-economic, and financial benefits, Dubai Government is strongly committed to addressing any challenges the DSM Strategy may face along the way.

4.4 DSM SUCCESS ROADMAP (2011-2023)

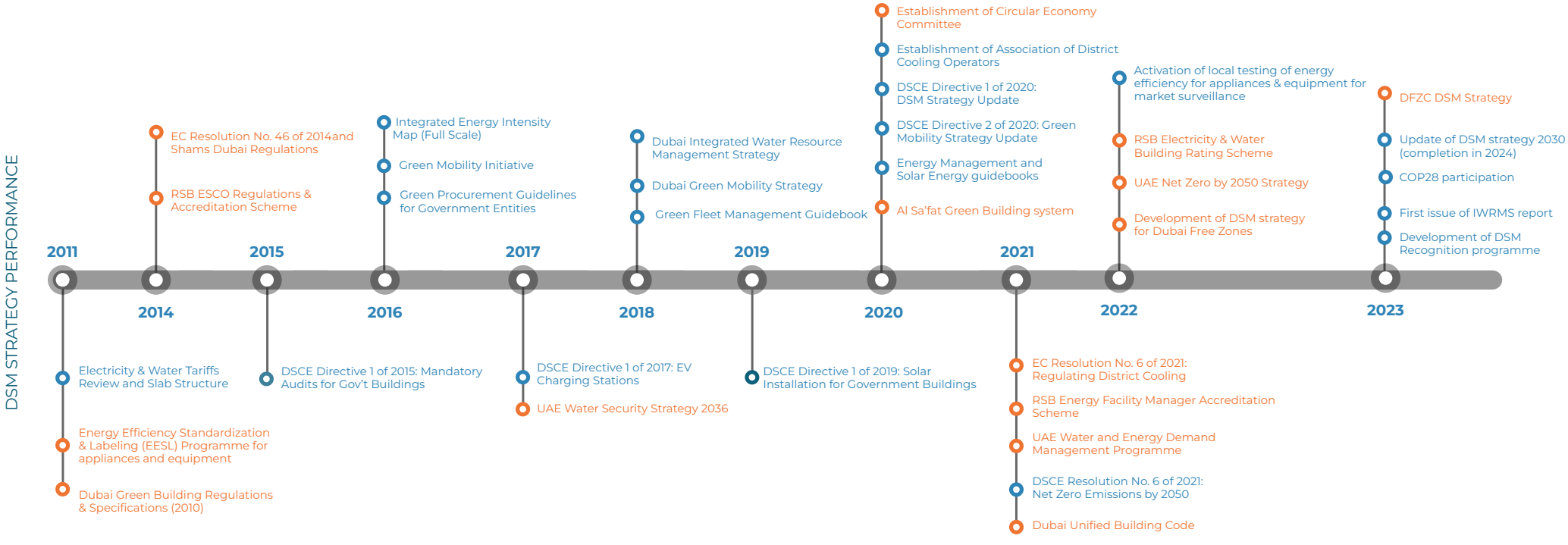


Exhibit 11: Timeline of main Dubai Demand Side Management policies from 2011 to 2023

4.5 DSM KEY ACHIEVEMENTS TILL END OF 2023

Green Building Regulations
>54,000
Green buildings

Building Retrofits
>15,000
Buildings and villas retrofitted with energy efficiency measures[2]

Efficient Cooling
0.848 KWh/TRh
Actual district cooling efficiency

50%
Share of efficient cooling (DC and non-DC) out of total cooling capacity

Outdoor Lighting
>40,000
LEDs installed in roads and parks

Standards & Labels
41%
Share of 4 and 5 star appliances[1]

Shams Dubai
>600 MWp
of Solar rooftop capacity installed

Tariff Rates
100%
Smart Meters in Dubai

Recycled and Ground Water Demand Management
100%
Public green areas irrigated with treated sewage effluent

Efficient Mobility & Smart Charging
~48,000
Registered green vehicles (hybrid and electric)

55%
electric vehicles out of total green vehicles

>380
Public Electric Vehicle Chargers

Exhibit 12: DSM Key Programme Achievements Until End of 2023

1) appliances included are air conditioners (AC), refrigerators, washing machines and dryers, dishwashers and water heaters

2) In Building Equivalents. Each building equivalent generates 46,667 KWh of savings per year

4.6 AWARENESS INITIATIVES

EVENTS AND CONFERENCES

In 2023, DSCE actively engaged in numerous events and conferences. In particular as part of COP28, DSCE participated in more than 15 speaking opportunities, panel discussions and events, effectively reaching and engaging with over 1000 stakeholders.
Alongside COP28, DSCE continued its active participation in events held in the UAE such as WGES, WETEX, WFES and an international events focused on energy efficiency such as the European Energy Efficiency conference in Austria.

In addition, DSCE partnered with the Advancing Net Zero Volunteering Team to host the first edition of the Emirates Net Zero forum at Etihad museum in September 2023.

Our strong engagement and participation in local and international events underscores DSCE's commitment to advancing awareness and knowledge on energy efficiency and climate action.

SOCIAL AND DIGITAL MEDIA

In an effort to improve public awareness on energy efficiency, DSCE continued its active presence on social media namely LinkedIn and Instagram. Energy efficiency tips and information are continuously shared through DSCE DSM Directorate platforms.

DUBAI.DSM *DUBAI DSM PROGRAMME*

In addition, DSCE's My Energy My Responsibility website is a one-stop shop to provide information on energy efficiency, along with measures that can help reduce energy consumption. The website is organized into two sections: At Home and At Work with relevant materials and is regularly updated with new resources, such as guidebooks, calculators, marketing materials, updates on initiatives related to energy efficiency.

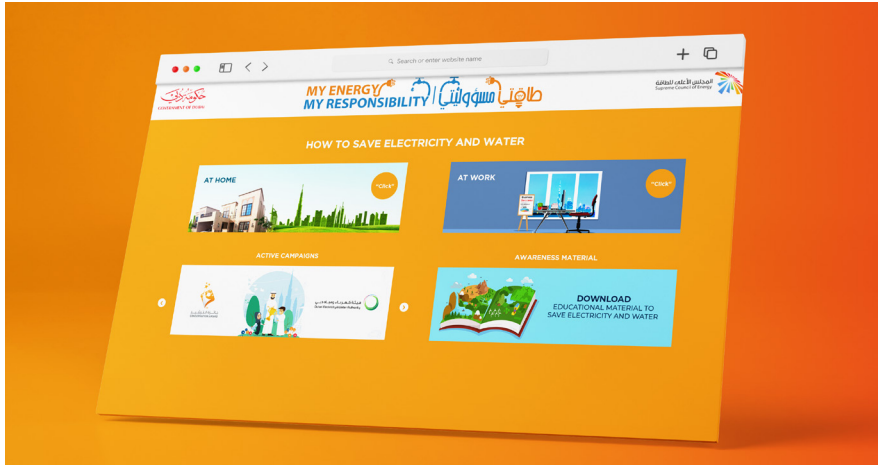


Exhibit 13: Snapchot of My Energy My Responsibility website

Exhibit 14: Examples of social media posts

5 DSM PRIORITIES MOVING FORWARD

DSM PRIORITIES MOVING FORWARD

Strategic priorities that support the scale-up of the DSM programmes and address identified risks to achieving the DSM Strategy saving targets are defined and amended on an annual basis.

For the next 2 years, DSM directorate will focus on the key strategic priorities as follows:

- Finalize the update of the Dubai DSM Strategy 2030 in line with UAE and Dubai Net Zero commitments by 2050 in light of innovation in the energy efficiency and DSM landscape in Dubai, the UAE and globally
- Launch the implementation of the updated strategy with a focus on activating new programmes and initiatives identified as part of the strategy update
- Launch the first cycle of the Dubai DSM Recognition Programme to recognize excellence and achievements in energy efficiency in Dubai
- Enhance coordination and collaboration with the Dubai Free zone Council in line with DFZC DSM Strategy

ACKNOWLEDGMENTS

This report represents the collaborative efforts of many individuals and organizations, whose contributions and support have been indispensable to its development.

- **Eng. Faisal Ali Rashid, DSM Senior Director, DSCE** and **Joyce Honeine, DSM PMO Director, DSCE** - for leading the report development and data analysis.
- **Dubai Electricity & Water Authority** - for their thorough review and validation of savings and reported data.
- **DSM programme champions and stakeholders** for providing the necessary information and data to produce this report including:

  - Ministry of Industry and Advanced Technology
  - Dubai Municipality
  - RTA
  - RSB Dubai
  - Dubai Free Zones Council
  - Etihad Energy Services Company

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