

Dubai Government Role in Pioneering a Sustainable Energy Model

Insightful Vision towards Sustainable Development and Security of Supply

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Introduction

The Emirate of Dubai is one of the fastest growing cities in the world as it positioned itself on the global map as the regional hub for tourism, logistics and finance. To fuel its economic growth and maintain its regional and global prominent position, Dubai innovated a smart strategy to manage demand, diversify fuel sources, secure supply and foster green growth. Currently, Dubai's installed capacity of about 10GW is powered mainly by imported natural gas making Dubai a net energy importer. Therefore, energy security becomes essential given that forecasted electricity demand for the next decade is projected at 5-6% per year. In addition, the Emirate is compelled to pursue a sustainable development path, particularly given the recent clean technology advances.

Therefore, the success story of Dubai demonstrates how it managed to design and implement an energy strategy that captures the key levers driving its economy; i) energy security, ii) demand side management & iii) sustainable growth. Dubai is therefore a living model of a coherent and cohesive energy strategy that meets future energy needs through an optimal energy mix that delivers affordable, sustainable and clean energy to Dubai's citizens and residents.

Dubai's Journey to Sustainable Future: The Enabling Environment

Dubai's energy model stems from the Dubai Integrated Energy Strategy (DIES) 2030, which was launched in 2011 by the Dubai Supreme Council of Energy (DSCE), and is reviewed periodically. The DIES was recently extended till 2050 and it details a roadmap to achieve various targets by 2030 and 2050, based on building a world-class regulatory framework to accelerate the diversification of the energy mix, ensure security of supply and facilitate effective demand side management as shown in Figure 1.

The Dubai Integrated Energy Strategy is aligned with the national sustainable development goals making it an effective tool to meet the UAE Vision 2021 and Dubai Plan 2021 by steering the following pillars:

Governance & Policies: As part of achieving DIES targets, the policy & regulatory regime in Dubai's energy sector has been overhauled. New principles such as PPP have been put in place to boost the market participation on key projects, such as the clean coal and solar power generation. Also, the regulatory framework for district cooling and energy service companies (ESCOs) is supporting the implementation of DIES 2030.

Dubai Electricity and Water Authority, Dubai Sustainability Report 2013, 2014, Dubai.



Figure 1: Dubai Integrated Energy Strategy 2050 as a coherent strategy.

Energy Efficiency & Demand Reduction: Demand reduction through energy efficiency has been a focus of Dubai's policy interventions to rationalize the use of power and water. The demand side management (DSM) strategy has led to nine different programs and technical levers for energy efficiency and demand reduction. This resulted in achieved savings in capital, operational & opportunity costs as shown in the next sections.

Energy Security & Sustainable Cost of Gas: Diversification of Dubai's energy sources has been a key focus of DIES 2030. This has led to spawning of projects such as clean coal power plant, Solar IPP, etc. The Mohamed bin Rashid Al Maktoum Solar Park has been a critical demonstrator of Dubai's commitment to renewable energy. Imported nuclear energy, clean coal, waste-to-energy, hybrid & electric vehicles, the distributed solar program (Shams Dubai) are other key elements contributing to Dubai's energy diversification.

Financial Mechanism & Capacity Building: DIES 2030 has been the launching pad for measures and projects targeting DSM, renewable power, energy service contractors (ESCOs), Green Building Codes, and energy efficiency technologies. Financial mechanisms have been devised & deployed for clean technologies in Dubai. A regulatory framework to attract strategic partnership and joint ventures, in addition, to government support for implementation of new projects and technologies has also been developed.

Market Transformation

To respond to fast growing demand of infrastructure development, a market-based approach using Public Private Partnerships promises to meet Dubai's needs. Such an approach leverages funding sources and helps balance the risk between the government and private investors. By fostering partnerships with leading international firms in clean energy, Dubai also aims to develop its local capacities through transfer of knowledge and skills.

. Therefore, since its inception, the DSCE has rolled out a series of step by step regulatory reforms and policies to open the electricity market for independent power producers (IPPs). This involved establishing the Regulatory and Supervisory Bureau (RSB) for the electricity and water sector in 2010. Part of RSB responsibilities include licensing of new entrants in the power sector. One of the pillars of Dubai Sustainable Energy Model and a crucial factor in transforming the energy market of Dubai is the review of electricity and water tariff structure. In 2011, DEWA introduced cost-reflective tariffs to incentivize lower consumption and more efficiency in the use of electricity and water. This sent positive signals to clean energy investors as the market became economically attractive for clean technologies, allowing for successful public private partnerships (PPP). In other words, Dubai's robust regulatory framework resembles the tenets for sound policy design to attract investment, namely: 1) Transparency; 2) Longevity; and 3) Certainty.

Security and Diversification of Dubai Energy Supply while Maintaining Sustainability

The security of supply to power Dubai economy has been thoroughly evaluated where a drastic shift from dependency on fossil fuel to renewables has culminated a target of 25% of clean installed capacity by 2030 and 75% by 2050 using CO₂-free generation sources. To achieve these targets, Dubai took progressive strides in integrating solar power into its energy mix portfolio, which is currently dependent mainly on imported natural gas. Its robust regulatory framework and commercial terms have attracted international and regional investors to achieve the lowest levelized cost of electricity (LCOE) for the 200MW at 5.64 US cent/kWh and recently announced 800 MW solar photovoltaic (PV) power plant at 3.0 US cent/kWh. This development marked a turning point in the journey to diversify Dubai's energy mix and demonstrated the value proposition of strategic public private partnerships for risk management, knowledge transfer and job creation.

The transformation of the energy sector in Dubai is also taking place at the customer side. Dubai residents can now generate their own electricity using solar panels that can also feed extra energy to Dubai power grid. This step will gradually transform the consumers to prosumers: a term used to describe consumers that also generate part of their own energy consumption. Currently Dubai deploys a simple net-metering system where customers achieve savings by generating their own electricity.

Demand Side Management

A reduction in Dubai's energy-demand, as compared to the business-as-usual scenario, is one of the objectives of the Dubai Integrated Energy Strategy 2030. In order to achieve its target of a 30% energy demand reduction by 2030, Dubai has implemented a detailed Demand Side Management (DSM) Strategy for electricity and water, an initiative that is the first of its kind in the region. This opened up new business opportunities for sustainable and efficient businesses by outlining policies, regulations, awareness schemes, technologies and finance schemes.

The strategy is based on nine programs with specific database, reduction targets and enablers to influence behavior and unleash thoughtful measures following twenty four months of stakeholders' engagement and global benchmarking: Building Regulations, Building Retrofits, District Cooling, Standards and Labels for Appliances and Equipment, Water Reuse and Irrigation, Outdoor Lighting, Change of Tariffs, Demand Response, and Distributed Solar.

Green Mobility in Dubai

Striving to become one of the most sustainable, smart cities in the world, the Emirate of Dubai has launched the Green Mobility Initiative to accelerate the uptake of hybrid and electric vehicles (EVs). The initiative complements the spirit of Dubai Plan 2021 by providing alternative modes of transportation that can save fuel and reduce carbon emissions.

Given that road transportation is the third largest source of Dubai greenhouse gas (GHG) emissions, this initiative becomes an important contributor to Dubai Carbon Abatement Strategy 2021 which aims to reduce carbon emissions by 16% in 2021 compared to the business as usual (BAU) scenario.

In order to create the market for such vehicles, the Dubai Supreme Council of Energy (DSCE) and its entities followed a comprehensive approach that is founded on the principle of “leading by example” by government entities. A detailed analysis of market potential and size led to a penetration target of 10% of hybrid and EVs in government fleet by 2021.

In addition to creating a market for hybrids and EVs, leading by example will enable the government to build the learning curve necessary to expand the deployment of such vehicles in the arid climate of Dubai. For example, hybrid vehicles were already proven to function successfully as demonstrated by the Road and Transportation Authority (RTA) of Dubai. They used over 140 hybrid taxis in 2015, reporting about 30% fuel savings and no performance challenges. The RTA is currently planning to convert 50% of its fleet to hybrid taxis by 2021.

Dubai Carbon Abatement Strategy 2021: Local Action...Global Change

In a short span of time, the Emirate has created a platform to drive specific programs and projects where opportunities and innovation can encounter energy challenges. A first-in-the-region, the Dubai Carbon Abatement Strategy 2021, details programs which integrate alternative and renewable energy to diversify Dubai's generation mix, manage its demand to increase efficiency and develop sector-based reduction targets for Greenhouse Gases (GHG).

To design a performance-based program for carbon abatement, the strategy defined major sectors contributing to carbon emissions, referred to as “high impact sectors”. Based on the carbon emissions profile for 2011, these sectors are: power and water, manufacturing, road transportation, and waste. A technical evaluation of the emission reduction potential for these high-impact sectors was carried out with the support of Dubai Carbon Centre of Excellence, resulting in a target of 16% reduction of greenhouse-gas emissions (GHG) by 2021 in comparison with the business-as-usual estimations for the same year.

In 2015, Dubai Carbon Abatement Strategy members saved a staggering 5.7 million ton CO₂e or what is equivalent to 10.6% reduction from business as usual of 2015.

Steady Steps to become a Role Model in Energy Management and Sustainability

The efforts of UAE and Dubai in spearheading clean energy development in the region contribute greatly beyond the borders of the UAE. In fact, Dubai's achievements directly relate to several United Nation Sustainable Development Goals, such as “providing affordable and clean energy”, “industry innovation and infrastructure”, “sustainable cities and communities” and “climate change”. In a rapidly changing world, Dubai has seized the opportunity to follow a sustainable development pathway as it continues to grow. The clear and supportive vision of its leadership paved the way to develop a long term strategy and deliver phased but steady implementation progress to achieve the goals of its Integrated Energy Strategy 2030. This galvanized the trust of the private sector resulting in successful public private partnerships (PPP) that drove the cost of solar energy to unthinkable ranges, impacting the future of solar not only in Dubai but the entire region.

The Emirate's model is emerging as a benchmark for the transition to a clean energy future in a region historically perceived as a synonym to “oil”. As we approach 2030, Dubai is expected to turn its sunny days into a sustainable fuel for generations to come and deliver strategic programs to support its Green Agenda to become a role model in energy management and sustainability.



Figure 2: Dubai Sustainable Energy Model and its 10 pillars.