

# DEWA SMART GRID REPORT 2024







## MD & CEO MESSAGE

**HE SAEED MOHAMMED AL TAYER**  
MD & CEO of DEWA

### **DEWA's smart grid is an effective tool in Dubai's quest to become the smartest and happiest city in the world**

At Dubai Electricity and Water Authority (DEWA), we work in line with the vision of His Highness Sheikh Mohammed bin Rashid Al Maktoum, Vice President and Prime Minister of the UAE and Ruler of Dubai, to provide a state-of-the-art and integrated infrastructure for electricity and water and make Dubai the smartest and happiest city in the world. We achieve this by managing facilities and services via a smart and interconnected network that adopts the latest disruptive technologies of the Fourth Industrial Revolution, including AI, blockchain, energy storage, the Internet of Things, and others.

In 2014, DEWA developed its first Smart Grid strategy and in 2021 we launched an updated Smart Grid Strategy up to 2035, transitioning the smart grid programmes into 6 themes. This helps expand smart enablers and proves more flexibility and agility to keep pace with new opportunities and needs. The themes cover 19 globally leading smart grid capabilities that support DEWA's strategic objectives.

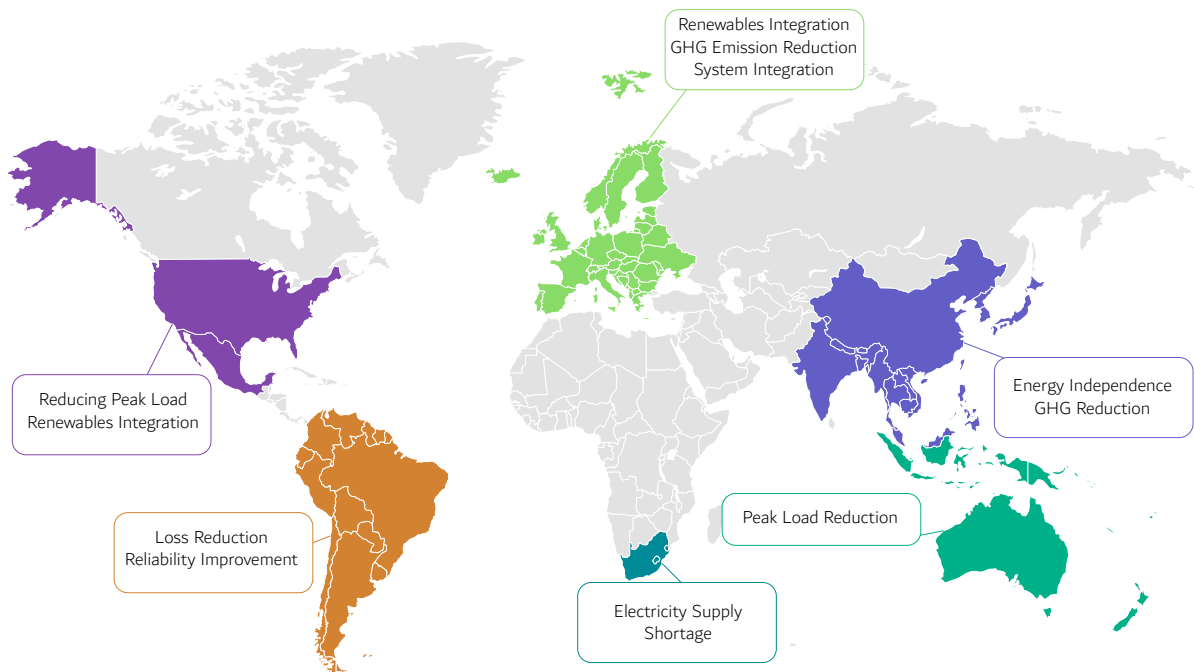
The smart grid that DEWA is implementing with total investments of AED 7 billion, is one of the tools to ensure the seamlessness and availability of round-the-clock integrated and connected services. It guarantees two-way communication between DEWA and its customers, allows for monitoring the various components of the power and water networks, and provides advanced features that include automated decision-making capabilities and interoperability across the entire electricity and water network to ensure a smooth, fast and efficient operation.

The seamless, swift and effective operation of the smart grid helped DEWA achieve competitive results that surpass prominent European and American companies in terms of efficiency and reliability.

In 2023, DEWA recorded 2% losses in electricity transmission and distribution networks compared to 6-7% in Europe and the USA, and 4.6% water network losses compared to around 15% in North America. DEWA also recorded the world's lowest electricity Customer Minutes Lost (CML) per year in the world with an average of 1.06 minutes in 2023, compared to around 15 minutes recorded by leading utility companies in the European Union.

## PREFACE

The smart grid represents a revolutionary approach to the transmission and distribution of energy, as well as how it's being measured. It is rapidly emerging as the new norm for both utilities and consumers alike. The motivations driving utilities to adopt smart grid technology vary worldwide. At DEWA, our aim is to intelligently balance supply and demand while minimising our carbon footprint. This approach aligns with our strategic vision and the directives outlined by both local and federal governments in the UAE.



Smart Grid Business Drivers By region

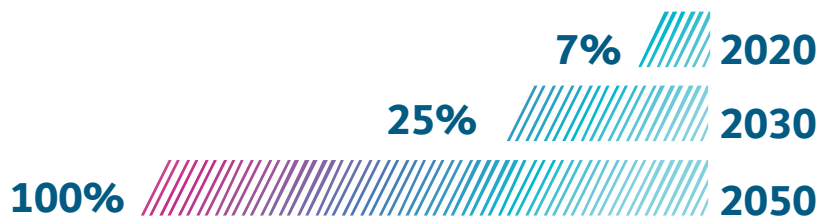
In 2014, DEWA developed its first Smart Grid strategy up to 2035, which is a key component of a smart city. One of the most important factors for the success of smart cities is the seamlessness and availability of round-the-clock integrated and connected services that meet daily living requirements, which is only possible via a Smart Grid. A Smart Grid ensures two-way communication between the utility and its consumer and allows for monitoring along the power and water grids. A Smart Grid consists of controls, computers, automation, and equipment working together.



## STRATEGIC DIRECTION

Dubai Electricity and Water Authority is actively contributing to transforming Dubai into the smartest city in the world. To support this objective, DEWA has developed a comprehensive strategy to implement a smart water and electricity infrastructure. This is what we refer to as a smart grid, which will provide advanced features and ensure interoperability across the entire electricity and water network. DEWA's Smart Grid Programme, with investments totalling AED 7 billion, aligns with the directives and vision of HH Sheikh Mohammed bin Rashid Al Maktoum, Vice President and Prime Minister of the UAE and Ruler of Dubai, to establish Dubai as the smartest and happiest city in the world.

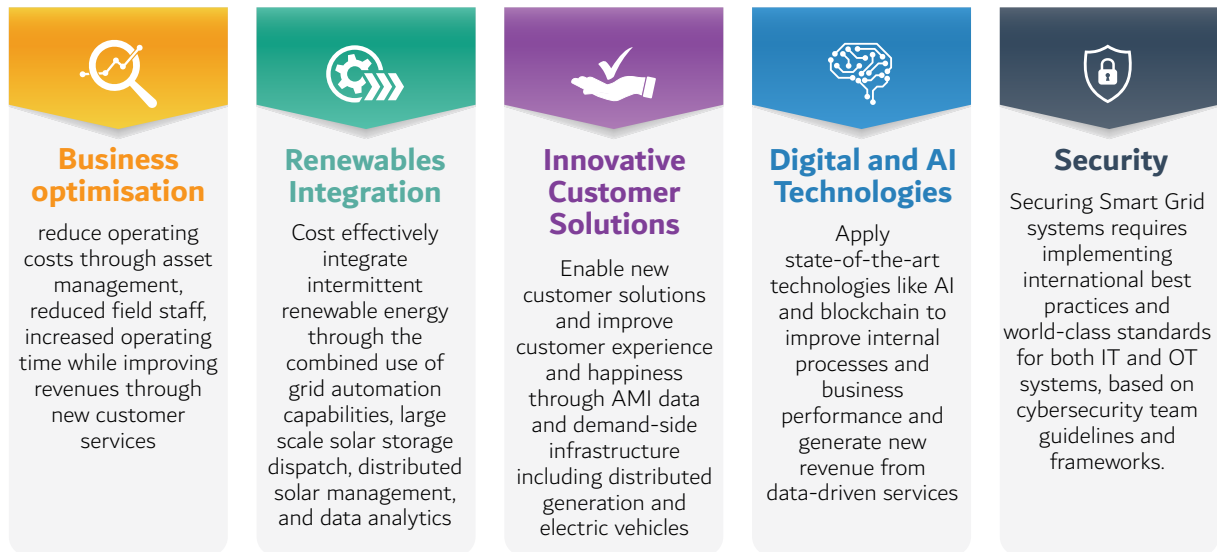
### THE DUBAI CLEAN ENERGY STRATEGY 2050



The programme is a key element in DEWA's strategy to develop an advanced infrastructure. To implement the Dubai Clean Energy Strategy 2050, and Dubai's Net Zero Carbon Emissions Strategy 2050, DEWA has worked on major programmes to diversify its energy mix and manage the demand for electricity. The strategy aims to provide 100% of Dubai's total power output from clean energy by 2050. DEWA has reached a noteworthy milestone in Dubai's journey towards clean energy, accounting for 16.15% of the city's total energy mix, totalling 2,627 MW, produced by the Mohammed bin Rashid Al Maktoum Solar Park as of the end of 2023. By 2030, 100% of DEWA's desalinated water will be produced through a mix of clean energy that uses both renewable energy and waste heat. Currently, DEWA has an electricity generation capacity of 16,270 MW and a water production capacity of 490 million Imperial Gallons per day, providing its services to over one million customers across Dubai.

DEWA's Smart Grid strategy was developed in 2014, in alignment with the Dubai Plan 2021. In 2021, DEWA launched its updated Smart Grid Strategy up to 2035, evolving from a technology-led approach to a value-driven approach, as well as transitioning DEWA's smart grid programmes into themes. This allows for expanded smart capabilities and provides increased flexibility and agility as new opportunities and needs arise.

The updated DEWA Smart Grid Strategy through 2035 will enable DEWA to develop a globally leading set of smart grid capabilities that map to key policy areas and meet the following strategic objectives:



DEWA's vision to become 'A globally leading sustainable innovative corporation committed to achieving Net-Zero by 2050' is based on delivering sustainable electricity and water services at a world-class level of reliability, efficiency, and safety. This vision will result in the connection of renewable energy resources to DEWA's grid and it supports the adoption of electric vehicles in Dubai. In turn, this will lead to a greener and cleaner environment, better energy and water conservation, improved demand side management and a more efficient management of infrastructure investments and grid operations.

DEWA constantly enhances its services and operations using the latest technologies to become one of the leading pioneers in system reliability, sustainability, and availability worldwide. DEWA's transmission network availability is typically above 99.9% reflecting world-class standards of performance. Moreover, DEWA has adopted several international standards to validate its performance excellence such as System Average Interruption Frequency Index (SAIFI) and Customer Minutes Loss (CML). In 2023, DEWA recorded a SAIFI score of 0.04 and achieved the lowest CML worldwide at 1.06 minutes, highlighting DEWA's ability to restore power during faults or unplanned outages.

Moreover, DEWA continues to enhance its water network by identifying and remotely managing potential leaks throughout its transmission and distribution network by utilising its Supervisory Control and Data Acquisition (SCADA) system. By using specialised leak detection technology and implementing other improvements to its network, DEWA has been able to reduce losses in its water network to 4.6%; one of the lowest in the world.

DEWA achieved the highest score worldwide of 99.5% in the updated IDCXS (International Digital Customer Experience Standard) for 2023.

In line with the increasing prominence of happiness concept in the UAE and in Dubai in particular, the same was reflected in the strategic direction of many of the new national and local development plans including the UAE Vision 2025, Dubai Urban Plan 2040, Smart Dubai, Happiness Agenda, UAE Artificial Intelligence Strategy, Blockchain and Dubai Paperless Strategy. On the other hand, DEWA has always recognized the importance of customers happiness to the achievement of its business objectives and this was accomplished via adopting a state-of-art Customer Happiness Framework, that is aligned with Dubai and DEWA's Strategy



# WHAT FORMS DEWA'S SMART GRID?

The following are the main governance themes that ensure a smooth, quick, and effective functioning of DEWA's Smart Grid.

## FOUNDATIONAL CAPABILITIES

Focuses on key enabling infrastructure such as advanced metering infrastructure for electricity and water, telecommunications, and IT infrastructure that form the technical “backbone” of the smart grid.

## GRID AUTOMATION

Focuses on deployment of sensors, controls, and real-time applications to orchestrate transmission and distribution grid operations.

## SMART ENERGY SOLUTIONS AND GREEN MOBILITY

Focuses on deployment of distributed renewables and storage technologies to effectively manage grid operations.

## SMART WATER

Focuses on water network monitoring, automation, and optimisation.

## SMART GRID ARTIFICIAL INTELLIGENCE

Unlocks additional value from AI-derived data insights, whether internally or externally for wider commercial application and increased customer happiness.

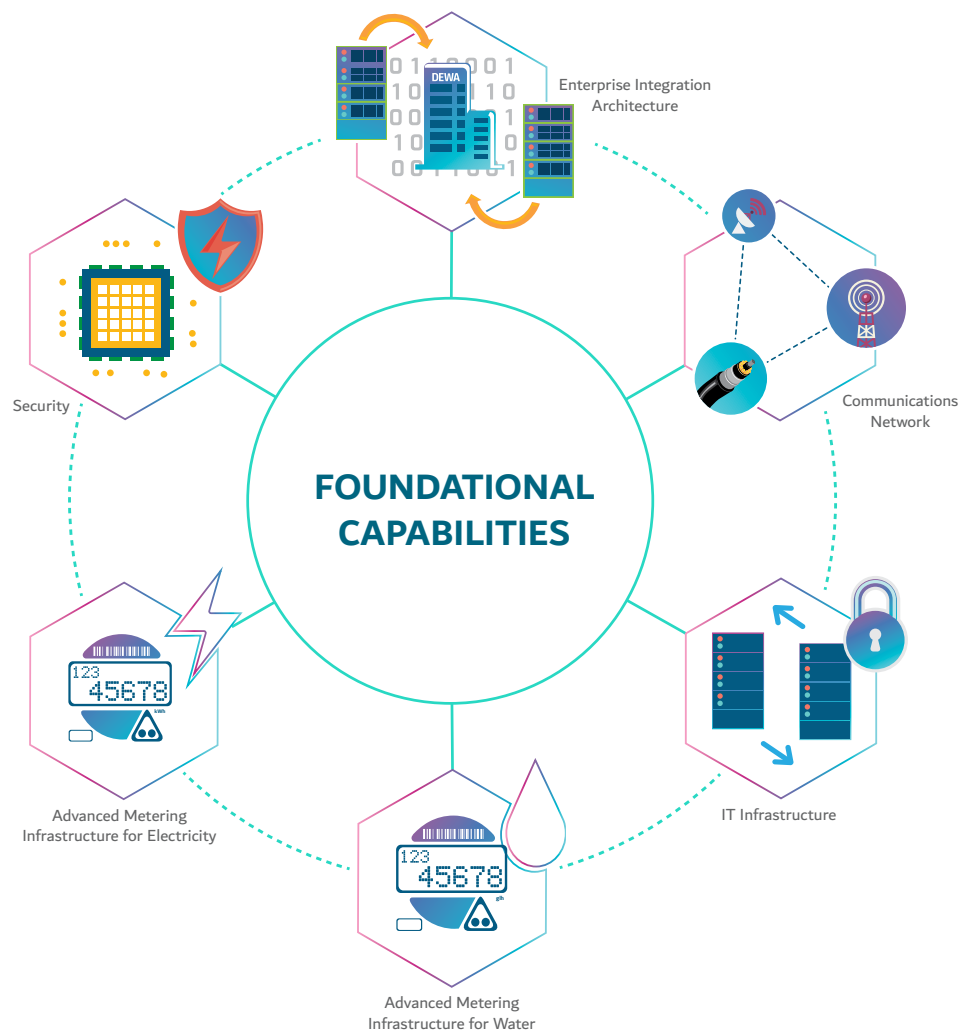
## INNOVATIVE VALUE-ADDED SERVICES

Unlocks customer value behind DEWA's current and future smart grid investments by enabling new products and services while enhancing current ones.

## THEME

# FOUNDATIONAL CAPABILITIES

Foundational Capabilities are DEWA's capabilities that form the backbone of the 'smart' grid. DEWA's advanced metering infrastructure provides interval meter reading data, with the data transported over the communications network and exchanged, processed and stored across DEWA's Enterprise Integration Architecture and IT Infrastructure. A key function of the foundational capabilities is to keep DEWA's and DEWA's customer data safe through the deployment of advanced cyber security controls across the organisation.



### Capability: **ADVANCED METERING INFRASTRUCTURE FOR ELECTRICITY AND WATER**

This capability is an enabler for rolling out the electricity and water smart grids, which provides advanced metering services and applications for customers. DEWA deployed fully automated and secure advanced metering infrastructure, using the latest technologies, across Dubai. This infrastructure includes multiple head-end systems to ensure on-time communication with smart field devices, a centralized meter data management system to orchestrate the huge amount of data received from smart devices and seamless integration with DEWA Enterprise, and customer-facing applications for billing and providing value-added services to customers. All of this is implemented by ensuring end-to-end security through latest tools and



technologies. This enables them to manage their electricity and water usage and preserve natural resources. DEWA also facilitates faster opening and closing of customer accounts by utilising on-demand meter reading. Between 2015 and 2020, DEWA successfully replaced all its mechanical electricity and water meters with smart electricity and water meters, a deployment of over 2.2 million smart meters. As of December 2023, DEWA deployed approximately 1,166,282 smart electricity meters and 1,052,444 smart water meters across Dubai. With 100% of DEWA's customers utilising smart meters, this enables smart grids for DEWA's electricity and water networks.

#### **Capability: IT INFRASTRUCTURE**

This capability provides a dedicated state-of-art architecture, both on premise and cloud-based infrastructure, capable of hosting Smart Grid Program applications and storing business data, allowing for interoperability across all smart grid themes. The platform is hosted in Moro Hub carbon neutral TIER-III+ certified data centres (including world's largest solar powered data centre), ensuring high availability, scalability, and seamless failover. As part of the enterprise architecture, six smart grid applications are hosted on-premises and on a state-of-the-art private cloud enabled for big data analytics, asset performance management, and data governance platforms. Smoother annual maintenance activities initiated successfully through Moro Hub (Data Hub Integrated Solutions LLC), a subsidiary of Digital DEWA, the digital arm of DEWA, for Infrastructure maintenance, expansion purpose.

#### **Capability: COMMUNICATIONS NETWORK**

This capability provides the vital connectivity for information necessary to conduct core operations as well as enabling new services for DEWA's smart grid. This capability is critical for enhancing and maintaining the communications infrastructure of DEWA's Smart Grid programme and initiatives. This capability is also instrumental to identify gaps, evaluate and analyse leading communications technologies, and identify the best-fit communication configurations for DEWA's Smart Grid themes, including security capabilities for telecommunications infrastructure. This ensures privacy, integrity, authentication, and authorisation, along with encryption. As part of this capability, the existing MPLS network was enhanced, and an RF-mesh network was commissioned across Dubai. The RF-mesh network provides the last mile communication between DEWA's fibre-optic network and its smart meters. To complement its terrestrial IoT communication network, Dubai Electricity and Water Authority (DEWA) has integrated nanosatellite technology into its Space-D program. The successful launch of DEWA-SAT 1 in January 2022 via a SpaceX Falcon 9 rocket from the Cape Canaveral Space Launch Complex opened up new opportunities for DEWA to enhance its monitoring and detection capabilities in various use cases. These include secondary substation pre-fault detection, improved distribution network visibility, solar power plant monitoring, better solar forecasting, transmission operation planning, power planning, transmission line patrolling, infrastructure change detection, and water leak detection.

In May 2022, DEWA signed an MoU with Eutelsat, the French global satellite operator, to provide technical support for the Space-D program and DEWA-SAT 1. The collaboration aims to explore the potential integration of Eutelsat Earth Low Orbit (ELO) satellites with the Space-D program, expand the fleet of nanosatellites for both parties, and develop use cases that can advance the utility sector worldwide. As part of this effort, the two parties plan to design, develop, and implement the first use case at DEWA's Research & Development (R&D) Centre, which involves combining IoT sensors and Eutelsat ELO satellites.

In April 2023, DEWA successfully launched its second nanosatellite, DEWA SAT-2, aboard the Falcon 9 rocket of SpaceX from Vandenberg Space Force Base in California, USA. The launch represents another milestone in DEWA's mission to leverage the latest technology and innovations to improve its utility services and enhance its customers' experience.

### Capability: **ENTERPRISE INTEGRATION ARCHITECTURE**

This capability is responsible for integrating information, transactions and events between smart grid systems, enterprise back-off systems, and operation technology (OT) systems to improve innovative and efficient business processes. As part of this capability, DEWA has implemented an enterprise service bus integration platform to enable seamless data exchange between Smart Grid applications by implementing the planned Smart Grid integration architecture. Through this capability, DEWA will integrate its current and future business and operations systems using service busses on a service-orientated architecture (SOA). This means Smart Grid applications can exchange and synchronise data in a system-independent way.

In coordination with various source and target IT & OT system together with respective system vendors, this capability facilitated DEWA to follow Multi Data Center, Multi Core approach and installed 4 dedicated Enterprise Service Bus (ESB) instances to integrate 14 IT and 4 OT systems in total 18 systems by deploying 108 integration services. Real time and non-real time integration took place in total to +1.3 billion integration records till now. Smoother annual maintenance activities initiated successfully through MORO for day-to-day support, maintenance, enhancement and additional integration for smart grid applications.

### Capability: **SECURITY**

The Security capability maintains confidentiality, integrity, and availability of information, assets, and facilities of smart grid infrastructure by implementing world-class security standards and best practices. This capability provides security governance, assurance, and defence in depth to the entire smart grid ecosystem based on DEWA Information Security Governance Framework that covers the following:

1. **Govern & Assure:** Ensure cyber resilience is govern, overseen, and validated by DEWA's top management.
2. **Manage & Protect:** Managing the cyber exposure, security defences, and protects DEWA from cyber threats.
3. **Respond & Recover:** Manage incidents quickly and effectively to limit harm and return to full functionality to demonstrate agility in incident response to quickly recover and restore.
4. **Identify & Detect:** Penetrate, assess, and monitor DEWA's information, industrial control systems and information systems for zero-day threats, vulnerabilities, and anomalies.

Security capability is a crucial part of the entire smart grid ecosystem where information and cyber security provide an end-to-end resilient defence structure to predict, protect, detect, and recover from any infringement or breaches with least business disruption. DEWA has developed holistic information security approach to maintain a robust security through adhering to:

- Information Security Regulation of Dubai (ISR)
- Dubai Electronic Security Center Industrial Control System
- ISO/IEC27001:2022 certified ISMS framework
- IEC 62443, IEC 62351 standards for its IT/OT critical infrastructure

The smart grid Safe & Secure Principle for DEWA is driven by: Security is a key consideration in smart grid architecture. It ensures that the highest security and encryption capabilities are in place, enforced and maintained.

The Safe & Secure Principal is built on five main principles as follows:

- Security Governance
- Data Privacy and Management
- Identity & Access Management
- Cryptography
- Security Operations

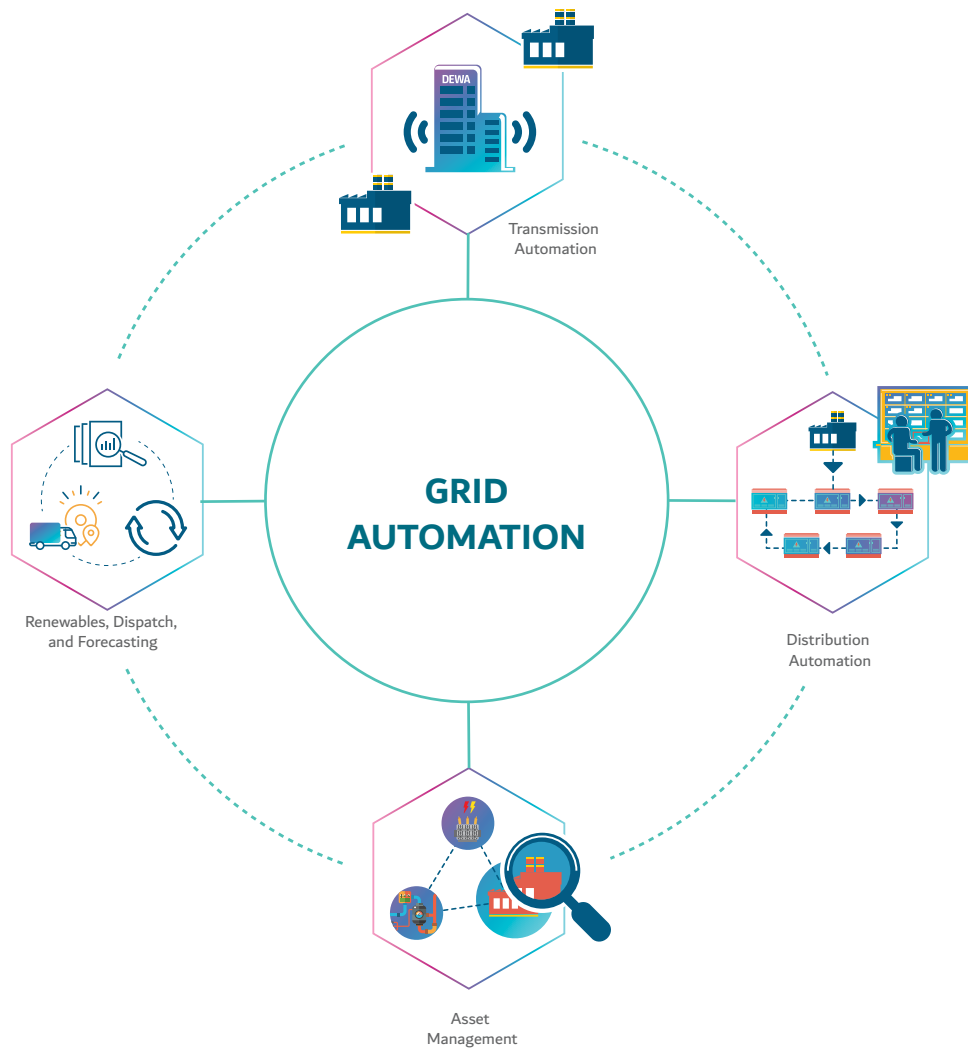
These overarching principles apply to all applications, assets, data, infrastructure components and integration points. The cybersecurity team ensures when any part of smart grid is being designed, built, tested, and operated; these principles are in place before production go-live. With the evolving of such critical infrastructure to be connected online, DEWA has implemented various security controls, solutions, technologies, measurements and conducted security assessments to ensure Dubai smart grid infrastructure is safe and secure. The cyber-security team ensures end-to-end security coverage with various advanced security controls and 24/7 security and availability monitoring of all smart grid infrastructure from cybersecurity threat.



# THEME

## GRID AUTOMATION

Automating the transmission and distribution grids, as well as asset management practises, is a key contributor and a prerequisite to achieving a Smart Grid. Grid Automation focuses on deploying sensors, controls and software orchestrating its' operation. As the deployment of such technologies accelerates, the grid becomes increasingly resilient, better utilised, more secure and autonomous. Another key driver is enabling the integration and dispatch of distributed and intermittent resources.



### Capability: **TRANSMISSION AUTOMATION**

The capability provides advanced transmission automation and control at high-voltage substations, those 132kV or higher. It focuses on substation automation architecture, digital substations, wide area monitoring systems (WAMS) with deployment of phasor measurement units (PMU), cybersecurity, and artificial intelligence. It also provides the optimal architecture for the SCADA control systems to integrate with the automated distribution substations. This improves the reliability and security of transmission substations, with enhanced substation control and monitoring (SCMS) capabilities, compliant with cybersecurity requirements. Moreover, DEWA has implemented digitally optimised substations (DOSS), as part of its efforts to digitise and enhance transmission substation technology by way of the latest



Intelligent electronic devices (IEDs), IEC61850-9-2 process bus digital communication, enhanced Cyber security, improved energy efficiency, reduced carbon footprint and smart monitoring opportunities for transmission 132kV substations. Additionally, an operations training centre (OTTC) has also been completed, which supports DEWA employees to be aligned with international best practices to leverage new technologies and standards. Moreover, DEWA has developed the capabilities of the existing control centre SCADA systems by improving integration with utility-scale renewables and other distributed energy resources. DEWA has also successfully completed a pilot for unmanned aerial vehicles (drones) for overhead line inspections and maintenance

#### Capability: **DISTRIBUTION AUTOMATION**

This capability covers the technologies utilised by DEWA for continuous monitoring and control of its electric distribution system infrastructure in an optimal manner. It provides advanced distribution system automation, protection, and control at low to medium voltages. With thousands of substations and electric components, the system provides scalable connectivity to support the introduction and expansion of automated functions to manage the distribution system. It is designed to increase customer satisfaction, improve reliability, optimisation, and efficiency, and increase asset life cycle and workforce productivity. For its distribution network, DEWA utilises SCADA system for monitoring, supervision, and control of its 33kV, 11kV, and 6.6kV primary and secondary substations. Further as part of its efforts to enhance and maintain distribution network reliability and for enhancing Distribution Control Centres (DCC) capabilities, DEWA has implemented a fault location isolation and service restoration (FLISR) system, that includes Automatic Smart Grid Restoration (ASGR) application, the replacement of ring main units (RMU) with motorised RMUs for self-healing functionalities. The capability also includes switching procedure management, voltage variance control and optimisation functions, a crew management system, and ERP (SAP) system for managing DCC business. The power network applications integrated into the SCADA system and efficiently utilised are distribution system power flow (DSPF), dispatch power flow (DPF) and state estimator (SE).

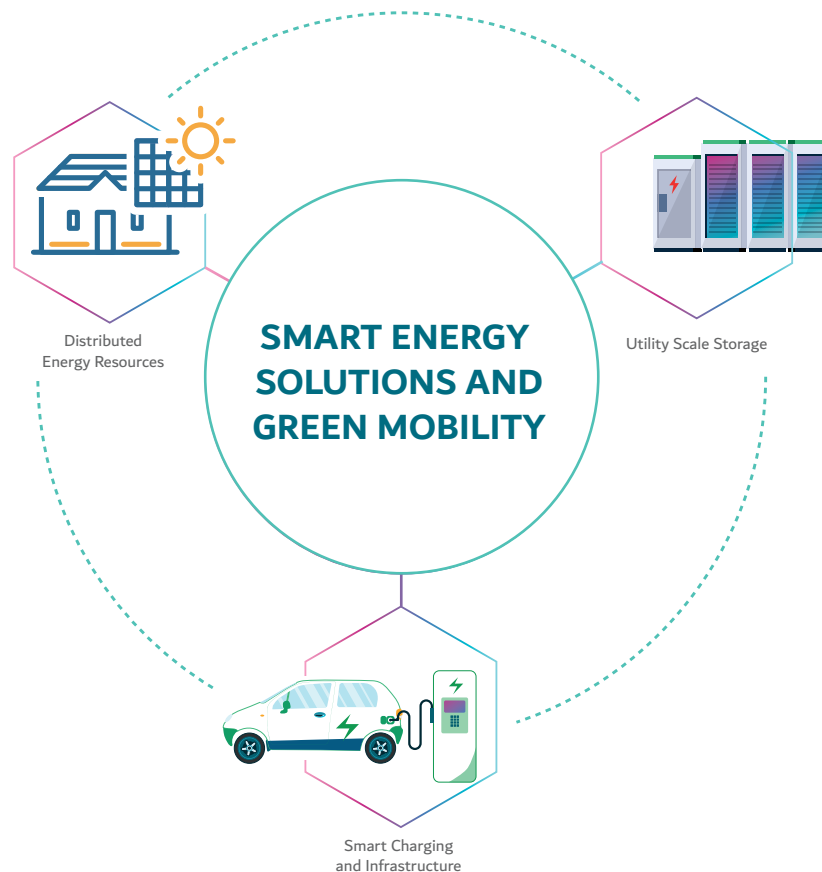
#### Capability: **RENEWABLES, DISPATCH, AND FORECASTING**

This capability focuses on the set of assets and technologies that creates near autonomous dispatch and control of renewable energy sources. Unlike traditional forecasting and dispatching regimes that are based on standalone or manual controls, this capability integrates distributed energy resources and sensor data, as well as data from external information providers such as weather data services. This will become increasingly more important and more complex, as increasing amounts of renewable energy and storage technologies are introduced into the DEWA network. Forecasted loads and renewable energy generation output and management will integrate with SCADA and distribution control centre technologies to maintain reliability, enhance the value of these sources and provide support to the distribution network.

## THEME

# SMART ENERGY SOLUTIONS AND GREEN MOBILITY

DEWA's renewable energy goals support the Dubai clean energy strategies and as such greater levels of distributed renewables are expected on the grid, mainly in the form of rooftop solar generation. Moreover, as storage technologies mature and become more affordable, DEWA will remain at the forefront of assessing the technologies that become available. Through pilots and test projects, DEWA is currently evaluating the viability of storage solutions that are most suitable to the environmental conditions of Dubai. With a growing fleet of electric vehicles charging on the DEWA distribution grid, managing demand and supply to avoid hotspots on the network will become a priority for grid stability. DEWA will monitor, control and optimise the distributed generation, storage and loads to optimise the supply/generation mix.



### Capability: **DISTRIBUTED ENERGY RESOURCES**

This capability is a set of services and technologies that enable the procurement, installation and operation of distributed energy systems and smart energy solutions. The Shams Dubai initiative was launched in support of HH Sheikh Mohammed bin Rashid Al Maktoum's vision to make Dubai the smartest and happiest city in the world and to promote renewable energy within Dubai.

Through this initiative, the public was encouraged to install photovoltaic systems at their premises and connect it to DEWA's grid. This promoted the use of renewable energy at these individual sites, with any surplus exported to DEWA and credit awarded to customers in their bills. The connection process consists of four stages (no objection certificate, design approval, inspection and connection, and generation) and the procedure can be found on DEWA website. As part of this initiative, 7578 sites have now connected solar power equipment to DEWA's grid, generating 601.78 MW of electricity at end of 2023. DEWA has also built the first virtual power plant (VPP) in the region, which is connected to its Smart Grid Station. DEWA's Smart Grid Station was developed in cooperation with the Korean Electricity Power Corporation (KEPCO), resulting from their joint MOU in 2014 to share information on the latest international standards for smart cities. The DEWA Smart Grid Station uses a variety of Smart Grid technologies to generate electricity through renewable resources such as solar power maximise energy efficiency through real-time monitoring and control, reduce peak load, peak shift, and reduce water consumption.

#### Capability: **UTILITY SCALE STORAGE**

This capability is a set of assets and technologies that enable the storage of generated energy that exceeds the instantaneous load of the system for use at a later time. It allows DEWA to harness excess large scale renewable energy and put it to operational use. DEWA has implemented two pilot projects for energy storage systems, the first in the region, at the Mohammed bin Rashid Al Maktoum Solar Park; the largest single-site solar park in the world based on the Independent Power Producer (IPP) model. It has a planned production capacity of 5,000 MW by 2030, with investments totalling AED 50 billion. When completed, it will save over 6.5 million tonnes of carbon emissions annually. The first energy storage project within the solar park used sodium sulphur battery technology, with a power capacity of 1.2MW and an energy capacity of 7.2MWh. The second pilot project used lithium-ion battery technology, with a power capacity of 1.25MW and an energy capacity of 9.35MWh. These pilots, with a combined power capacity of 2.45MW, are contained in outdoor solutions with minimal degradation of the battery capacities due to the weather conditions of Dubai with potential for full-scale implementation to meet the operational requirements of the Mohammed Bin Rashid Solar Park. These solutions not only reduce the thermal generation spinning reserve emissions but also provide support to the solar generation plant with several operation modes and ancillary services. Moreover, DEWA is developing a pumped-storage hydroelectric power plant in the Hatta region of Dubai, with a production capacity of 250 MW and a storage of 1,500 MWh. The station, which is the first of its kind in the GCC, will have a life span of up to 80 years. The hydropower plant mechanism includes the use of advanced turbines that run on clean energy generated at the Mohammed bin Rashid Al Maktoum Solar Park, to pump water from the dam to the upper reservoir. DEWA has also installed the tallest concentrated solar power (CSP) tower in the world. The 700 MW CSP plant utilises molten salt, has a thermal storage capacity of 15 hours and has an energy capacity of 10,500 MWh.

#### Capability: **SMART CHARGING AND INFRASTRUCTURE**

This capability provides a fit for purpose network of public charging spots supported by smart charging services that enable DEWA customers to charge their electric vehicles. The EV Green Charger initiative was launched to support the vision of HH Sheikh Mohammed bin Rashid Al Maktoum, to make Dubai the smartest and happiest city in the world and to promote green transportation. This initiative was the first public charging infrastructure for electric

vehicles in the region. In 2014, DEWA launched the EV Green Charger initiative to promote sustainable mobility in Dubai by encouraging the use of electric vehicles. By the end of 2023, DEWA had successfully installed more than 700 charging points across Dubai, attracting over 13,959 registered customers in the EV Green Charger initiative, in addition to the daily “Guest Mode” feature users. These users collectively covered approximately an impressive 117 million kilometres through electric vehicle travel. Simultaneously, the initiative contributed to the growth of EVs in Dubai, reaching over 25,700 by end of Q4 2023. Additionally, DEWA launched the 'Dubai EV Community Hub' website to further boost EV adoption. This platform centralises information on EV developments within Dubai, providing a valuable resource for those interested in electric mobility.

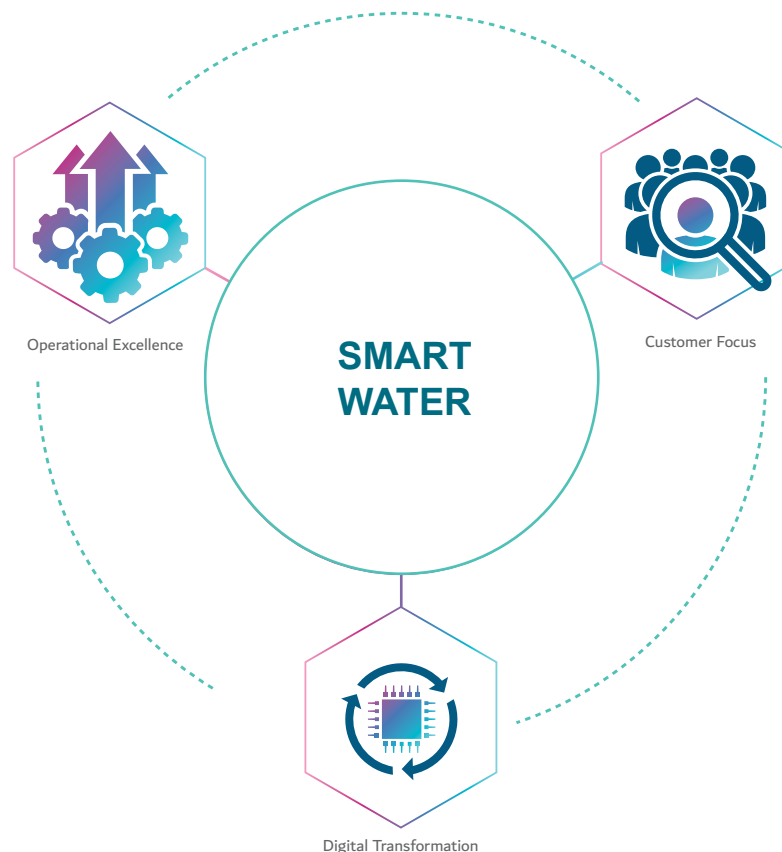
Moreover, Customer Care Center staff facilitating remote support to EV customer on EV charging which empower the agent and elevate customer experience. DEWA has achieved an impressive milestone by ensuring the prompt delivery of 99.71% of EV Green charger cards within just three working days when customers have been registered at the service. This remarkable efficiency has been extended to over 4643 cards. by the end of 2023. As member of Dubai Green Mobility Committee, DEWA supports the 10% annual government procurement target for electric and hybrid vehicles by utilising 125 electric and hybrid vehicles in its own fleet. This target will increase to 20% starting from 2025, with a further increase to 30% in 2030. DEWA is also researching and testing emerging technologies in mobility such as V2G technology, autonomous mobility, ultra-fast charging, mobile charging, and inductive charging.



## THEME

# SMART WATER

Adopting a data-driven approach to enhance operations and optimise asset management practices is foundational to realising a smart water network. Data management enables DEWA to monitor operations, improve system performance, and enable data driven decision making across the system for an efficient, reliable, secure and autonomous water network remotely and continuously. The continuous flow of data also provides insights into the status of the assets in the network, thus enabling smart maintenance practices leveraging AI-analytics that prolong the lifetime of the water network assets, provide additional security and reliability, reduce field operation costs and overall optimise asset repair and replacement planning.



### Capability: **OPERATIONAL EXCELLENCE**

This capability focuses on optimising the maintenance and planning of water assets by leveraging asset optimisation initiatives and improving leak detection. It aims to expand the existing capabilities to the entire suite of DEWA's assets and operations and enable the use of integrated data-driven insights for informed decision-making. This allows DEWA to maximise operational efficiency, maximise asset value and extend their lifetime, reduce maintenance costs, improve system reliability, and enhance customer happiness. DEWA, as a leading utility, utilises a number of leading leak detection technologies within its water network.

### Capability: **CUSTOMER FOCUS**

This capability focuses on ensuring that DEWA sustains its position as a utility that champions customer happiness and enhances the customer experience by utilising actionable data insights, through smart water applications. DEWA has a unified approach to building awareness about its services and programs that cuts across a variety of channels. By utilising smart grid artificial intelligence, DEWA is able to deliver mass-customised messages and campaigns to its customers based on their profile and their interactions with DEWA. This improves customer engagement and happiness, while supporting Dubai's clean water targets.

### Capability: **DIGITAL TRANSFORMATION**

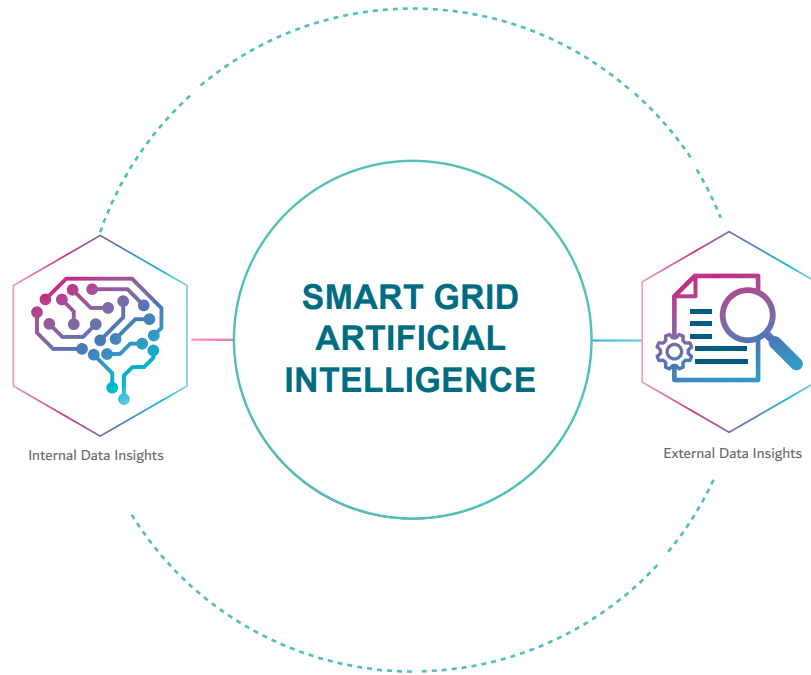
This capability focuses on the implementation of digital platforms, alongside the highest cyber security requirements, to enhance the reliability and the resiliency of DEWA's water network, as well as maintain the water quality at the highest possible standard. Such digital platforms can enable near-real time data flow coupled with advanced analytics where digital adoption of DEWA's services reached 99.26% in 2022. It provides DEWA with a holistic overview of operational data streams and analytics, thus unlocking remote monitoring and control capabilities, enhancing the ability to make data-driven decisions, increasing the network's automation and improving leak detection, isolation and service restoration processes. Furthermore, this capability is in line with Dubai's 10X initiative, to develop the Government of Dubai and make it 10 years ahead of other cities.

This positions DEWA as 10 years ahead of globally leading utilities and as a pioneer of disruptive initiatives and services that enhance customer experience and service provision.

## THEME

# SMART GRID ARTIFICIAL INTELLIGENCE

By utilising internal and external data insights, derived from artificial intelligence implementations by Moro Hub, DEWA is able to unlock additional value for wider commercial application and potentially increased customer happiness.



### Capability: **INTERNAL DATA INSIGHTS**

This capability enables a set of data driven services that builds the needed intelligence to operate and improve DEWA's business and internal processes by leveraging the data streams generated by its smart grid assets and services. Unlike traditional siloed uses of operational data, Internal Data Insights applies technologies such as Big Data & Analytics and artificial intelligence to improve DEWA's internal processes and business performance, which can unlock additional value. Through the Big Data & Analytics platform, DEWA expanded its analytic systems to improve both operations and customer experience by leveraging the large volumes of data from smart meters and the grid, as well as incorporate artificial intelligence and advance analytics. It provides insights into hidden patterns, correlations, customer sentiments, and other useful business information based on the real-time streaming of data, data ingestion, predictive modelling, and using big data. Moreover, a comprehensive data management environment was established, based on a Smart Grid data governance framework, which includes data quality and metadata management, lifecycle management, and change management. Moreover, utilising artificial intelligence as part of DEWA's customer experience allows DEWA to better understand the experience across multiple channels over time and thus provide insights for continuous improvement. DEWA utilises interactive virtual assistants to answer customer quickly and consistently. They address issues and handle a high volume of requests and direct customers to live agents if more complex issues arise. Verbal interactions can be optimised to enrich customer happiness.

### Capability: **ASSET MANAGEMENT**

This capability focuses on the preventative and proactive maintenance of DEWA's transmission, distribution and water assets, thus optimising asset life cycle management and ensuring the smooth running of the Smart Grid through the use of data analytics. DEWA successfully developed Asset Health Center (AHC) and deployed 13 use cases for Distribution Power and facilitated 50+ KPI's, 120+ Dashboards etc., on Big Data Analytics platform to collect and analyses data from existing assets and systems to quantify the health and risk of failure of these assets, based on certain end of life indicators and their associated use cases. Also further enhancing AHC use cases, DEWA successfully enabled Asset Performance Management (APM) solution and deployed 6 use cases and further use cases implementation in progress. AHC and APM deployed use cases will support DEWA to optimise investment, internal process, data driven decision making and efficient and sustainable operations.

### Capability: **EXTERNAL DATA INSIGHTS**

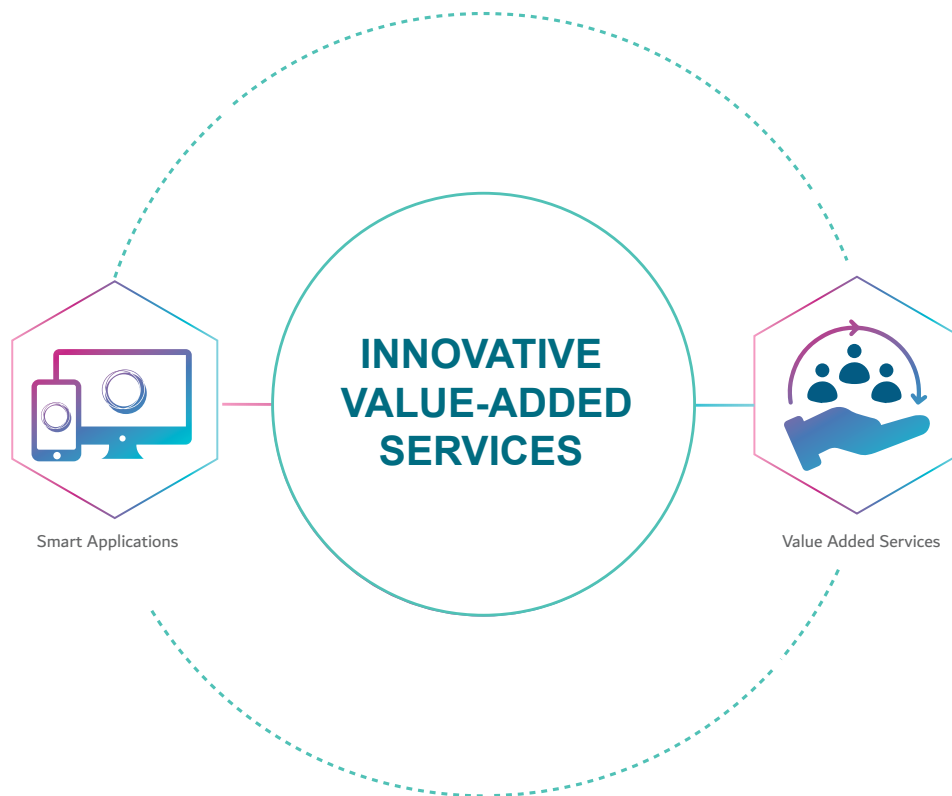
This capability allows DEWA to leverage data streams generated by its smart grid and value-added services. that will benefit DEWA to generate new revenue streams, enhance services and performance.



## THEME

# INNOVATIVE VALUE-ADDED SERVICES

DEWA is able to unlock the value behind its current and future smart grid investments by putting the customer into focus and enabling new products and services, while enhancing current ones.



### Capability: **SMART APPLICATIONS**

This capability provides a set of organisational capabilities and technologies that ensures consistent and smooth interfacing with customers across all service channels, built on data driven insights from customer interactions. This resulted to achieving 98.3% from 709,000 customers votes in the Dubai Government Instant Customer Happiness Score for 2023. It provides a personalised experience that makes customers feel recognised and valued. This strengthens the relationship between DEWA and its customers and enables DEWA to engage them in new ways. DEWA has launched the Smart Living initiative, which utilises smart meter data insights, to support its customers to conserve and manage their electricity and water consumption by providing them with digital consumption dashboards, as well as access to five years of historical consumption data. DEWA also allows them to compare their consumption with similar homes in the area upon conducting necessary Proof of Concept (POC) with leading vendors, DEWA is in progress of upgrading existing My Sustainability Living Program (MSLP) to new version MSLP 2.0 in order to include AMI fingerprinting and near real time data for customers.

## Capability: **VALUE-ADDED SERVICES**

This capability focuses on non-core premium smart services that enhance the customer experience while generating additional revenue. It leverages smart grid artificial intelligence to identify the needs of each individual customer and create tailor-made offerings for them that extend far beyond the traditional utility portfolio. This allows DEWA to create new revenue streams and increase customer happiness. Such services would include virtual energy audit services for customers, customer water quality assurance services, and smart certificates for suppliers.

For example, the High Water Usage Alert initiative aligns with DEWA's core strategy of minimizing our environmental footprint and promoting conservation awareness and social responsibility. To that extent, smart meters were leveraged to efficiently identify unusual water consumption, significantly reducing the time needed to detect leaks, which previously took around 29 days. Advanced algorithms now swiftly identify high usage and notify customers within 48 hours, entirely without manual intervention

# DEWA'S SMART GRID IN THE NEWS



Welcome to the "DEWA's Smart Grid in the News". This segment features key articles highlighting DEWA's Smart Grid and its initiatives, publicly shared. Explore our journey towards a sustainable energy future with accompanying external links for further information:

- **DEWA's Smart Grid: an effective tool to reach the smartest and happiest city in the world, 30 Jul, 2023**  
<https://mediaoffice.ae/en/news/2023/July/30-07/DEWA-Smart-Grid>
- **DEWA's Smart Ball technology saves 243 million gallons of water, AED9.66 million in 2023**  
<https://www.wam.ae/en/article/b17pjp4-dewa%E2%80%99s-smart-ball-technology-saves-243-million>
- **DEWA records world's lowest electricity Customer Minutes Lost per year**  
<https://wam.ae/en/article/b1a3afh-dewa-records-world%E2%80%99s-lowest-electricity-customer>
- **DEWA and Kepco to build smart grid in Dubai**  
<https://www.khaleejtimes.com/business/dewa-and-kepco-to-build-smart-grid-in-dubai>
- **Smart grid station launched in Dubai**  
<https://www.utilities-me.com/news/12326-smart-grid-station-launched-in-dubai>
- **Dewa's adoption of clean energy storage technologies enhances energy security in Dubai**  
<https://www.khaleejtimes.com/business/dewas-adoption-of-clean-energy-storage-technologies-enhances-energy-security-in-dubai>
- **DEWA inaugurates pilot project at the Mohammed bin Rashid Al Maktoum Solar Park using Tesla's lithium-ion energy storage solution**  
<https://www.mediaoffice.ae/en/news/2021/september/26-09/dewa-inaugurates-pilot-project>

- **DEWA provides real-time information to customers to monitor energy and water consumption through the DEWA app. Additionally, customers can compare with their neighbours' consumption for similar premises and provide advice to reduce or control the consumption.**

<https://www.mediaoffice.ae/en/news/2021/May/31-05/DEWAs-smart-programmes-increase>

<https://wam.ae/article/13po8l2-dewa-recorded-125-million-digital-transactions>

- **Smart electricity & water meters in Dubai**

<https://mediaoffice.ae/en/news/2023/January/02-01/Dubai-Customers-benefit>

- **DEWA ensures water security and sustainability through global projects and a smart and connected grid**

<https://www.mediaoffice.ae/en/news/2024/January/02-01/DEWA-ensures-water-security-and-sustainability>

- **DEWA's EV Green Chargers witnessed 59% surge in service usage in 2023**

<https://wam.ae/en/article/13qze3v-dewa%E2%80%99s-green-chargers-witnessed-59-surge-service>

- **DEWA becomes a core member of CharIN**

<https://www.charin.global/news/dewa-becomes-a-core-member-of-charin/>

- **DEWA fosters green mobility by supporting electric, hybrid, and hydrogen vehicles**

<https://www.emirates247.com/sustainability/cop28/dewa-fosters-green-mobility-by-supporting-electric-hybrid-and-hydrogen-vehicles-2023-12-10-1.728597>

- **DEWA inaugurates Cyber Security Innovation Lab, Waee Cybersecurity Centre and Identity Intelligence Centre**

<https://mediaoffice.ae/en/news/2023/March/12-03/DEWA-inaugurates-Cyber-Security-Innovation-Lab>

- **DEWA wins the Smart Water Project of the Year Award 2024 at the Global Water Awards**

<https://www.emirates247.com/business/energy/dewa-wins-the-smart-water-project-of-the-year-award-2024-at-the-global-water-awards-2024-05-05-1.732094>

- **Save money: DEWA installs 2 million smart meters across Dubai homes**

<https://www.timeoutdubai.com/news/dewa-smart-meters-dubai>



