



Cleantech in the Middle East

Renewables, Energy Efficiency,
Agritech & E-Mobility

A paper by Sunergy Advisory for Enterprise Ireland

Contents

Introduction	
Renewable Energy	2
United Arab Emirates (UAE)	3
Kingdom of Saudi Arabia (KSA)	7
Egypt	11
Oman	16
Energy Efficiency	20
United Arab Emirates (UAE)	20
Kingdom of Saudi Arabia (KSA)	22
Egypt	24
Oman	26
Agritech	28
United Arab Emirates (UAE)	29
Kingdom of Saudi Arabia (KSA)	32
Egypt	36
Oman	39
Electric Mobility	42
United Arab Emirates (UAE)	42
Kingdom of Saudi Arabia (KSA)	47
Egypt	53
Oman	60

Introduction

Within the dynamic interdisciplinarity of renewable energy, energy efficiency, agritech, and electric mobility, this report embarks on a comprehensive exploration of the United Arab Emirates (UAE), the Kingdom of Saudi Arabia (KSA), Egypt, and Oman. These nations, nestled in the heart of the Middle East and North Africa (MENA) region, are at the forefront of a transformative journey towards sustainable, technologically-driven energy and agricultural systems.

At present, Egypt shines as a leader in the MENA region, boasting the highest total installed capacity of renewable energy sources. Trailing closely are the UAE and KSA, which have made remarkable strides in the pursuit of renewable energy, demonstrating a mature ecosystem with clear targets and a rich tapestry of initiatives. KSA, in particular, showcases unparalleled potential, especially in the domain of solar energy production, underscoring its significance as a regional powerhouse.

The UAE, with its clear strategic vision, provides a well-established model for advancing renewable energy and sustainable agriculture, setting high standards for the rest of the region to follow. Meanwhile, KSA is diligently forging ahead, actively advancing key projects, emphasizing technology localization, and nurturing a robust value chain for the sector.

In contrast, Egypt and Oman find themselves in the early stages of their renewable energy evolution, necessitating increased engagement from stakeholders to unlock their full potential.

As we traverse the scientific landscape of these countries, it becomes apparent that the regulatory, financial, and innovation terrains differ significantly among them. These variations present both unique challenges and extraordinary opportunities within the renewable energy, energy efficiency, agritech, and electric mobility sectors, each requiring tailored approaches to maximize impact.

Furthermore, the realm of renewable energy in MENA is poised for a seismic shift with the emergence of green hydrogen. The growing demand for this clean energy source is underpinned by its ability to serve as an hourly, authenticated input for electrolysis, an integral process for clean hydrogen production. In a resounding chorus of commitment to sustainability, all the countries under review have unveiled ambitious projects and set targets for green ammonia and green hydrogen.

As we venture deeper into the heart of these transformative energies and agricultural ecosystems, this report seeks to unravel the intricacies, challenges, and prospects that shape the landscape of renewable energy, energy efficiency, agritech, and electric mobility in the UAE, KSA, Egypt, and Oman. Herein, we delve into the market analysis, stakeholders, project landscape, and regulatory environment shaping the MENA region's sectors. Together, these nations stand as beacons of progress, illuminating the path towards a greener, more sustainable future for the MENA region and the world.



2 Renewable Energy

The MENA region presents an evolving market for renewable energy. The UAE has set its sights on achieving Net Zero by 2050, with a target of 50% renewable energy capacity. Saudi Arabia has outlined a goal of generating 58.7 GW of renewable energy by 2030, while Egypt aims to increase the proportion of electricity generated from renewables to 20% by 2022 and 42% by 2035. Oman, on the other hand, envisions 10% of its energy mix coming from renewables by 2025 and targets 30% of electricity demand from renewable projects by 2030.

2.1 United Arab Emirates (UAE)

Market Analysis

The UAE government has set various targets to be achieved in order to reach Net Zero by 2050. These targets are short-term (by 2030) and long-term (by 2050) and can be summarized as follows:

Renewable Energy Targets by 2030:

- Triple renewable energy by 2030.
- Increase clean energy capacity to 19.8 GW by 2030.
- Reach 30% clean energy in the energy mix by 2030.
- Achieve 32% clean energy generation by 2030 for climate change mitigation.
- Create 50,000 green jobs by 2030.
- Save 100 billion dirhams, and invest 150-200 billion dirhams for energy demand and growth.

Energy Strategy 2050:

- The country aims to generate 50% of its energy from renewable sources by 2050, with a target of 44% renewable energy capacity by then.
- The long-term target is to decrease the carbon footprint by 70% by 2050.
- Increase Consumption Efficiency of individuals and corporations by 40% by 2050.
- Implement the Dubai Clean Energy Strategy 2050 with the aim of 75% clean energy of Dubai's power capacity by 2050.

- The Emirate of Ras Al Khaimah aims for 30% energy savings, 20% water savings, and 20% renewable energy contribution by 2040, with a target of 44% renewable energy by 2050.

The UAE is one of the major oil-producing economies in the world. However, it has also been one of the leaders in the energy transition. Each transition comes with its own challenges, and some of the challenges that the UAE is facing include:

- **Intermittent Infrastructure:** While the UAE is working on developing its infrastructure for renewable energy, it can be intermittent, requiring energy storage and smart grid technologies.
- **Lack of Technical Skills:** Relying on imports can lead to higher costs and longer lead times.
- **Market Design Need:** The challenge facing policymakers is not the lack of resources but rather the requirement for a market structure that is adaptable and capable of dealing with unconventional fuels and renewable energy.
- **Clean Oil Generation:** A challenge to find ways to generate oil more cleanly since it will still have a position in a new energy system.
- **Competition from low-cost fossil fuels:** Low-cost fossil fuels remain a challenge to the growth of renewable energy.

Despite these challenges, the UAE has created many opportunities to accelerate its energy transition and diversify its economy, such as:

- Aiming to triple its renewable energy contribution by spending between AED 150-200 billion (USD 40-54 billion) by 2030.
- Launching several major renewable energy projects, such as the 5.0 GW Mohammed bin Rashid Al Maktoum Solar Park in Dubai (by 2030) and the 1.0 GW Noor Abu Dhabi solar project.
- The country's Net Zero 2050 Strategic Initiative calls for Dh600 billion to be invested in clean and renewable energy sources over the next three decades.
- The UAE has invested over \$50 billion in clean energy technologies worldwide over the past 10 years, and the Abu Dhabi Fund for Development has completed renewable energy projects worth AED 117.3 million (\$31.9 million) in 2020 across various countries.

In conclusion, the UAE government is showing genuine interest in energy transition and renewable energy (RE) projects and has taken strong steps to meet its targets in the near future.

Stakeholders Mapping

Government Entities



Private Sector Stakeholders



Regulatory Environment

The regulatory framework for renewable energy in the UAE is robust, ensuring the effective integration of distributed energy resources into the national grid. The Federal Distributed Energy Law in the UAE is a pivotal piece of legislation governing the connection of Distributed Production Units (DPUs) to the Distribution Network. This law pertains to Producers, Service Providers, and Electrical Installations Contractors operating within economic, free, and investment zones.

Under this law, the Competent Authority is mandated to:

- Approve the general policy for electric power production from DPUs.
- Determine the electrical voltage and size of DPUs.
- Adopt the "Annual Limit" to achieve policy targets.
- Monitor and supervise producers to verify compliance with the laws.
- Issue licenses for energy production and distribution.
- Impose fines and penalties, enforce corrective measures, and ensure adherence to local legislation.

The Competent Authority, which could be the Ministry of Energy and Infrastructure or the local authority overseeing electricity production, distribution, and supply, is also responsible for regulating supply tariffs, fees, and costs associated with:

- Imported Electric Power.
- Exported Electric Power.
- Surplus Energy.
- Connecting Distributed Production Units to the network.

Cabinet Decision No. 103 of 2022 prescribes penalties for any non-compliance with the Federal Distributed Energy Law. These penalties can include monetary fines, suspension of Connection Agreements, cancellation, and other administrative penalties as determined by the Competent Authority.

In Dubai, the Executive Council Resolution No. 46 of 2014, known as Shams Dubai, is designed to foster the adoption of solar panels in residential and commercial buildings. This resolution sets forth the requirements for solar power generating units to connect to the power distribution system. Producers are empowered to generate electricity using solar PV systems on their premises and export any excess generation to the distribution network. The net-metering credit facilitates a direct exchange of values, with each kilowatt-hour (kWh) generated credited against future consumption. The resolution stipulates a maximum installed capacity of 1,000 kW per plot, which is a reduction from the previous limit of 2,080 kW, effective since May 2020.

The Small-scale Solar PV Energy Netting Regulation in Abu Dhabi, enacted in 2017, introduces an energy net-metering system specifically for small-scale solar PV owners. It allows them to receive credits for surplus electricity generated by their panels, which can be fed back into the grid. This regulation is applicable to customers, producers, licensed contractors, and entities connected to small-scale solar PV systems with an aggregate capacity of up to 5MW within a single premises.

This comprehensive regulatory environment ensures the orderly development of renewable energy in the UAE, facilitating the transition towards a sustainable and energy-efficient future.

Financial Landscape

In the UAE, utility-scale renewable energy projects, often structured as Independent Power Projects (IPPs), secure long-term financing through various channels. Sponsors typically obtain limited or non-recourse project financing from both local and international commercial banks and, occasionally, from foreign export credit agencies.

These large utility-scale renewable power projects are generally awarded through competitive bidding processes.

The entities responsible for issuing these bids include the Abu Dhabi Department of Energy (DOE), the Dubai Electricity and Water Authority (DEWA), the Sharjah Electricity and Water Authority (SEWA), or the Etihad Water and Electricity (Etihad WEC). At times, the projects may also be tendered directly by local municipalities.

The regulatory framework guiding these projects includes:

- Abu Dhabi IPP Law: Overseen by the Abu Dhabi Law No. 2 of 1998 (as amended), this law governs independent water and power projects in the Emirate of Abu Dhabi.
- Dubai IPP Law: Projects in Dubai are awarded contracts through competitive bidding processes, which lead to long-term power purchase agreements (PPAs) with EWEC and DEWA acting as single-buyer off-takers, under the auspices of Law No. 6 of 2011.

The IPP framework in the UAE offers financial benefits to private sector participants, providing safeguards like take-or-pay protection and payment mechanisms in cases of grid failure or political changes.

While there are currently no direct financial or regulatory incentives for utility-scale renewable energy projects, Abu Dhabi has initiated a clean energy certificate scheme to spur investment in the sector. This scheme operates alongside other incentives, such as the Dubai Green Fund, which provides loans to investors in the renewable energy sector.

Acting as DEWA's investment arm, the fund extends its support to clean energy projects at strategic locations like the Dubai International Airport and the Jebel Ali Free Zone Authority.

This financial landscape, underpinned by a supportive legal and regulatory framework, is integral to advancing the UAE's renewable energy ambitions, providing a robust foundation for investment and growth in this critical sector.

Projects Landscape

By the end of 2022, the UAE had completed or begun constructing 11 large environmentally friendly energy projects costing 159 billion dirhams (\$43.30 billion). The main projects include:

- **Al Dhafra Solar PV:** The Al Dhafra Solar PV project in Abu Dhabi, which is the world's largest single solar site, is overseen by the China National Machinery Engineering Co., Ltd., with a production capacity of 2.3 GWh. Jinko Solar has supplied 25 MW of high-efficiency n-type TopCon solar panels, while Arctech is providing 2.1 GW of solar tracking systems. The project is expected to connect to the grid in mid-2023.
- **Mohammed bin Rashid Al Maktoum Solar Park:**
 - 5th phase: DEWA has added 300 MW of photovoltaic solar energy to the park, bringing its total capacity to 900 MW with investments estimated at 2 billion and 58 million dirhams, aiming to complete this phase by 2023.
 - 6th phase: It will have a capacity of 900 MW from photovoltaics (PVs) and will be operated in phases starting in Q3 2025, with a total capacity of 3,760 MW, targeting 5,000 MW by 2030.
- **Al-Ajban Station:** EWEC has invited developers to submit expressions of interest to implement the 1500MW PV station in Abu Dhabi. The project is expected to reduce more than 2.4 million metric tons of carbon emissions annually and to meet the electricity needs of 160,000 homes in the UAE.
- **Waste-to-Energy Plant:** Tadweer and EWEC have launched a tender to construct the plant in Abu Dhabi, which will have an electricity production capacity of 90 MW from 1 million tons of waste annually.
- **Clean Energy Certification:** Emirates Global Aluminium (EGA) has acquired clean energy credits for 1.1 million MWh of electricity supplied by EWEC.

In addition to the aforementioned projects still in the development phase, there are other projects that are already installed, such as:

- **Wind Energy:** The UAE Wind Program by Masdar, a 103.5-megawatt (MW) landmark project, was completed in 2023. It is expected to power more than 23,000 UAE homes annually and displace 120,000 tons of CO₂ emissions. The project spans four locations: Sir Bani Yas Island in Abu Dhabi (45MW capacity), Delma Island (27MW), Al Sila in Abu Dhabi (27MW), and Al Halah in Fujairah (4.5MW).
- **Solar Energy:** The Bab Al Shams Solar PV Plant (1.2 MW), Masdar City Solar Photovoltaic Plant (annually generating 17,564 MWh), Masdar City rooftop solar PV (1 MW), Khazna Data Center Photovoltaic Plant (7 MW capacity), and Shams (Installed Capacity: 100 MW).
- **Biomass Energy:** In 2017, BEEAH Energy and Masdar formed the Emirates Waste to Energy Company (EWTE), the UAE's first waste-to-energy venture. Their initial project, the Sharjah Waste to Energy plant, can process 300,000 tons of waste annually, producing 30 MW of clean energy, which is enough to power 28,000 homes.

2.2 Kingdom of Saudi Arabia (KSA)

Market Analysis

The Kingdom of Saudi Arabia (KSA) holds a pivotal role in advancing the development of renewable energy, underpinned by policy commitments and strategic initiatives driven by the Ministry of Energy (MOE), the National Renewable Energy Program (NREP), and the Public Investment Fund (PIF). In alignment with Vision 2030, KSA has set an ambitious target to generate 58.7GW of renewable energy by 2030, with an interim goal of 27.3GW by 2024. The breakdown for the 2030 target is 40GW from solar photovoltaic (PV), 16GW from wind, and 2.7GW from concentrated solar power (CSP). The MOE is tasked with procuring 30% of the 2030 renewable energy target through competitive public tenders, while the PIF is set to develop the remaining 70% through direct negotiations with developers. Committed to environmental stewardship, Saudi Arabia has vowed to achieve net-zero carbon emissions by 2060.

To bolster the solar market's expansion, Saudi Arabia has introduced several initiatives and programs, including:

- National Renewable Energy Program eProcurement Portal: A centralized platform to streamline the procurement processes for renewable energy projects.
- Mutajadedda: An initiative under the NREP eProcurement Portal designed to accelerate the deployment of renewable energy.
- Tarshid**: Another branch of the NREP eProcurement Portal focusing on energy efficiency and sustainability.
- Saudi Green Initiative An ambitious plan to reduce carbon emissions by 278 million tons per annum by 2030, marking it as the initiative's second key objective.

Despite the strategic vision, Saudi Arabia confronts several challenges that impede the swift rollout of renewable energy projects:

- Regulatory Hurdles: The Ministry of Municipal, Rural Affairs, and Housing has placed roadblocks on grid-connected projects within the residential and commercial & industrial (C&I) solar sectors. For the past three years, this has become a significant impediment, leading to a contentious debate between the need for a transparent PV project approval process and the reality of applications being stalled indefinitely.
- Local Content Requirements: Ambiguities in local content requirements for the foreseeable future (the upcoming 5 years) have cast a shadow of uncertainty over suppliers. Despite numerous announcements regarding local solar manufacturing, substantial manufacturing facilities have yet to be established.

Addressing these challenges is imperative for KSA to meet its renewable energy objectives and contribute to global sustainability efforts effectively.

Stakeholders Mapping

Government Entities



Private Sector Stakeholders



Regulatory Environment

In the Kingdom of Saudi Arabia, the government has established a comprehensive framework to facilitate the development of renewable energy. At the core of this framework is the Renewable Energy Project Development Office (REPDO), serving as the principal interface for investors and developers interested in the kingdom's renewable energy opportunities. REPDO's mandate encompasses the development, implementation, and oversight of renewable energy projects across the nation.

The Renewable Energy and Energy Efficiency Law constitutes the bedrock of the kingdom's legal framework for renewable energy. It defines the development landscape for renewable energy projects and delineates the roles and responsibilities of all involved stakeholders, including investors, developers, and governmental bodies.

The current regulatory instruments include:

- **Tenders:** The Saudi government, through REPDO, releases tenders to engage the private sector in the construction and operation of solar power facilities. These tenders are detailed in comprehensive Request for Proposal (RFP) documents that specify the technical, regulatory, and financial details of each project.
- **Build-Own-Operate (BOO):** The BOO model is a contractual pathway wherein private entities are contracted by the government to design, finance, build, own, and operate solar power plants. The electricity produced is then sold to the Saudi Principal Buyer (SPB) under a long-term Power Purchase Agreement (PPA).

- **Self-consumption:** To reduce reliance on grid electricity and enhance sustainability, the Saudi government promotes self-consumption of solar energy. Policies and regulations have been put in place to support the adoption of self-consumption systems, underscored by incentives such as the Net Billing policy. The cost savings from self-consumption range from 0.031-0.048 SAR/kWh (approximately 0.0083-0.013 USD/kWh), varying according to the time of energy consumption.

Through this well-articulated regulatory environment, KSA is solidifying its position as a forward-thinking leader in renewable energy, poised to meet its ambitious energy goals while fostering a sustainable future.

Under this law, the Competent Authority is mandated to:

Financial Landscape

Saudi Arabia has embarked on an ambitious journey to reshape its economy, with a keen focus on reducing its reliance on oil by fostering renewable energy projects. The success of this shift hinges on the accessibility of financial resources dedicated to the development of sustainable energy. This section delineates the spectrum of local funding sources and financial mechanisms underpinning renewable energy ventures in the kingdom. Some of these mechanisms are:

- **Development Funds:** The Saudi government has instituted a number of development funds with a mandate to catalyze renewable energy projects. These funds serve as a conduit for loans, grants, and equity investments, empowering companies engaged in the renewable sector.
- **Local Banks and Financial Institutions:** With the government's increasing endorsement and a more defined regulatory landscape, local banks and financial institutions are progressively participating in the renewable energy domain, offering loans and credit facilities to entities focused on renewable initiatives.
- **Sovereign Wealth Funds:** The Public Investment Fund (PIF), Saudi Arabia's sovereign wealth fund, has become a pivotal player, channeling investments into renewable energy projects both within the kingdom and abroad. This strategic pivot underscores a commitment to sustainable energy development.

- **Private Equity and Venture Capital:** The private sector's role in financing renewable energy projects is burgeoning.
- Private equity and venture capital have become more accessible, attracted by the sector's promise of high returns and its beneficial impact on the economy.
- **Green Bonds and Sukuk:** The introduction of green bonds and Sukuk (Islamic bonds) has opened new avenues for financing renewable energy projects. Tailored to resonate with ethical and Islamic investment principles, these instruments adhere to Sharia law, expanding the appeal to a diverse range of investors.
- **Crowdfunding:** While still in early stages of development, crowdfunding platforms are beginning to emerge as an innovative funding source, especially for small and medium-sized renewable energy projects. This democratizes investment opportunities, allowing a wide investor base to contribute to renewable energy funding.

Together, these multifaceted financial avenues—from government-backed initiatives to contemporary banking, and alternative financing methods—constitute a formidable financial ecosystem that underpins the expansion of the renewable energy sector in Saudi Arabia.

It is noteworthy that the kingdom has achieved the world's lowest levelized cost of electricity (LCOE) in renewable energy without subsidies, underpinned by zero-subsidy projects and localization requirements. This exceptional position has led local regulators and policymakers to view additional incentives such as tax benefits or subsidies as unnecessary within the current framework.

Projects Landscape

Saudi Arabia's energy sector has witnessed significant growth in renewable energy projects, particularly in 2022. The Saudi Energy Procurement Company spearheaded the launch of five major projects with a combined capacity of 3,300MW, marking a substantial step towards the kingdom's renewable energy targets:

- Wind Projects: Three wind energy projects have been initiated with substantial capacities:
 - Yanbu Wind Project at 700MW
 - Al Ghat Wind Project at 600MW
 - Waad Alshamal Wind Project at 500MW
- PV Projects: Two photovoltaic projects are set to contribute significantly to the solar energy capacity:
 - Al Hanakiya PV Project at 1,100MW
 - Tabarjal PV Project at 400MW

Power Purchase Agreements (PPAs) play a pivotal role in the development of these projects:

- The Ministry of Energy awarded two renewable energy projects with a total capacity of 1,000MW, located in Qassim and Ramah in Riyadh.
- The Layala Solar Project, boasting a 91MW capacity, resulted from a PPA signed between ACWA Power and SEPC for a value of 401 million-SAR.
- Additional projects contributing to the landscape include Al-Rass Solar at 700MW, Saad Solar at 300MW, Jubail 2 PV at 110MW, and the King Abdullah Economic City project at 12.5MW.

Other notable developments include:

- World's Largest Solar Steam Plant: A memorandum of understanding (MoU) was signed between Ma'aden and GlassPoint for this pioneering project.
- First Fully RE-Powered Desalination Plant: An MoU between ENOWA, Veolia, and ITOCHU will give rise to this innovative facility.
- Largest Carbon Capture Centre in the Middle East: An agreement between the Ministry of Energy and Saudi Aramco is set to establish this significant environmental project.
- PV Hardware Factory: Situated in Jeddah, this facility is anticipated to have an annual production capacity of 8GW.
-

Since 2018, KSA has completed approximately 13 renewable energy projects, cumulating in a total capacity of 3.7 GW. The focus has largely been on solar energy, with 12 projects dedicated to this, alongside a single project for wind energy:

- **Wind Energy:** The Dumat Al Jandal wind park, with a capacity of 400MW, stands as the sole wind energy project at present.
- **Solar Energy:** A series of solar energy projects highlights the kingdom's commitment to solar power, with the Sakaka Solar PV Park leading as the first large-scale utility project in Saudi Arabia at 405MW. Other solar projects include Qurrayat at 200MW, Shuaiba at 600MW, Madinah at 50MW, Rabigh at 300MW, Rafha at 20MW, Jeddah at 300MW, Mahad Dahab at 20MW, Saad at 300MW, Wadi Adwawser at 120MW, Alras at 700MW, and Layla at 80MW.

These projects collectively enhance KSA's position in the global renewable energy sector, contributing to a greener and more sustainable energy future.

2.3 Egypt

Market Analysis

Egypt's renewable energy sector is ambitiously working towards elevating its green energy output to account for 20% of the country's total electricity by 2022, with a further aim to reach 42% by 2035. These targets are depicted in the New and Renewable Energy Authority (NREA)'s Figures 1 and 2. The government has also delineated specific goals to achieve 7.2 GW of wind energy, 2.8 GW from solar CSP by 2027, and 700 MW from photovoltaics (PV) by the same year. As of July 2023, Egypt has not yet defined a net-zero carbon target.

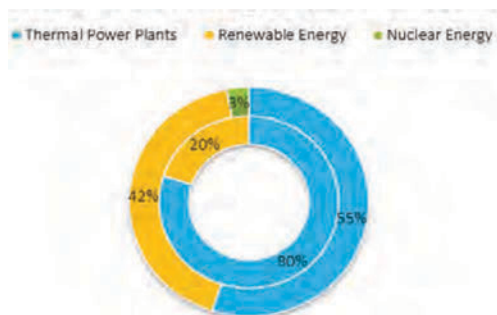
Key Aspects of Egypt's Renewable Energy Market:

- The renewable energy sector has been somewhat constrained by a low level of private sector engagement in energy investments and a reliance on a limited range of oil import sources, which has hindered the advancement of energy production and consumption technologies.

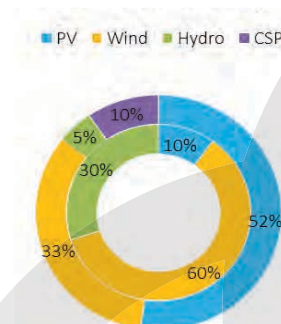
- The country's transmission and distribution infrastructure is in need of modernization, which currently presents challenges for the seamless integration of variable wind and solar energy sources.
- Economic pressures, such as foreign currency shortages and a widening budget deficit, have placed significant stress on the nation's finances.
- The volatility of the Egyptian pound, especially against foreign currencies, raises concerns for renewable projects that depend on foreign investment, potentially leading to escalated costs.

Despite these challenges, Egypt has made notable strides in the renewable energy realm, as outlined by the Minister of Electricity and Renewable Energy:

- Over the past nine years, Egypt has channeled investments amounting to 355 billion Egyptian pounds into the development of solar and wind energy infrastructures.
- Plans are underway to enhance the national grid with an additional 1,000 megawatts from solar and wind power plants in Sohag, Minya, and Aswan by 2025.
- To catalyze investment in the renewable energy sector, the country extends various incentives, including land allocation, facilitation of information and environmental impact assessments, long-term power purchase agreements, exemptions from customs duties, and the provision of sovereign guarantees.



)#*+,-.)/&#%#*0%12\$3,"1/'4,%5,&#*'
6(7(('8.9'(7:;<'6=>)?@')#*+,<



!"#\$%&:')#*+,-.'>&/&A5BC&')/&#%#*D&3E/1C1#"&.'6(7(('8.9'
(7:;<'6=>)?@')#*+,<

Stakeholders Mapping

The key government entities in the renewable energy market in Egypt are:

- The Supreme Council of Energy (SCE)
- Ministry of Electricity and Renewable Energy (MoERE)
- Ministry of Petroleum (MoP)
- Egyptian Electric Utility & Consumer Protection Regulatory Agency (EgyptERA)
- Gas Regulator Authority
- Egyptian Electricity Holding Company (EEHC)
- Egyptian Electricity Transmission Company (EETC)
- Hydro Power Plants Executive Authority (HPPEA)
- New and Renewable Energy Authority (NREA)

Some of the key private sector companies in Egypt include:

- Vestas Wind Systems AS
- SkyPower Ltd
- Siemens Gamesa Renewable Energy SA
- Orascom Development Holding AG
- Elsewedy Electric Co S.A.E.
- Scatec Solar ASA
- Infinity Power
- Solariz Egypt
- Karm Solar
- Masdar
- Hassan Allam Holding

Regulatory Environment

Egypt's trajectory toward renewable energy expansion is underpinned by a series of regulatory frameworks developed by the government. These regulations are designed to promote and facilitate the deployment of renewable energy technologies. The evolution of these legislative measures is summarized as follows:

- 1986: Establishment of the New and Renewable Energy Authority (NREA) under Law No. 102.
- 2014: A pivotal year that saw:
 - The initiation of Electricity Tariffs Reform.
 - The introduction of the Feed-in Tariff (FiT) Mechanism with Cabinet Decree No.1974.

- The reorganization of NREA, endorsed by Presidential Decree No. 135.
- The passage of Renewable Energy Law No. 203, laying the foundational legal framework for renewable energy.
- 2015: The enactment of The Electricity Law No.87, offering a comprehensive regulatory approach to the electricity sector.
- 2016: Further development of the FiT Mechanism with Cabinet Decree No. 2532 and the allocation of land for renewable projects through Presidential Decree No. 116.
- 2017: Implementation of a net metering scheme for photovoltaic projects up to 20 MW with Periodical Decree No. 3.
- 2019: Cabinet Decree sets specific electricity prices for biomass under the FiT scheme.
- 2020: Restructuring of the Net Metering Scheme with Periodical Decree No. 2.
- 2022: A series of Periodical Decrees (Nos. 3, 5, 6, 7, and 10) introduce regulations covering various aspects of renewable energy use, including net metering, self-consumption, electric vehicle charging, and the integration of renewables in irrigation projects.
- 2023:
 - Regulations for purchasing electricity generated from renewable sources are outlined in Periodical Book No. 2.
 - Presidential Decrees No. 51 and No. 55 allocate land in Sohag, Aswan, and Matrouh Governorates for renewable energy plant construction.

These regulatory measures exhibit Egypt's strategic approach to fostering a supportive environment for renewable energy, reflecting the government's ongoing commitment to energy diversification and sustainability.

Financial Landscape

Egypt's renewable energy sector has witnessed significant support from a variety of initiatives and contributions, spanning investments, training, capacity

building, awareness campaigns, research and development, as well as the enhancement of labs and processes. The support for renewable energy (RE) market development in Egypt includes funding from international and national institutions:

- **International Support:** Funding has been provided by international bodies such as the Agence Française de Développement, European Bank for Reconstruction and Development, European Union, United Nations Development Program, International Renewable Energy Agency, and more.
- **Bilateral Cooperation:** Joint committees and agencies from countries like Germany and Japan, including the Egyptian-German Joint Committee on Renewable Energy, Energy Efficiency and Environmental Protection, and the Japan International Cooperation Agency, have contributed to the financial landscape.
- **Regional and Global Financing:** Contributions from the League of Arab States, Regional Center for Renewable Energy and Energy Efficiency, and the World Bank have played a significant role.
- **National Banks:** Local financial institutions have also supported the sector, offering various financing mechanisms.

To facilitate the implementation of RE projects, Egypt employs several schemes:

- **Competitive Bidding:** Developers submit competitive proposals to secure contracts for renewable energy projects.
- **Build, Own, and Operate (BOO):** This scheme involves competitive bidding with Power Purchase Agreements (PPAs), where developers bid to provide electricity at pre-agreed prices.
- **Feed-in Tariff (FiT) Scheme:** The government offers a fixed payment rate for RE producers for electricity fed into the national grid.

Additionally, Egypt provides a range of incentives to stimulate investments in the renewable energy sector:

- **Tax Incentives:** Increased minimum and maximum investment incentives, offering cash incentives from 15% to 55% of the taxes paid.

- **Investment Systems:** A variety of investment systems are available, including internal investment, free zones, investment zones, and technology zones.
- **Tax Deductions:** For projects focused on new and renewable energy or the recycling of agricultural waste, a deduction from net taxable profits of up to 30% is allowed to offset investment costs.

These financial frameworks and incentives underscore Egypt's commitment to fostering a conducive environment for the growth and expansion of the renewable energy sector.

Projects Landscape

Egypt's renewable energy landscape features a mix of wind and solar projects, some completed and others in various stages of development. The Egyptian government has taken proactive steps to facilitate investment in renewable energy, with several large-scale projects announced in recent years, such as:

- **Wind Energy Projects:**
 - **Under Construction:**
 - Gulf of Suez 1 (252 MW)
 - Amunet Wind Farm (500 MW)
 - RSWE Wind Farm (500 MW)
 - **Under Development:**
 - SGRE Wind Farm (500 MW)
 - Suez Wind Energy Project (1,100 MW)
 - Masdar-Infinity Power Project (200 MW)
- **Solar Energy Projects:**
 - **Under Construction:**
 - Abydos Solar PV Plant (500 MW)
 - ACWA Power Kom Ombo Solar Project (200 MW)
 - **Under Development:**
 - Hurghada Solar PV Plant (20 MW)

Investment Opportunities:

- Establishment of PV and wind stations across regions like Benban, Fares, Kom Ombo, and Zaafarana.
- Development of the PV Egypt project to facilitate solar energy projects and overcome barriers facing small on-grid solar systems.

A notable agreement in 2023 underlined Egypt's ambition in the renewable sector: a land allocation for a 10 GW capacity onshore wind farm, one of the largest globally, with an investment of over US\$10 billion. This project is a collaboration between the Prime Minister of Egypt, the Egyptian Ministry for Electricity and Renewable Energy, Masdar, the UAE Ministry of Industry and Advanced Technology, Infinity Power, and Hassan Allam Holding.

Recent years have seen a significant uptick in the number of renewable energy projects. For instance, the 50 MW Zaafarana PV project was commissioned in 2022, and a 252 MW wind power plant in the Gulf of Suez is currently under construction. Additionally, the Hurghada PV facility, including a battery storage system, is in the bidding phase.

Key Installed Projects:

- Wind Energy:
 - Gulf of El Zayt (580 MW)
 - Zafarana Wind Complex (540 MW)
 - RGWE Wind Farm (262 MW)
 - West Bakr Wind Project (250 MW)
- Solar Energy:
 - Benban Solar PV Complex (1,465 MW)
 - El Kuraymat CSP/Thermal Plant (140 MW)
 - Rooftop Solar Plant (97 MW)
 - Zafarana Solar PV Plant (50 MW)
 - Stand-Alone Solar PV Systems (30 MW)
 - Kom Ombo Solar PV Plant (26 MW)

- Biomass Energy:
 - Jabal ElAsfar Biogas Plant Phase 1 (25 MW)
 - Jabal ElAsfar Biogas Plant Phase 2 (27.5 MW)
 - Various Private Sector Projects (3.5 MW)

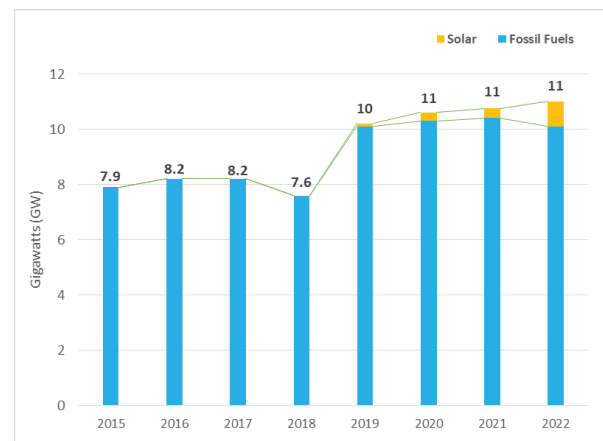
This diverse array of projects demonstrates Egypt's dedication to expanding its renewable energy capabilities and increasing the sustainability of its energy portfolio.

2.4 Oman

Market Analysis

Oman is emerging as a significant player in the renewable energy sector, with a demonstrated growth in solar energy capacity and a strategic commitment to renewable energy integration.

Capacity Growth: As of 2019, Oman's total power capacity reached 12,050 MW, with a notable growth trend of 6% from 2015 to 2022, as reported by the International Renewable Energy Agency (IRENA).



National Energy Strategy: Established in 2015, Oman aims for 10% of its national energy mix, approximately 2.6 GW, to be derived from renewable sources by 2025. By 2030, the country plans to source 30% of its electricity from renewables, with a projected capacity of 13,400 MW by 2040. The strategy specifies capacity allocations for various renewable technologies, targeting a total of 5,500 MW from renewable sources by 2030.

Market Challenges:

- Dependence on oil and gas as primary economic drivers, presenting a transition challenge to clean energy.
- High urban population density increasing energy consumption rates.
- The necessity for innovative solutions, such as utilizing existing gas infrastructure for hydrogen transportation.

- The critical need for investment incentives to bolster the renewable energy sector.
- Reliable data acquisition for securing investments and financing in renewables.

Opportunities:

- Oman's National Strategy for Net Zero by 2050 identifies six decarbonization technologies pivotal to this transition.
- The allocation of 50,000 square kilometers for renewable energy projects, with a development target of 30% by 2050.
- Petroleum Development Oman's commitment to halving its 2019 emission levels by 2030.
- Oman Sustainability Center's oversight of net-zero carbon strategies and the development of a hydrogen economy, expecting an investment influx of \$20 billion by 2050.
- Noteworthy projects include the Duqm and Sohar port initiatives, with potential capacities of up to 3.5 GW of solar energy in collaboration with international partners.

Renewable Energy Projects: OQ Alternative Energy's plan to construct a 250 MW to 500 MW green hydrogen project in the Duqm Special Economic Zone, with phased development culminating in full capacity by 2038. This ambitious project is set to be powered by 25 GW of wind and solar energy, aiming to produce significant quantities of green hydrogen and ammonia.

Oman's strategic approach, coupled with the outlined opportunities and ongoing projects, underscores the Sultanate's commitment to establishing itself as a renewable energy hub in the region.

Stakeholders Mapping

Some of the key government entities in the renewable energy market in Oman are:

- Petroleum Development Oman (PDO)
- Energy Development Oman (EDO)
- Authority for Public Services Regulation (APSR)
- The Council of Ministers
- Ministry of Energy and Minerals
- Ministry of Environment and Climate Affairs
- The Oman Power and Water Procurement Company (OPWP)
- NAMA Holding
- The Public Authority for Electricity and Water (PAEW).

Where some of the key private sector companies are:

- The Oman Power and Water Procurement Company (OPWP)
- NAMA
- The Rural Areas Electricity Company (Tanweer)
- Majan Electricity Company S.A.O.C
- Oman Cables Industry
- SOLAR WADI
- Solis Depot
- Huawei
- Longi Solar
- Oman Solar System Co. LLC (OSS)
- Oman Environmental Services Holding Co. SAOC - be'ah

Regulatory Environment

Oman has laid down a comprehensive legal and regulatory framework to manage its energy sector, promoting the involvement of the private sector and independent power projects.

- Electricity Sector Law (Sultani Decree 78/2004): The fundamental legislation governing energy generation, encouraging private sector engagement.
- Authority for Public Services Regulation:
 - Renewable Energy Focus (Since 2007): The Authority has concentrated on renewable energy, commencing with a potential assessment in 2008 and progressing through various initiatives.
 - Pilot Projects (2010): Launch of rural electrification projects through RAEC, targeting areas without grid connectivity.
 - Solar Potential (2010): Commissioning of consultants to pinpoint locations for large-scale solar power plants.
 - Rural Areas Policy (2013): Inclusion of renewable energy requirements in rural projects and adoption of economic fuel cost evaluations.

- Oman Wind Atlas Project (2015): An initiative to identify prime locations for wind energy projects.
- National Energy Strategy to 2040 (2016): Anticipated approval of policies including economic gas pricing.
- Rooftop Solar PV Adoption (2017): Revision of regulatory frameworks to facilitate the deployment of rooftop solar PV systems.
- Feed-in Tariff Scheme:
 - Provides long-term contracts and guaranteed prices for small-scale renewable projects up to 50 kW.
 - Sets a fixed tariff of 0.055 OMR/kWh for solar PV and 0.04 OMR/kWh for wind energy.
 - Offers a net metering option for consumers with renewable energy installations.
- Customers' Tariffs: Approved new tariffs for electricity and water, covering residential, non-residential, agricultural, fisheries, and cost-reflective categories.
- Cost Reflective Tariffs: Implemented for government, commercial, and industrial customers with annual consumption over 100 MWh, effective from January 1, 2021.

Oman's regulatory measures reflect a strategic approach to fostering renewable energy adoption, ensuring a stable environment for investment and project development in the sector.

Financial Landscape

Oman's financial support mechanisms for its energy sector are an integral part of its strategy to transition to renewable energy and maintain an efficient electricity network. Some of these mechanisms are:

- Financial Support for Electricity Networks:
 - In 2022, the Authority for Public Services Regulation (APSR) indicated financial support for the main connected network at 414.3 million Omani Riyals, against the economic costs of 1,079.6 million Omani Riyals, with subscriber revenues at 665.2 million Omani Riyals.

- Dhofar Electricity System received a support of 68.9 million Omani Riyals, with economic costs of 144.3 million Omani Riyals and subscriber revenues of 75.3 million Omani Riyals.
- Rural Areas Electricity Company was supported with 46.8 million Omani Riyals, covering economic costs of 84.5 million Omani Riyals against revenues of 37.8 million Omani Riyals.
- International Financing: The Asian Infrastructure Investment Bank (AIIB) extended a loan of US\$60 million as part of a US\$400 million financing for Oman's first renewable energy project under the AIIB.
- Investment in the Hydrogen Economy: Oman plans investments surpassing \$30 billion in developing a hydrogen economy, aiming to become a leading hydrogen producer by 2030.
- Subsidy Mechanism: Article (18) of the Sector Law prescribes an annual electricity subsidy provided by the Ministry of Finance to Licensed Suppliers, designed to bridge the gap between the economic cost of supply and the revenue from Permitted Tariffs.
- National Support System: A government initiative to support Omani citizens, mitigating the impact of fuel price liberalization and the cost of public services like electricity and water fees.
- Electricity and Water Subsidies Redirection Initiative: Part of the 2020-2024 financial balance plan, aiming to reclassify subscriber categories, approve tariff structures, strengthen social protection, and direct subsidies to eligible individuals, with a gradual reduction in subsidies to reach unsubsidized rates by 2025.
- Tax Exemptions: Renewable energy projects benefit from a five-year tax exemption under the Income Tax Law, extendable for another five years, applicable to corporate income tax and withholding tax on dividends, interest, and royalties for foreign investors.

Oman's financial measures showcase a robust approach to fostering renewable energy growth while balancing economic and social welfare considerations.

Projects Landscape

Oman has embarked on numerous renewable energy projects to diversify its energy mix and support its growing energy needs sustainably.

Ongoing Projects:

- **Manah 1 and 2 Solar Project:** A combined capacity of 500 MW located in Al Dakhiliyah Governorate.
- **Tanweer:** A hybrid Solar-Diesel Independent Power Project (IPP) with 146 MW capacity, currently in bid evaluation.
- **Petroleum Development Oman:** Developing a 100 MW Duqm solar photovoltaic IPP.
- **Miraah Solar Thermal:** A 1000 GW project with the first 100 MW completed in 2018.
- **Waste Power Plant:** A project between 130 - 150 MW currently under construction.
- **OPWP:** Planning a Waste to Energy Plant in Barka with a capacity of 1000 MW.
- **Madayn/Mubadrah:** Developing a 100 MW Solar Power Plant at Sohar Industrial City.

Sahim Programs:

- **Sahim-I:** An initiative for residential solar photovoltaic (PV) adoption, offering a feed-in tariff for surplus electricity supplied to the grid.
- **Sahim-II:** A program that enables households and businesses to install grid-connected PV systems and receive an export tariff for excess electricity. It aims to deploy PV systems in 3,000 homes, with a potential expansion to 1 GW of solar capacity.

Main Installed Projects:

- **Wind Energy:** Dhofar I wind farm with a capacity of 50 MW.
- **Solar Energy:**
 - Amin Photovoltaic Solar with a capacity of 125 MW.
 - Ibri Solar Project with a capacity of 500 MW.
- **Biomass Energy:** SSDC's Biomethane and Solar PV Power Generation Plant with a capacity of 20 MW.
- **Oil/Gas:**
 - Marafiq/Tanweer Gas-Diesel IPP with 80 MW capacity.
 - Oman LNG's Gas Fired Power Plant at Sur with 120 MW capacity.
 - PDO's Qarn Alam Power Plant Phase V with 20 MW capacity.

Oman's diverse portfolio of projects underlines its commitment to renewable energy and showcases a strategic approach to a sustainable energy future.

3 Energy Efficiency

3.1 UAE

Market Analysis

The energy efficiency market in the UAE is valued at an estimated \$3.2 billion in 2023, experiencing a growth rate of 10% per annum. The expansion of this market is propelled by several key factors:

- Escalating energy costs.
- Supportive government policies, incentives, and subsidies.
- Rising public awareness of energy efficiency's advantages.
- The imperative to bolster energy security and mitigate greenhouse gas emissions.

The Dubai Supreme Council of Energy (DSCE) notes that the UAE government aims to reduce energy consumption by 30% by 2030, benchmarking against 2009 levels.

Challenges within the market include:

- A general lack of awareness regarding the benefits of energy efficiency.
- The high initial investment required for energy efficiency measures.
- A shortfall in skilled labor within the energy efficiency domain.

Emerging opportunities are also shaping the market:

- Innovation in energy-efficient technologies, such as smart grids and energy storage.
- Increasing demand for energy efficiency solutions within industrial and commercial sectors.
- Greater accessibility to financing for energy efficiency projects.

Stakeholders Mapping

The UAE government is a key player in the promotion of energy efficiency, with the Ministry of Energy and Infrastructure spearheading several initiatives, including:

- The National Energy Efficiency Strategy (2013-2030).
- The Dubai Supreme Council of Energy (DSCE).
- The Energy Efficiency Fund.

Financial incentives such as tax breaks and subsidies have also been introduced to encourage energy efficiency projects.

In the private sector, notable companies active in the market include:

- Johnson Controls International L.L.C.
- ENOVA Facilities Management Services LLC.
- ENGIE Solutions.
- Schneider Electric.
- Siemens Industrial LLC.
- Etihad Energy Services Company (ESCO).

These companies provide an array of products and services, including LED lighting, energy management systems, and renewable energy solutions.

Regulatory Environment

The UAE has implemented numerous regulations and policies to facilitate the energy efficiency sector:

- The Dubai Electricity and Water Authority (DEWA) has launched initiatives such as retrofitting over 30,000 government buildings, promoting energy-efficient appliances and vehicles through incentives, and developing a green building code.
- The Abu Dhabi Department of Energy (DoE) has developed a Demand Side Management Strategy with a goal to cut Abu Dhabi's energy consumption by 10% by 2030. It has also launched the Abu Dhabi Energy Savings Program to incentivize private sector energy efficiency and established the Abu Dhabi Energy Services Company (ADESC) to deliver energy efficiency services.

Financial Landscape

Local funding sources supporting energy efficiency projects in the UAE include:

- The Dubai Green Fund (DGF).
- Emirates Development Bank.
- Abu Dhabi Developmental Holding Company (ADQ).
- National Bank of Abu Dhabi (NBAD).
- First Abu Dhabi Bank (FAB).

These entities offer diverse financial products such as loans, guarantees, and equity investments.

DEWA has leveraged government tax incentives to support projects that have contributed to over a 30% reduction in Dubai's energy consumption since 2006.

Project Landscape

Noteworthy ongoing energy efficiency projects in the UAE include:

- The Energy Efficiency Project for Public Buildings, supported by the World Bank, aiming to enhance energy efficiency across 1,000 public buildings.
- The Dubai Integrated Energy Strategy 2030, targeting a 30% reduction in energy consumption by 2030 through initiatives like building retrofits, a new green building code, and the promotion of energy-efficient appliances and vehicles.
- The Dubai Green Building Program, in collaboration with the United Nations Environment Program, is set to encourage green building development in Dubai.

These initiatives have achieved substantial results, including a 20% reduction in energy use in public buildings and support for over 1,000 green buildings in Dubai, leading to noteworthy energy savings and a smaller environmental footprint.

3.2 Saudi Arabia

Market Analysis

The energy efficiency market in Saudi Arabia is valued at approximately \$1.5 billion in 2023, with a growth rate of 12% per annum. Factors contributing to this growth include:

- Rising energy costs.
- Proactive government policies, incentives, and subsidies.
- Growing recognition of energy efficiency's advantages.
- Urgency to enhance energy security and cut greenhouse gas emissions.

The Saudi Energy Efficiency Center (SEEC) estimates that the country could reduce its energy consumption by 30%, amounting to an annual saving of \$30 billion.

Challenges facing the market:

- Insufficient awareness about energy efficiency advantages.
- Substantial initial costs for implementing energy efficiency measures.
- A gap in skilled workforce specific to the energy efficiency sector.

Opportunities arising in the Saudi market:

- Innovations in energy-efficient technologies, including smart grids and energy storage systems.
- Increased demand for energy efficiency services in industrial and commercial arenas.
- More accessible financing options for energy efficiency initiatives.

Stakeholders Mapping

The Saudi government is instrumental in energy efficiency advancement. Initiatives by the Ministry of Energy include:

- The National Energy Efficiency Strategy (2019-2030).
- The establishment of the Saudi Energy Efficiency Center (SEEC).
- The creation of the Energy Efficiency Fund.
- Tarshid, the Super ESCO, formed by the Public Investment Fund (PIF) to promote energy efficiency across the Kingdom.

Financial incentives have been implemented to stimulate energy efficiency projects, including tax breaks

Key private sector players in the market:

- Schneider Electric
- Siemens
- Engie
- Enova
- Alfanar
- Smart Automation Energy
- Tarshid

These entities offer a variety of products and services, such as LED lighting solutions, energy management systems, and renewable energy technologies.

Regulatory Environment

To bolster the energy efficiency market, Saudi Arabia has introduced regulatory measures:

- The Energy Efficiency Law (2018).
- The National Energy Efficiency Strategy (2019-2030).

These frameworks guide the development and execution of energy efficiency projects within the country.

Financial Landscape

Support for energy efficiency projects in Saudi Arabia is provided by:

- The Saudi Energy Efficiency Center (SEEC): Offers grants, loans, and guarantees.
- The Saudi Industrial Development Fund (SIDF): Provides loans for industrial energy efficiency projects.
- The National Commercial Bank (NCB): The largest commercial bank in Saudi Arabia, offering various loan options for energy efficiency endeavors.

The government also incentivizes energy efficiency through:

- Tax deductions: Up to 100% tax break for businesses investing in energy efficiency.
- Encouragement of Public-private partnerships (PPPs) in energy efficiency and renewable energy sectors.

Project Landscape

Prominent energy efficiency projects in Saudi Arabia include:

- The Energy Efficiency Project for Public Buildings, backed by the World Bank, aiming to enhance the energy efficiency of 1,000 public buildings.
- The Industrial Energy Efficiency Project, in collaboration with the Ministry of Industry and Trade and the Global Environment Facility, targeting energy efficiency improvements in 200 industrial enterprises.
- The Saudi Green Building Initiative, supported by the United Nations Environment Program, to foster green building practices.

Achievements of these initiatives:

- The Energy Efficiency Project for Public Buildings has realized a 20% energy consumption reduction in involved buildings.
- The Industrial Energy Efficiency Project has achieved a 15% reduction in energy consumption among participating enterprises.
- The Saudi Green Building Initiative has facilitated the construction of over 100 green buildings, leading to significant energy conservation and environmental benefits.



3.3 Egypt

Market Analysis

The energy efficiency market in Egypt is valued at approximately \$300 million in 2023, with an anticipated growth rate of 15% per annum. This market expansion is propelled by:

- An increase in energy prices; with a 17% rise in July 2023 compared to the previous year, and 36.5% compared to January 2023.
- Supportive government policies and incentives.
- Escalating awareness of energy efficiency benefits.
- The imperative to enhance energy security and mitigate greenhouse gas emissions.

The International Energy Agency (IEA) posits that Egypt could curtail its energy consumption by 20%, equating to yearly savings of \$600 million.

Market challenges include:

- Limited public awareness of energy efficiency benefits, with a 2022 survey by the
- Egyptian Energy Efficiency Agency revealing only 30% awareness among Egyptians.
- High initial costs for implementing energy efficiency measures.
- A shortage of skilled labor within the energy efficiency sector.

Emerging market opportunities:

- Advancements in energy-efficient technologies such as smart grids and energy storage systems.
- Rising demand for energy efficiency services in the industrial and commercial sectors.
- Increased access to financing for energy efficiency projects.

Stakeholders Mapping

The Egyptian government leads the charge in promoting energy efficiency, with initiatives from the Ministry of Electricity and Renewable Energy including:

- The National Energy Efficiency Strategy, targeting a 20% reduction in energy consumption by 2030.
- The Green Transformation Roadmap, a plan for transitioning to a green economy.
- The Energy Efficiency Fund, offering financial support for energy efficiency investments.

In addition, tax breaks and subsidies have been deployed as financial incentives for energy efficiency projects.

Key private sector participants:

- Schneider Electric
- Siemens
- ENGIE Solutions
- Tabreed
- Enova by Veolia

These companies provide an assortment of energy efficiency services and products like LED lighting, energy management systems, and renewable energy technologies.

Regulatory Environment

The Egyptian government's regulations and policies to foster the energy efficiency market include:

- The Energy Efficiency Law (2018), which sets the groundwork for energy efficiency promotion.
- The National Energy Efficiency Strategy (2019), which delineates the government's energy efficiency goals.
- The Green Transformation Roadmap (2021), outlining the strategy for Egypt's transition to a green economy.

These regulatory frameworks provide clear guidance for the implementation of energy efficiency projects in Egypt.

Financial Landscape

Local funding sources and mechanisms to bolster energy efficiency in Egypt encompass:

- The Energy Efficiency Fund, offering loans and grants for energy efficiency projects.
- The Green Transformation Initiative, providing grants and financial guarantees for renewable energy and energy efficiency projects.
- The Industrial Development Fund
- The Commercial International Bank (CIB)
- The National Bank of Egypt (NBE)

These entities provide diverse financing products, including loans, guarantees, and equity investments.

Governmental financial incentives for energy efficiency projects include:

- Tax breaks for purchasing energy-efficient equipment, such as income tax deductions, customs duty exemptions, and sales tax exemptions.
- Subsidies for energy efficiency, covering solar panels, LED light bulbs, and energy audits.

Project Landscape

Significant ongoing energy efficiency projects in Egypt:

- The Sustainable Energy Finance Facility (SEFF), a collaboration with The World Bank, which has funded
- numerous projects and achieved over 10% energy savings.
- The Egypt Sustainable Energy and Environmental Improvement Program (SEEIP) by USAID, targeting gov-
- ernment buildings, appliances, and industry, with over 15% energy savings recorded.
- The Industrial Energy Efficiency Project, aiming to boost efficiency in 200 industrial enterprises in Egypt.

Successful operational initiatives:

Local funding sources and mechanisms to bolster energy efficiency in Egypt encompass:

- A 20% reduction in energy consumption for the Energy Efficiency Project for Public Buildings.
- A 15% decrease in energy consumption through the Industrial Energy Efficiency Project.

- The Green Transformation Initiative has facilitated over 100 MW of renewable energy capacity and
- implemented energy efficiency measures in more than 1,000 buildings.

3.4 Oman

Market Analysis

The energy efficiency market in Oman is currently valued at \$200 million, with an annual growth rate projected at 10%. This market expansion is fueled by:

- Increasing energy prices; with a 6.4% average annual increase over the past decade.
- Supportive government policies, incentives, and subsidies.
- Rising awareness of the benefits of energy efficiency.
- The imperative to enhance energy security and mitigate greenhouse gas emissions.

Market challenges include:

- A lack of public awareness regarding the benefits of energy efficiency.
- High initial costs associated with energy efficiency measures.
- A shortage of skilled labor in the energy efficiency sector.

Emerging opportunities:

- The advent of new energy-efficient technologies, such as smart grids and energy storage systems.
- Increasing demand for energy efficiency services in the industrial and commercial sectors.
- Greater access to financing for energy efficiency projects.

Stakeholders Mapping

The Omani government is at the forefront of energy efficiency promotion, with the Ministry of Energy and Minerals rolling out several initiatives:

- The National Energy Efficiency Strategy (2019-2040).
- The Energy Efficiency Labelling Program.
- Energy Efficiency Standards for buildings and appliances.

- Energy efficiency targets aiming for a 10% reduction by 2030 and a 20% reduction by 2040, with improvements of 20% by 2030 and 40%

Key private sector contributors include:

- Oman Power and Water Procurement Company (OPWP).
- Oman Environmental Services Holding Company (OESHC).
- Arabian Business Machine Company (ABM).

These entities provide a variety of products and services to enhance energy efficiency, such as LED lighting, energy management systems, and renewable energy solutions.

Regulatory Environment

Omani government regulations and policies supporting energy efficiency:

- The Energy Efficiency Law (2019).
- The National Energy Efficiency Strategy (2019-2040).

These guidelines offer a definitive structure for energy efficiency project development and implementation in Oman.

Financial Landscape

Local funding sources and mechanisms for energy efficiency in Oman include:

- The Energy Efficiency Fund: Offering loans for energy efficiency measures with favorable terms.
- The Green Buildings Program: Providing grants covering up to 30% of green building project costs.
- The Industrial Development Fund.
- The Bank of Muscat.
- The Oman Arab Bank: Offering energy efficiency loans with specific interest rates and repayment terms.

The Omani government also offers financial incentives for energy efficiency projects, such as tax breaks and subsidies for purchasing energy-efficient equipment.

Project Landscape

Notable ongoing energy efficiency projects in Oman:

- The Energy Efficiency Project for Public Buildings, in partnership with the World Bank, aiming to enhance the efficiency of 100 public buildings.
- The Industrial Energy Efficiency Project, in collaboration with the Global Environment Facility, focused on improving efficiency in 50 industrial enterprises.
- The Green Buildings Program, promoted by the Ministry of Housing and Urban Planning and supported by the United Nations Environment Program, encouraging the construction of green buildings.

Operational initiatives have recorded successes:

- The Energy Efficiency Project for Public Buildings has achieved a 25% reduction in energy consumption in involved buildings.
- The Industrial Energy Efficiency Project has contributed to a 15% energy consumption reduction in participating enterprises.
- The Green Buildings Program has facilitated the construction of over 100 green buildings, leading to substantial energy savings and a reduced environmental footprint.

4 Agritech

In the rapidly progressing world of technology, agriculture is also undergoing significant transformation. The fusion of technology with traditional farming practices, known as agritech, is revolutionizing the cultivation and management of crops. This report provides a comprehensive overview of the agritech sector in four key MENA countries: the United Arab Emirates (UAE), Oman, Egypt, and the Kingdom of Saudi Arabia (KSA). It delves into various aspects of the agritech landscape, including market analysis, stakeholder involvement, key projects, regulatory frameworks, financial landscapes, and innovation ecosystems. The report aims to shed light on the current state and potential growth of the agritech sector in these countries, exploring the market dynamics and key stakeholders driving the agritech revolution. It also highlights significant projects that are paving the way for advancements in this sector. Furthermore, the report examines the regulatory frameworks governing the agritech sector in these countries, providing insights into how these regulations impact the development and deployment of agritech solutions. The financial landscape is analyzed to understand the investment trends and opportunities in the agritech sector. Lastly, the report investigates the innovative ecosystems of these countries, focusing on how startups, accelerators, and incubators are contributing to the growth of agritech. Through this multi-faceted analysis, the report aims to provide a holistic view of the agritech sector in the UAE, Oman, Egypt, and KSA, offering valuable insights for stakeholders and decision-makers in this rapidly evolving field.

4.1 United Arab Emirates

Market Analysis

According to Mordor Intelligence, the agriculture sector is expected to grow to USD 3.17 billion in 2023 and reach USD 3.92 billion by 2028. The CAGR during the forecast period (2023-2028) is projected to be 4.34%. In 2022, the Emirati AgriTech market had a total profit of \$15.4 million, reflecting a CAGR of 10.4% from 2017 to 2022. Notably, the UAE reached second place in the Middle East and African AgriTech market in 2022 with a 12.7% share. These developments underscore the UAE's commitment to advancing the AgriTech sector and positioning itself as a prominent regional player. Recent developments in the sector are noteworthy: there are currently more than 35,000 farms in the UAE, many of which employ advanced irrigation and hydroponic techniques to maximize crop yield with minimal water usage. This initiative capitalizes on several key advantages, including globally competitive tax rates, robust infrastructure, the capacity to handle substantial agricultural output, abundant natural sunlight, and a strategic business hub location.

Market trends in the global feed industry offer substantial growth opportunities, with the UAE's central strategic location playing a pivotal role. This location positions the UAE to tap into a vast global market, which is further fueled by rising incomes in emerging economies and the resulting increase in the consumption of high-value products such as meat and dairy. The demand for feed products is expected to continue its upward trajectory. Additionally, advancements in feed productivity, driven by innovations in improved feeds, plant-based proteins, and resilient crop breeds, are boosting agricultural sustainability while increasing yields. Consequently, the UAE emerges as a prominent player in the global feed market, capitalizing on its strategic location, growing demand, and innovative solutions.

On a local scale, the UAE's domestic market is equally promising, with food consumption anticipated to grow at an annualized rate of 3.5%, reaching an estimated 10.3 million tons in 2023. This growth is attributed to factors such as population expansion, rising incomes, and evolving dietary preferences, making the UAE an attractive market for food and agriculture businesses. However, there are notable challenges in the form of soil degradation, deforestation, and loss of biodiversity, which pose significant long-term threats to global sustainability.

Stakeholder Mapping

Government entities in the UAE play vital roles in supporting and advancing the field of Agritech. Here are some of those entities:

- The UAE Ministry of Climate Change and Environment (MoCCA) is instrumental in facilitating the establishment of aquaculture and farming businesses. It has launched several initiatives, including the Food and Agriculture Entrepreneurs Programme.
- The Department of Education and Knowledge (ADEK) significantly contributes to the agricultural sector, with a focus on critical aspects such as food safety, food security, and biosecurity.
- The Department of Economic Development in Dubai takes charge of issuing business licenses, including those for AgriTech firms in the emirate of Dubai. This involves the facilitation of AgriTech startups and the enforcement of essential regulations and quality standards.
- The UAE Ministry of Food and Water Security collaborates closely with the UAE Government Accelerators program, jointly driving ten initiatives that aim to simplify entry into the agriculture sector.

Here are some key companies operating in the Agritech sector in the UAE:

- Verticraft Holdings: Established in 2018, Verticraft Holdings has the distinction of being the first company in the Middle East to integrate vertical farming and food security, producing grass-fed lamb in the UAE's desert.
- Fish Farm LLC: Founded in 2013, this company specializes in marine fish breeding. Their work supports the local aquaculture industry and helps decrease dependence on imported fish.
- Marmum Dairy: Since its inception in 1984 with 250 Danish cows, Marmum Dairy has expanded its operations to cater to the evolving needs of its customers, not only in milk but also in other dairy and juice categories.
- Badia Farms: In 2016, Badia Farms pioneered the concept of vertical indoor farming in the UAE.
- Crop One: In a partnership announced in July 2018, Crop One ensured that all vegetables used for Emirates flights' catering would be locally grown in the UAE, eliminating the need for reimportation on return.

Regulatory Environment

The primary impetus driving the Agritech sector in the UAE is the National Food Security Strategy, which aspires to establish the nation as a global leader in innovation-driven food security by 2051. This vision encompasses reducing water consumption for agriculture from 8.2 million in 2016 to 7.1 million in 2036, necessitating innovative Agritech solutions. Another compelling reason for investing in the Agritech sector is the UAE's ambition to elevate its ranking on the Global Food Security Index from 21st in 2019 to 9th by 2021, ultimately aiming for the top position by 2051.

This strategic initiative aims to facilitate international agri-business trade, diversify sources of international food, and promote sustainable technology-driven domestic food production throughout the entire value chain. Additionally, it seeks to diminish food loss and waste and enhance nutritional intake. To effectively implement this strategy, the UAE has established a robust food security governance model. Key components of this model include the Food and Agriculture Entrepreneurs Programme, designed to nurture the skills of young Emiratis in managing agriculture and livestock projects, and the Emirates Council for Food Security, which strengthens the collaborative efforts of national authorities in achieving food security objectives.

Financial Landscape

In 2019, the Abu Dhabi Investment Office (ADIO) unveiled partnerships with three forward-thinking agriculture firms: Pure

Harvest Smart Farms, FreshToHome, and Nanoracks. These collaborations were established with the intention of advancing the agricultural technology (AgTech) capabilities in the emirate, with ADIO providing a combination of financial and non-financial incentives amounting to AED 152 million (USD 41 million). The primary objective of these partnerships was to elevate Abu Dhabi's Agri-Tech ecosystem and drive innovation within the agricultural sector, particularly in addressing global food security challenges. This initiative was a component of ADIO's broader strategy to expedite the growth of the AgriTech sector in Abu Dhabi, facilitated through the AgTech Incentive Programme, which welcomed both local and international AgriTech enterprises.

ADIO had previously allocated AED 367 million (USD 100 million) to attract four AgriTech trailblazers to Abu Dhabi, with a specific focus on devising agricultural solutions tailored for arid and desert environments. Also in 2019, significant investments were made by venture capital firms Sequoia and Accel Partners in the MENA AgriTech sector, totaling approximately USD 300 million.

The Abu Dhabi Investment Office (ADIO) has introduced a comprehensive array of incentive packages valued at an impressive USD 272 billion, with the primary aim of attracting local and international AgriTech companies, alongside other businesses, to establish and expand their operations in Abu Dhabi. These incentive packages are meticulously designed to foster innovation and stimulate growth within the AgriTech sector, in alignment with Abu Dhabi's overarching vision of evolving into a global hub for sustainable agriculture.

These incentive packages are strategically tailored to cater to three pivotal sub-sectors: precision farming and agriculture robotics, bioenergy (algae), and indoor farming. Precision farming and agriculture robotics encompass the deployment of cutting-edge technologies to optimize crop yields and resource utilization. Bioenergy (algae) centers on the sustainable and renewable production of energy derived from algae. Indoor farming revolves around the cultivation of crops within controlled environments, which not only leads to increased yields but also ensures the efficient use of resources.

Furthermore, the 'Ghadan 21' accelerator program, introduced as part of the UAE's strategic initiatives, holds a multi-faceted mission of guaranteeing food security, enhancing farming conditions both locally and globally, and securing job opportunities for the future. This program has made remarkable strides towards these objectives, achieving noteworthy milestones. By 2021, it had contributed over USD 450 million to the GDP and generated over 2,900 job opportunities in Abu Dhabi. These accomplishments underscore the program's remarkable success in propelling economic growth and job creation in the emirate, thus contributing substantially to the broader vision of sustainable development and prosperity.

Project Landscape

In the UAE, numerous agritech projects are currently underway:

- Badia Farms: This is a large-scale, technologically advanced vertical farm situated in Dubai Industrial City.
- Emirates Flight Catering (EKFC) and Crop One: These two organizations are jointly investing US\$40 million to construct the largest vertical farming facility in the world, located near Al Maktoum International Airport at Dubai World Central.
- ADIO Partnership: In the previous year, ADIO collaborated with seven innovators in agriculture as part of its AgTech programme to set up R&D and operational facilities and spearhead groundbreaking projects.

Urban and Vertical Farming Gains Momentum: Dubai has witnessed the emergence of strong momentum in urban and vertical farming initiatives. Emirates Flight Catering, in collaboration with Crop One Holdings, has made significant strides by establishing the world's largest vertical farm in Dubai, involving a USD 40 million investment. This pioneering project is dedicated to the year-round production of fresh produce within a controlled environment. Further bolstering this trend is the announcement of another groundbreaking project in the UAE, the GreenFactory Emirates, which is set to become the largest indoor farm globally. A joint venture between GrowGroup IFS from The Netherlands and RainMakers Capital Investment LLC from Abu Dhabi, this endeavor carries an estimated cost of USD 177 million. Located in Abu Dhabi, the GreenFactory Emirates is projected to yield a remarkable 10,000 tons of fresh produce annually, encompassing a vast 17.5-hectare plot with a cultivation area spanning 160,000 square meters. These ventures are integral components of the UAE's overarching strategy to fortify food security and sustainability by harnessing cutting-edge farming technologies.

Diverse Investments to Enhance Food Security: The UAE is diversifying its investments across various sectors to fortify food security and sustainability. One standout initiative is the Dubai Food Park, a USD 1.5 billion endeavor unveiled within the expansive 51 million square meters of Dubai Wholesale City. This ambitious project is designed to elevate Dubai's standing as a prominent regional hub within the food industry. In tandem, the UAE has channeled USD 54 million into the development of fish farms and hatcheries, with aquaculture poised to emerge as a key industry in the country. A significant milestone in this domain is the successful farming of Atlantic salmon achieved by Fish Farm, a UAE-based aquaculture facility. Leveraging the Recirculating Aquaculture System technology, Fish Farm boasts a monthly production of 10,000 to 15,000 kilos of salmon, representing a pivotal achievement in the UAE aquaculture sector and a substantial contribution to the nation's ongoing efforts to enhance food security.

4.2 Saudi Arabia

Market Analysis

The Ministry of Environment, Water and Agriculture reported significant growth in Saudi Arabia's agricultural sector due to adherence to Vision 2030 goals, leading to a historic high of 100 billion riyals in domestic agricultural product value in 2022. The Kingdom also attained self-sufficiency in numerous crops, especially those benefiting from modern technologies, thanks to effective water management practices that reduced agricultural consumption from 86% to below 70%. The following graph shows the agriculture domestic production from 2017 to 2022. The IMF Forecasts the Saudi GDP to Grow at 7.6%, the Highest such rate Globally.

Fish farming in Saudi Arabia has surged, with a remarkable 183% increase, reaching an annual production of 85 thousand tons, up from 30 thousand tons, through the last 5 years. Forecasts indicate that the Kingdom's fisheries and aquaculture sector is expected for steady growth, with a projected compound annual growth rate of 4.1% from 2020 to 2025. Anticipations also suggest that Saudi aquaculture production will reach 970,000 tons annually by 2029. Saudi Arabia imports livestock and animal products valued at around \$5.2 billion. The livestock market is expected that the annual market growth rate of 6.34% (CAGR 2022 – 2027).

Saudi Arabia faces several problems that hinder the progress of agriculture:

- Price fluctuations due to their impact on international prices during production seasons and drought seasons
- Local production suffers from the red palm weevil, as 10% of palm trees in the Kingdom are infected.
- Intensive water consumption, with more than 15 billion cubic meters consumed annually.
- Urban sprawl on agricultural areas such as vegetable, fruit, and chicken farms
- The red meat sector suffers from fragmentation and the impact of diseases and epidemics on production, which weakens the competitiveness of the product importer.
- Lack of cooling facilities and storage for vegetables and fruits, forcing farmers to sell with the market prices.

The Ministry of Environment, Water and Agriculture also presented some investment opportunities to increase agricultural activities:

- Establishing a center for local veterinary vaccines and serums to protect livestock from pests and diseases.
- Investing in aquaculture projects with the floating cage system and the aquaponic system, which is an integrated agriculture between plants and fish together, relying on fish waste, as well as the bio floc system based on improving the properties of water in aquaculture.
- Investing in establishing a scientific research center to produce local bio-pesticides, control pest invasions, test food products.
- Investing in creating an institutional base to improve fisheries management, increase fish productivity, and inform about fish species, seasons, habitats, and protection.

Stakeholders Mapping

The government sectors play a vital role in developing the agritech market in the country to make it the first one in the middle east. They include:

- Ministry of Environment, Water, and Agriculture (MEWA)
- The National Center for Environmental Compliance
- General Food Security Authority (GFSA)
- Agriculture Development Fund
- Saudi Food & Drug Authority.

The below private sector companies mainly focus on food security through increasing the production of wheat, seeds, crops, dairy products, and livestock production:

- The Saudi Agricultural and Livestock Investment Company (SALIC)
- National Seed & Agriculture Services Co.
- Buthor
- Alwatania
- The National Agricultural Development Company (Nadec)
- Tabuk Agricultural Development Company (TADCO)
- Almarai
- Al-Dahra Agricultural Company

Regulatory Environment

The Saudi Arabian government has implemented a comprehensive array of laws and regulations to effectively manage, protect, and develop the agricultural sector while ensuring food security and controlling various related activities such as production, import, export, bans, and restrictions. These include:

- The Sustainable Agriculture System 2021
- The Organic Agriculture System 2014
- Aquaculture Regulations 2014
- The Livestock Wealth System 2003

One of the pivotal legal frameworks is the Sustainable Agriculture System that was structured into three key subsectors: plant wealth, animal wealth, and aquatic life, with a primary goal of enhancing the nation's valuable resources. Saudi is still in the early stage in developing regulations for the agritech, but it is developing rapidly.

Financial Landscape

There are different funding sources available to invest in the agriculture of Saudi Arabia. These include:

- **The Agriculture Development Fund (ADF):** ADF is a vital funding source, providing short and long loans to enhance agricultural development, ensure food security, and improve production efficiency through modern scientific and technical methods.
- **The Saudi Agricultural and Livestock Investment Company (SALIC):** SALIC invests both inside and outside the Kingdom of Saudi Arabia by establishing subsidiary companies or through national, regional, and international partnerships.
- **The National Commercial Bank (NCB):** NCB is providing different loans for business.
- **The Public Investment Fund (PIF):** PIF focuses on local and international funding and launches initiatives to contribute to the goals of Vision 2030.
- **The Government:** Whether the Ministry or the Council of the Ministries, they are providing loans and credit facilities for the private sectors at the initiated projects.

Saudi Arabia has implemented several investment incentives to support and promote the agricultural sector such as:

Project Landscape:

- **The National Agriculture Strategy 2030:** The National Agriculture Strategy 2030 aims to build a sustainable agricultural sector that ensures food and water security, economic and social growth, preventing and controlling plant and animal diseases and pests, and ensuring product safety in the Kingdom. The National Strategy report stated that in 2017, Saudi Arabia had one million hectares of farmland, which met 34% of its calorie needs. The agricultural sector added 64 billion riyals (4% of non-oil GDP) to the economy and exported 739 thousand tons of dairy, dates, and fish. Agriculture also employed over a million Saudis, mostly small farmers (300,000).
- **The National Transformation Program (NTP):** Saudi Arabia's NTP is an economic plan to diversify and develop its economy as part of Vision 2030. It also aims for sustainable agriculture in various sectors. As stated in the Executive Plan for the National Transformation Program 2021-2025, Saudi Arabia is the leading country in the region for food security, fish farming, water desalination and smart meter installation. By the end of 2020, it had a food stock of more than any other Middle Eastern country, produced 100,000 tons of fish, desalinated 5.9 million cubic meters of water per day, and installed over a million smart meters to improve water services.
- **Saudia & Middle East Green Initiative:** Saudi Arabia is working on 77 initiatives to achieve the Saudi Green Initiative and create long-term positive change. These include Greening Saudi: Planting 10 billion trees to restore 40 million hectares of land. The goal is to plant over 650 million trees by 2030. They planted 10 million trees in 2021 and protecting Land and Sea: Saudi Arabia pledged to protect 30% of its land and marine areas by 2030. They protected 16.9% in 2021.

- **Organic Poultry Production Initiative:** The Ministry of Environment, Water and Agriculture launched an initiative to increase and encourage investments in the field of organic poultry production, as part of the goals of reaching organic production up to 5% by 2030. It also plans to invest 17 billion riyals and increase self-sufficiency in poultry meat to 80% by 2025. Organic agriculture increased by (25%) from 2018 to 2022, while the volume of organic production increased by more than (108%) during the same period.

4.3 Egypt

Market Analysis

The Egyptian agriculture market, a vital sector of the economy, is projected to grow from USD 5.04 billion in 2023 to USD 5.90 billion by 2028 as shown in Figure 6 at a compound annual growth rate (CAGR) of 3.20%. In 2021, agriculture contributed 11.83% to Egypt's GDP and provided employment for 28% of the workforce. The country's goal is to increase the agricultural sector's GDP contribution to 12% and boost agricultural production by 30% by 2024, as stated by the Minister of Planning and Economic Development. Egypt grows a variety of major crops including sugar beet, sugarcane, wheat, maize, rice, tomato, potato, onion, orange, grapes, and dates. Sugarcane is the country's primary crop with a production quantity of 14,913.5 thousand metric tons in 2020 as per the Food and Agriculture Organization (FAO) and the production of wheat reach 9 million metric ton in 2021. Egypt stands as a leading producer of aquaculture in Africa, boasting an approximate yearly yield of 1.3 million tons of farmed fish. Tilapia forms the bulk of this production, making up about 90% of the country's farmed fish. Other significant species encompass carp, catfish, and mullet.

The agritech sector in Egypt is undergoing a dynamic transformation with the emergence of both opportunities and challenges. On the one hand, there's a surge in investment interest in startups that aim to enhance and optimize the agricultural and food industries. This is evident from the \$45.7 million secured by Egyptian startups across 11 deals in December 2022. Companies like Mahaseel Masr are also contributing to this transformation by offering digital platforms for business-to-business trade in fresh produce. Additionally, initiatives such as the \$25 million Climate Resilience Fund have been established to invest in nature-positive and sustainable agriculture startups.

On the other hand, the sector faces significant challenges. The country's large population of approximately 110 million poses a challenge as Egypt grapples with water and food insecurity. The limited availability of arable land, with less than 5% of land being arable in two-thirds of the countries in the region, further exacerbates these issues. Moreover, the region is becoming increasingly water-stressed because of climate change. These trends indicate a sector that is evolving rapidly to meet new challenges while capitalizing on emerging opportunities.

Stakeholder Mapping

In Egypt, there are several government bodies that play a crucial role in promoting Agritech:

- **Ministry of Agriculture:** This ministry is instrumental in setting up a state-of-the-art reference laboratory equipped with sophisticated equipment for analyzing fish, water, soil, and feed, keeping in mind the global market requirements.
- **The Ministry of Water Resources and Irrigation:** The Ministry of Water Resources and Irrigation, in partnership with Cairo's MSA University, has launched a trial run of a novel mobile-based irrigation system. This initiative is a component of a broader national plan to implement contemporary irrigation techniques. They have engineered a portable gadget that gauges the humidity level of farm soil. The gadget transmits data about water levels to the farmer's cell phone, enabling them to make educated choices about their crop cultivation.
- **U.S. Agency for International Development (USAID):** While not a local body, USAID has made significant contributions to Egypt's agriculture sector since 1978 by providing technical assistance to over 500,000 smallholder farmers which worth \$1.4 billion.

Here are the main private sector companies in Egypt that are spearheading initiatives in smart farming:

- **IrriWatch:** Originating from the Netherlands, this application aids farmers in enhancing irrigation practices through ‘virtual sensing’ technology. It employs data from various thermal satellites to ascertain soil water potential and soil moisture levels.
- **Baramoda:** An Egyptian startup, Baramoda, is addressing water-related challenges by manufacturing compost, which has the potential to decrease water usage by up to 30%.
- **Vodafone Egypt:** As a prominent mobile operator, Vodafone Egypt is utilizing its extensive network and presence in rural regions to offer agricultural advice to smallholder farmers through daily SMS. In providing the service known as ‘Egyptian Farmers’, Vodafone has partnered with the Ministry of Agriculture.

Stakeholder Mapping

There are many policies and frameworks have been developed to boost agritech market in Egypt:

- **Sustainable Agricultural Development Strategy 2030:** This strategy leverages technology to increase production and efficient utilization of water resources.
- **CargoX and ACI Platforms:** Merchants are required to sign up on these specified platforms. The Egyptian government has discontinued the necessity for authentication of certificates of origin by the Egyptian embassy
- **Agricultural Policy Review:** The agricultural policy in Egypt focuses on maximizing agricultural output, achieving self-sufficiency in the production of specific types of food.
- **Food and Agriculture Policy.**
- **Law no.152 of 2020** is designed to back businesses and initiatives that have a tenure of under seven years through the provision of tax benefits, custom-related advantages, and various non-tax incentives.

Financial Landscape

According to Arabian Gulf Business Insight, agritech stands out as the leading sector, receiving a substantial 31% of the total investment. Fintech, HR-tech, and foodtech closely follow, collectively securing \$79.5 million, accounting for 64% of the total investment.

Among these sectors, foodtech leads in terms of deal count, with 10 out of the 38 deals occurring in this field.

In Egypt, several local funding sources and mechanisms are in place to support projects in the agriculture and food sector:

- **The Agricultural Bank of Egypt** is a key financial supporter of small and medium-sized enterprises engaged in a range of agricultural endeavors. This includes the manufacturing of irrigation systems powered by solar energy, the construction of greenhouses, the implementation of contemporary irrigation methods, and the cultivation of machinery and agricultural supplies.
- **The Food and Agriculture Organization (FAO)** in Egypt is a significant contributor to numerous programs and projects. The objectives of these initiatives are to boost agricultural efficiency, strengthen food security, and encourage the sustainable utilization of natural agricultural resources.
- **The USAID Egypt** which is a part of the Feed the Future Egypt Rural Agribusiness Strengthening initiative. This initiative is dedicated to fostering the growth of rural agribusiness in Egypt.
- **Climate Resilience Fund:** its objective to accelerate marine farming and new forms of food

The Egyptian government put a new law (Law no.152 of 2020) to support new SMEs with has less than 7 years of working and offering tax, customs, and non-tax incentives in addition to monetary incentives for all entities which encourage startups and SMEs.

Project Landscape

Some of the mega projects in Egypt that has great potential for advanced technology:

- **The New Delta project** is a colossal agricultural initiative being developed over an area exceeding one million feddan along Egypt's north-west coast. This project encompasses the Egypt's Future project, which is set to augment Egypt's farmland by 15%, contributing to the nation's food security. The project spans from the northern oases to the southern Wadi El-Natrun, and from east to west of the Qattara Depression.

This initiative is part of Egypt's strategy to increase water resources and improve irrigation, which will also help reclaim barren land and boost the economy. The New Delta project in Egypt is a prime example of an Agritech initiative, employing several technological advancements to enhance agricultural productivity. One of the key technologies used is advanced irrigation technology, which involves the use of developed central irrigation machines for efficient water usage.

- The Ghalioun Project, inaugurated by President Abdel Fattah El-Sisi on November 18, 2017, stands as a testament to the potential of sustainable aquaculture. Located on the international coastal road in the Ghalioun Pool area, part of the Motobas center in Kafr El-Sheikh governorate, this project is one of the largest fish farming initiatives in the world and holds the title of being the largest in the Middle East. Constructed at a cost of EGP 14 billion, the project spans an impressive 4,000 acres and includes 1,359 fish and shrimp ponds. It houses several factories, a hatchery for fish and shrimp, and intensive farming units.

4.4 Oman

Market Analysis

Modernizing agriculture and developing rural farms are among the main pillars of the 2040 Sustainable Development Strategy of the Ministry of Agricultural Wealth, Fisheries and Water Resources in the Sultanate of Oman. The Ministry has clarified the general indicators of the sector in 2022, as the value of the agricultural and fisheries gross domestic product reached 908 million OMR. The growth rate (2015-2021) in the agricultural sector reached an average of 4.6% and in the fish sector: 9.6%, with a total of 6.4%. The following graph shows the value of the gross domestic product for each of the plant, animal, and fish sectors from 2015 to 2021.

The volume of agricultural and fishery production reached 5 million tons in 2022, compared to 4.6 million tons in 2021, 4.3 million tons in 2002, 3.9 million tons in 2019, 3.8 million tons in 2018, 3.2 million tons in 2017, and 3.1 million tons in 2016, and 2.9 million tons in 2015, achieving an average growth rate in (2015-2021) of 8.1% and 6.4% in (2021-2022). Omani aquaculture projects are expected to contribute approximately US\$ 5.2 billion to the Sultanate's GDP, with production of up to 220,000 metric tons with an estimated market value of US\$900 million by 2040.



The agriculture sector faces major challenges, such as:

1. Current agricultural systems are hardly prepared to introduce new innovations.
2. Research planning is not carried out according to the actual needs in the field and without prior coordination with those in need or those concerned with it.
3. Fruit trees are exposed to insects and pests, causing major economic losses, such as the pest of pomegranate fruits and the cotton scale insect, which affects fig, apricot, and walnut trees.
4. Uncontrolled urban expansion within the Jordan Valley, threatening the most fertile agricultural spot in Jordan.
5. Extreme soil salinity and lack of suitable water for agriculture.

Also, there are opportunities to enhance the sector for achieving the targets of 2040 Strategy:

1. Investing in conducting research for innovation, introducing modern systems into the agricultural system, and training technicians on modern technologies
2. Investing in providing incentives for the farmers to promote agriculture investment.
3. Investing in spreading fruit traps and introducing new technologies and pesticides to combat pests that affect fruit trees in “Al Jabal Al Akhdar.”
4. Investing in providing an updated database for the agriculture sector that would help in taking decisions.

Stakeholders Mapping

The government is the key player for the agritech in Oman. It includes:

- The Ministry of Agriculture, Fisheries and Water Resource
- The Ministry of Commerce, Industry & Investment Promotion
- Agricultural and Fisheries Development Fund
- Oman Food Investment Holding Co. (Nitaj)
- The Environment Authority
- The Maritime Security Center
- Fisheries Development of Oman (FDO)

The below private sectors are working on increasing the production of fish, dairy products, and crops to sustain the self-sufficient. In addition to, developing new technologies to upgrade the sector.

- Oman Fisheries Company SAOG (OFC)
- Dhofar Cattle Feed Co. S.A.O.G.
- AI MAROOJ FOR AGRICULTURE SERVICE & TRADE LLC
- Mazoon

Regulatory Environment

The Omani government has published regulations to develop the sector, such as:

1. The agricultural system (2006)
2. The Living aquatic resources law (2009)

These laws work on licensing conditions, the permitted types, seasons, and locations, equipment criteria, and permitted tools to develop the agriculture and aquaculture sectors. But Oman still doesn't introduce a system or law to enhance and develop the Agri-Tech in country.

Financial Landscape

With more than 1,200 species of plants in Oman, there are distinct opportunities for investment in agriculture. There are number of entities contribute to funding agricultural sectors by loans, guarantees, and equity investments. These includes:

1. **Agricultural and Fisheries Development Fund:** ADFD supports investing in projects in various fields of agriculture, from production and manufacturing to product and pathogen testing.
2. **Oman Food Investment Holding Co. (Nitaj):** Nitaj is the investment arm to enhance food security in the Sultanate of Oman.
3. **The National Banks:** the banks provide different loans for the agricultural projects like the Bank of Muscat, the Bank of Dhofar, the National Bank of Oman
4. **The Oman Investment Authority (OIA):** OIA manages and develops the sultanate's funds and assets and achieve financial reserves for the public and private markets.
5. **The Research Council (TRC):** TRC is providing investment to support the research.

The Ministry of Trade, Industry and Investment Promotion provides a wide range of support services and assistance in food security sector such as:

1. Loans supported by the Development Bank by 3% and a grace period of two years.
2. Land rental at a price of 50 Omani Riyals per acre for the first 100 acres and above 5 Omani Riyals per acre.
3. Usufruct lands for fish farming projects for 25 years and a grace period of two years.
4. Providing agricultural insurance to cover diseases and risks to agricultural and livestock wealth.

Project Landscape

- **Oman Vision 2040:** Oman Vision 2040 is a plan for the economic and social development of Oman from 2021 to 2040. It aims to achieve food and water security using renewable resources, advanced technologies, and the strategic location and biodiversity of Oman. Among the initiatives to achieve this vision are: allocating 55 lands for integrated agricultural projects, with the area ranging from 10 to 66 acres, distributed among 8 governorates to implement projects related to raising livestock and poultry, and growing vegetables and fodder.

- **Integrated Farming Project in the Lima District:** The project is to help the Lima District improve its food security and income by producing and selling vegetables, fruits, eggs, and seafood. It aims to establish 3 greenhouses with a hydroponics system to sustain the plants resource, 2 barns to raise local laying hens, and oyster farms (scallops) to fat it, as well as installing 3 coastal fishing net towing machines.
- **The Goodness of my school:** The initiative aims to raise awareness of food security among students in six governorates of Oman. It also trains 10000 students and 16 specialists in agricultural and fishery skills, develops 3 greenhouses with modern techniques to produce different crops, and provides 7 greenhouses (agricultural and fisheries) in the targeted schools and 7 student companies to produce and sell crops and fish.
- **Sustainable Agriculture and Rural Development Strategy Towards 2040:** The investment plan is a medium-term action plan to reach the 2040 strategy goals. It was prepared by an Omani team and FAO experts. It focuses on enhancing the plant, animal, and agricultural sectors, preserving resources, and increasing the resilience of agriculture and rural livelihoods to climate change and disasters. The strategy had some outcomes in 2012-2016.

5 Electric Mobility

5.1 UAE

This overview provides a snapshot of the UAE's electric mobility market. The country is well-positioned to accelerate its transition to electric mobility due to its forward-looking policies, strong government support, and the proactive involvement of the private sector.

The United Arab Emirates (UAE) has been rapidly transforming its economic landscape, aiming to diversify away from oil dependency and foster sustainable growth across various sectors, including energy efficiency, which is integral to this transformation.

Market Analysis

According to Statista, the EV market revenue in the UAE is projected to reach US\$249.90M by end of 2023 while it is expected to show an annual growth rate (CAGR 2023-2028) of 8.20%, resulting in a projected market volume of US\$370.60m by 2028.

The UAE has been making strides in the EV market, with sales and infrastructure development showing an upward trend. While the current market size of EVs is only 1% of the overall automotive sector in the UAE, the adoption rate of EVs is expected to grow significantly. This is due to a combination of factors including government commitment, an increasing number of charging stations, rising awareness among individuals and companies and the introduction of new models by manufacturers.

There has been a focus in the UAE on the localization of the EV industry by building factories for manufacturing of EVs, charging stations, batteries and battery recycling facilities. Although not all of these are operational yet. But we expect that these existing initiatives and projects will create a much bigger complementary industry around it which will also contribute to creating new jobs as well as raising local awareness and in turn rising sales.

There has been a focus in the UAE on the localization of the EV industry by building factories for manufacturing of EVs, charging stations, batteries and battery recycling facilities. Although not all of these are operational yet. But we expect that these existing initiatives and projects will create a much bigger complementary industry around it which will also contribute to creating new jobs as well as raising local awareness and in turn rising sales.

The UAE currently has just over 42,000 registered EVs and around 1,000 EV public charging stations installed across the country. Majority of the charging stations and registered EVs are in Dubai followed by Abu Dhabi then the Northern Emirates.

The UAE is witnessing several market trends:

- The UAE market was showing an increased introduction of EV models, both from established automotive brands and new entrants. The UAE currently around 33 EV models available in the market which gives a lot of options to the user and accordingly will impact the sales.

- The trend towards SUVs and larger vehicles in the UAE market also saw a corresponding introduction of electric models in these categories. Some of these SUV models include AXL SHARX-5, BMW iX3, Mercedes EQC, MG ZS and more.
- Increasing consumer awareness and interest in sustainability among both individuals and fleet owners and operators.
- Growth in the installation of EV charging infrastructure especially over the last two years.
- Launch of several public and private sector initiatives to promote EV adoption such the partnership between the UAE's Ministry of Energy and Infrastructure (MOI) and Siemens in deploy a number of rapid charging stations across the UAE and the partnership between MOI and Einride to operate a number of commercial electric trucks across a few commercial corridors in the UAE.

Despite the opportunities, the market faced logistical challenges such as:

- Charging infrastructure: Even that the deployment of the public charging infrastructure in the UAE is the most advanced in the region, there is a still a lot of work to be done in both installing more charging stations across the country and also ensuring those networks of charging stations are reliable and working when the EV drivers need them to ensure a convenient and smooth EV charging experience. Residents of high-rise buildings have a bigger issue as well due to the poor coverage of charging in those buildings due to several different reasons including sometimes the complexity to obtain the necessary permits and the lack of excess power.
- Grid capability: There is a need for more robust grid capacity to support a large influx of EVs.
- Range anxiety: Different consumer surveys still suggest that range anxiety is still considered as one of the challenges for EVs in the UAE. Although there has been an increase in the number of charging stations as highlighted before and also in the battery capacity of the available modes, range anxiety remains one of the challenges that hinders consumers from buying EVs or making it their first and only car.
- High initial cost of EVs: Even that the Total Cost of Ownership (TCO) of EVs is lower than that of an internal combustion engine (ICE) vehicle, the purchase price of EVs is still higher than their equivalent ICE vehicle which is another barrier for end users.

Stakeholders Mapping

Government entities such as the Dubai Electricity and Water Authority (DEWA) and the Road Transport Authority (RTA) are actively promoting electric mobility. They have initiated various programs such as Green Charger Initiative by DEWA for installing EV charging stations and have set ambitious targets for the adoption of EVs in government fleets.

Major automotive players like Tesla, BMW, and GM have a presence in the UAE EV market. Local conglomerates and startups are also entering the space, offering innovative solutions and services. Investment activities include the development of charging networks and the launch of new EV models.

The below table includes a list of the existing stakeholders in the UAE EV market.

Government Entities													
													
EV Manufacturers & Brands													
													
Investors & Financial Institutions													
													
Infrastructure Providers													
													
Automotive Dealerships													
													
Insurance Companies													
													

NGOs, Industry Associations, and Consulting Firms



Fleet Owners/Operators & Transportation Companies



Regulatory Environment

The UAE government has recently updated its Nationally Determined Contribution (NDC) to cut emissions by 40% and stated that one of the ways to achieve this is to reduce the emissions from the transport sector by 55%. The UAE has implemented regulations to support the growth of electric mobility, including mandating government agencies to make up a certain percentage of their fleets with EVs and providing incentives for EV buyers. Government procurement of electric vehicles has been used as a policy measure to promote green mobility within the Emirate. For example: In 2016, His Highness Sheikh Ahmed bin Saeed Al Maktoum, Chairman of the Dubai Supreme Council of Energy, issued Directive number 1 of 2016 on the mandatory purchase of green vehicles by Dubai Government entities. The directive includes an annual 10% government procurement target for EVs and hybrid vehicles which was updated in 2020 to be 20% by 2025 and 30% by 2030. Subsequently, in 2018, the Dubai Green Mobility Committee formulated and launched the Dubai Green Mobility Strategy 2030, which supports the different international, national and local Emirate strategies.

New Vehicle Certification: The former Emirates Authority for Standardization and Metrology (ESMA) developed draft standards for electric vehicles in the UAE, which was raised to the Gulf Cooperation Council Standard Organization (GSO) for approval and implementation across the GCC. Currently, conformity certificates are provided to automotive manufacturers and traders to allow specific EV models to enter the UAE market by the Ministry of Industry and Advanced Technology. Automotive manufacturers and traders can apply for this certificate on the ESMA website

Some of the key policies in Dubai include:

- The introduction of its Green Building Regulations and Specifications for new buildings, through Dubai Municipality, which specifies that 5% of parking spaces should be dedicated to green or low emission vehicles. Moreover, as part of the Al Sa'fat – Dubai Green Building System, designated preferred parking must be provided for a combination of hybrid vehicles, electric vehicles and carpool vehicles. To achieve the Silver ranking a minimum of 5% of parking spaces should be dedicated to these vehicles, while for the Gold and Platinum rankings a minimum of 7% and 10% of dedicated parking is required respectively. Additionally, the Dubai Building Code provides guidelines and requirements for electric vehicle charging points in Dubai.
- All public and private organisations and developers are required to obtain approvals from DEWA before establishing, installing, operating or maintaining any electric vehicle charging station. In turn, DEWA will coordinate with Dubai Municipality (DM) and the RTA to ensure that electric vehicle charging stations meet the technical requirements and standards adopted by the relevant authorities.
- The selling of electricity from EV charging stations is governed by a specific tariff imposed by Dubai Government and implemented by DEWA as the sole provider of electricity for the Emirate of Dubai. Hence, developers or private stakeholders cannot implement a tariff for EV charging.

Where Abu Dhabi has a different set of policy and regulations such as:

- Introduced a government framework with a specified tariff for EV charging within the Emirate (30 fils per kilowatt hour).
- All EV charging stations in Abu Dhabi are required to be registered with the Abu Dhabi Distribution Company (ADDC) or the Al Ain Distribution Company (AADC). Following registration, a flat monthly fee of AED 92 is applied to all EV charger owners until a meter is installed by the utility. After the installation of the meter, billing is based on actual consumption.
- The Department of Energy has also introduced a regulatory policy for EV charging infrastructure in Abu Dhabi, which sets out the fundamental principles for ownership, installation and management of electric vehicle supply equipment (EVSE), the electricity supply to EVSE, and pricing mechanism to end customers.

Project Landscape

Projects like the Dubai Green Mobility Initiative aim to promote the use of EVs. There are also ongoing investments in expanding the charging infrastructure across the UAE. There have been several pilots for new technologies such as:

- **Wireless Charging:** RTA has run a pilot to test wireless charging for electric busses in partnership with Dubai Silicon Oasis.
- **Electric Buse:** Dubai has been trying a pantograph charging system for electric buses in partnership with ABB and Al Naboodah Commercial Group.

One of the success stories is the Dubai Taxi Corporation's (DTC) integration of electric vehicles into its fleet. This has not only reduced carbon emissions but also served as a model for private sector companies. Earlier this year, DTC announced a plan to transform taxis in Dubai (Dubai Taxi and franchise company taxis) into 100% environmentally friendly (hybrid, electric and hydrogen-powered) by 2027. DTC already boasts the largest fleet of eco-friendly vehicles with hybrid vehicles accounting for over 34% of the taxis fleet in Dubai. It is followed by Cars Taxi, National Taxi, Arabia Taxi, and Metro Taxi. Taxis have a huge role in Dubai as the operating taxi fleet in Dubai hit 11,371 taxis by the end of 2022. Taxis made 105 million trips and travelled over 2 billion km in the same year.

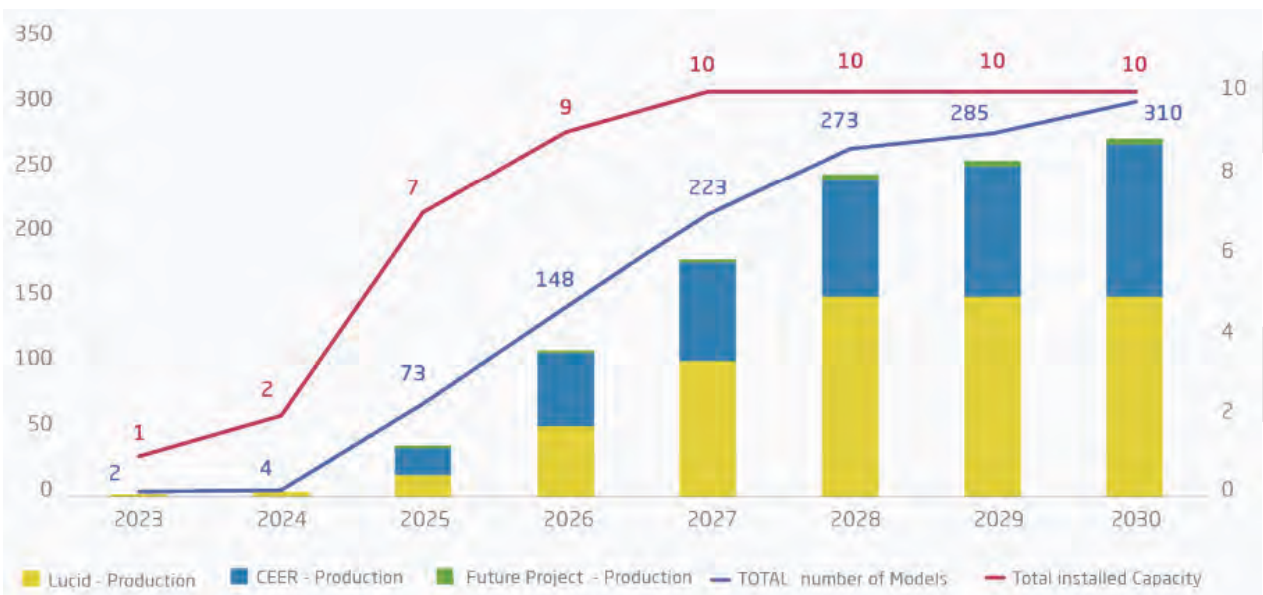
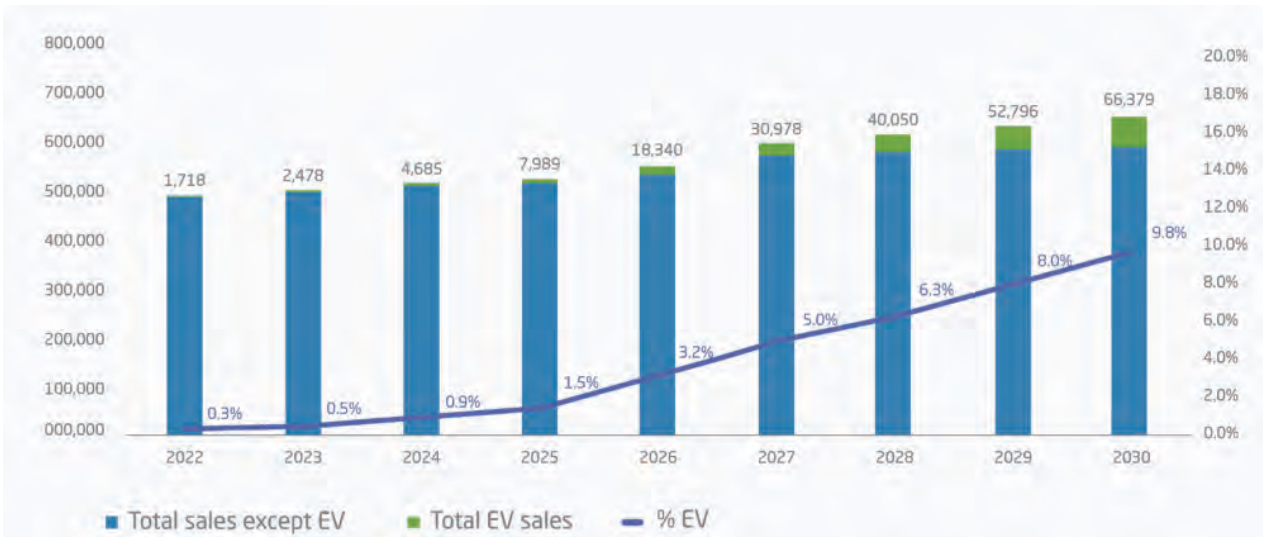
5.2 KSA

In light of the fast-evolving global landscape, which is characterized by energy transition and sustainability goals, KSA is sharing the way in embracing electric mobility. This section examines the state of electric mobility in the Kingdom now and provides a crucial road map for interested parties, policymakers, and who want to understand the flow of electric mobility as it develops there.

Market Analysis

According to Saudi Industrial Development Fund (SIDF), the electric vehicle market share in Saudi Arabia will make up to 10% of total automotive sales (including ICE and EV) by 2030. However, there is an optimistic estimate that EVs will constitute 25% of new car sales by 2030.

This continuous development is due to the ambitious plans the Saudi government has announced to have 15% of its public transport vehicles, 25% of its goods transport vehicles autonomous, and 30% of vehicles on Riyadh's roads are electric by 2030. Moreover, it is targeting to lead the automotive sector by investing in manufacturing of light (BEV and ICE) and heavy commercial fuel cell vehicles, manufacturing and assembly of the automotive industry supplying components, and manufacturing of Lithium-ion batteries. As shown in the upcoming two paragraphs, BEVs percentages in the KSA market are continuously increasing and the numbers of the locally manufactured electric vehicles will reach about 310 models with more than 250k cars by 2030.



Electromin, which is a subsidiary of Petromin that provides e-Mobility solutions, has launched a public EV charging network that covers the whole of Saudi Arabia. The charging network features 100 charging points, offering a comprehensive range of services, including AC home/office chargers, DC fast chargers, and ultra-fast chargers. The initial phase of the project will include chargers that are compatible with SASO-approved vehicles using AC Type 2 connectors while phase 2 would allow the users to add up to 100 Km in just 4 minutes by using the 360 KW AC and DC chargers. Electromin also launched its mobile application that allows customers to locate the nearest charging station, plan their journey, manage their charging session, monitor the charger's availability, and make payments and bookings. The Electromin Mobile EV Recovery Service will also be available to help EV users in Riyadh, Jeddah, and Dammam whose batteries have run out of charge.

Besides Electromin, there are other EV charging companies have got the approvals to join the Saudi EV charging market such as:

- ABB E-mobility has provided SASO-approved EV chargers to Electromin for installation at 100 petrol stations.
- Altaaqa, signed an initial agreement with TotalEnergies to develop integrated electric vehicle (EV) charging stations in the Kingdom.
- EVBox as EVBox Elvi and EVBox Business Line were shown at the EV Auto Show after partnership announcement with Al Sharif Group and CATEC Mobility,
- Schneider Electric's EVlink Smart Wallbox charging stations have received SASO's approval certification.

In summary, there are no official announced numbers for the existing EV charging stations in the Kingdom of Saudi Arabia. However, it is clearly expanding and is predicted to rise exponentially to cover a reasonable ratio of EV charging stations to available EVs, which are expected to reach 66k units by 2030. For the time being, Electromin holds most of the EV charging station, while other firms like EVBox, ABB, Altaaqa, Siemens, and Schnider Electric have begun to set their sights on contributing to the Saudi EV charging industry.

The development of EV holding backs increases not only its potential but also the public acceptability, these factors—covered in more detail below—are anticipated to affect prospective electric vehicles in Saudi Arabia.

- Charging infrastructure: one important factor in the acceptance of EVs is the availability of charging infrastructure. In the context of Saudi Arabia, a rather vast country with a desert environment, this is a particularly pressing issue. All major roadways should have charging stations because Saudi drivers report experiencing range anxiety and because lengthy distances between cities and frequent usage of air conditioning cause batteries to discharge more quickly.
- Saudi Arabia's extreme temperatures: extreme temperatures significantly reduce the range of electric vehicles (EVs). A study conducted in Saudi Arabia during the summer months revealed that driving an EV in a temperature of 40°C resulted in a 22% drop in battery range.
- Effect on the Electricity Grid: an estimated 362 TWh of electricity is produced in the KSA, mostly from natural gas and crude oil [36]. Nevertheless, during the hot summer months, demand might surpass supply, and the widespread use of EVs will put more strain on an already overloaded infrastructure. Furthermore, as less than 1% of electricity is produced using renewable energy sources [36], this could lead to a rise in greenhouse gas emissions unless action is taken to expand the production of renewable electricity.
- Environmental Benefits: with the transportation sector having one of the highest rates of emissions of any industry, EVs have the potential to be extremely important in lowering GHG emissions. However, determining the precise level of environmental friendliness of EVs is a difficult undertaking that involves analyzing the sources of electricity used for manufacturing and charging, the difficulties involved in recycling EV batteries, and the overall environmental harm that EVs cause. As a result, consumers commonly doubt if using an EV to reduce greenhouse gas emissions will benefit the environment. But powering EVs with renewable energy might greatly improve their environmental credentials.

Project Landscape

Create a market push for EVs: as stated by Apricum, Saudi Arabia could send a clear policy signal by encouraging electric vehicles with both monetary and non-monetary incentives, such as lowering gasoline fuel subsidies, establishing low-emission zones,

and providing free EV parking in Riyadh and throughout the nation under the planned paid parking schemes, in order to generate the necessary market push for EVs. Even still, few citizens claimed to be aware of a charging station, indicating that many Saudi residents find electric vehicle charging points to be a barrier. Only a few said this was conveniently located for their home or place of employment, nevertheless. This shows that there is still opportunity for improvement and that initiatives to advance infrastructure are being noticed.

Major automotive players like Ceer and Lucid Motors have a presence in the KSA EV market. Innovative products and services are being offered by local businesses and corporations as they enter the market. The introduction of new EV models and the construction of charging networks are examples of investment activity.

The below table includes a list of the existing stakeholders in the KSA EV market.

Key Government Entities



EV Manufacturers & Brands



Investors & Developers



Infrastructure Providers



Automotive Dealerships



Insurance Companies



NGOs, Industry Associations, and Consulting Firms



Regulatory Environment

Saudi Arabia is actively promoting the adoption of electric vehicles by offering various incentives and initiatives. The government is constantly updating its policies and regulations to get the most of its position to be leading manufacturing hub for electric vehicles in the MENA region.

- In 2017, The Saudi Standards, Metrology and Quality Organization (SASO) prohibited the import of EVs until SASO Regulations for Electric Vehicles were issued.
- In November 2020, the Technical Regulations for Electric Vehicles were published, which apply to all electric vehicles with a maximum weight of 3500 kg and a top speed of over 25 km/hour.
- The regulations include a comprehensive set of standards for charging, connectors and sockets, environmental testing, vehicle performance, safety, internal cabling, and battery technologies.
- In 2022, the Saudi Electricity Company (SEC) released the detailed procedure for the installation of charging stations.
- There are no announced incentives by the Saudi government for promoting EV adoption in the country.
- 5% EV-Friendly Parking: The Ministry of Municipal Rural Affairs and Housing (MOMRA) declared in November 2020 that it would set aside 5% of parking spaces for electric vehicles (EVs) and install charging stations for EVs in all car parks.

Current Regulations & Incentives: From SASO EV Technical Report, these take-aways can be summarized:

- Suppliers must obtain a Certificate of Conformity based on Type Approval to introduce electric vehicles to the market.
- Electric vehicles must have indicators on multiple sides for safety reasons and to distinguish them from non-electric vehicles.

- The EVs must travel at least 200 km per charge.
- Market Surveillance Authorities will inspect market and warehouse EVs for safety and compliance.

However, Saudi Arabia through SIDF hasn't introduced incentives for EV promoting in the Kingdom, it announced various incentives to lead the supply chain for the EV components and services like:

- The Saudi Industrial Development Fund (SIDF) provides loans with a repayment period of up to 20 years, and borrowers can have a grace period of up to two years for repayments.
- With low land costs, King Abdullah Economic City (KAEC) (3.7\$/m²) and the Saudi Industrial Property Authority (Modon) (0.27 – 1.07 \$/m²), offered in Saudi Arabia, investors can have their required land for the industrial needs.
- Import duties on plant equipment and machinery are waived in Saudi Arabia.
- Subsidies are available for local production of components and raw materials, and Saudi workers' salaries can be subsidized up to 30% for the first three years.
- Technical training is available for employees, with support at a rate of SAR 4,000 per month.
- The cost of natural gas for industrial sectors is \$0.048 per kWh, and the cost of MMBTU is \$1.25.
- EXIM Saudi Bank provides financial products to support export development.

In conclusion, while the electric vehicle (EV) market in Saudi Arabia is evolving, the government should provide further incentives to stimulate widespread adoption of EVs and the establishment of charging infrastructure. Additional measures such as tax incentives, subsidies, and supportive policies would accelerate the growth of the EV market, contributing to the kingdom's sustainability objectives.

Project Landscape

Sales of auto components are also recorded by the automotive sector in KSA, which accounts for 40% of Middle Eastern sales. In 2016, the Kingdom of Saudi Arabia imported about one million automobiles, comprising light-duty trucks, passenger cars, and commercial vehicles.

Overall, there was no discernible pattern of growth because, starting in 2008, sales fluctuated a lot. The year 2019 saw the biggest increase in vehicle sales, up 31%, while the year 2017 saw the biggest decrease in sales, down -23.6%.

Although the KSA EV market is still in its infancy, it is eager to increase the number of EVs on the road in the future. The Saudi Standards, Metrology and Quality Organization (SASO) has authorized the import of 16 EV models into the Kingdom of Saudi Arabia. With a massive USD1 billion investments, the Saudi Arabian wealth fund, the Public Investment Fund (PIF), partnered with California-based company Lucid Motors to produce electric vehicles. Additionally, PIF purchased Tesla stock in 2018 but sold all its holdings by the end of 2019.

The electric vehicle (EV) market in Saudi Arabia is experiencing significant growth and development, driven by strategic initiatives and partnerships. The government's investments through the Public Investment Fund (PIF) program, the launch of the country's first EV brand, Ceer, and collaborations with global players like Lucid Motors and Greaves Electric Mobility demonstrate a commitment to advancing the EV ecosystem. Moving forward, continued investments, supportive regulations, and the development of a robust supply chain will further strengthen the KSA EV market, fostering a greener and more sustainable transportation landscape. The list of these initiatives in the Saudi market has been announced throughout the previous years:

- **Public Investment Fund Program:** the PIF program is investing heavily in the electric vehicle ecosystem in Saudi Arabia, aligning with the government's target of having 30% of cars in the capital city be electric by 2030. PIF's investments include global ventures like Lucid Motors and Uber, as well as local projects like the development of EV charging infrastructure.
- **Ceer, the first Saudi electric vehicle brand:** Saudi Arabia has announced the launch of its first electric car brand, Ceer, which is a joint venture between the Saudi sovereign wealth fund PIF and Taiwanese contract manufacturer Foxconn with BMW parts.
- **LUCID MOTORS:** The government made a commitment in 2022 to buy up to 100,000 cars from Lucid over a decade, starting with 50,000 vehicles and the possibility of purchasing another 50,000.
- **Abdul Latif Jameel Investment in Greaves Electric Mobility:** Abdul Latif Jameel Group will invest \$220 million in Greaves Electric Mobility, acquiring a 35.8% stake initially with the possibility of another investment of \$70 million.

- **Autonomous Vehicle Trial:** Dhahaina, the Kingdom's first self-driving electric vehicle, is being tested at the Riyadh Business Front to reduce accidents, improve mobility, and establish a regulatory framework for AVs in the country. The initiative aligns with the Ministry of Transport and Logistics' objective to utilize advanced technologies in the transportation and logistics industry, as per the National Transport and Logistics Strategy.
- **EVs for Umrah pilgrims and Grand Mosque visitors:** the Kingdom has launched a fleet of electric buses and cars to transport pilgrims and visitors to the Grand Mosque, reducing carbon emissions and promoting sustainable transportation. The fleet includes over 4,000 electric buses and 5,000 electric cars, which are available for use by Umrah pilgrims and visitors to the Grand Mosque in Makkah.
- **Electric Lorries are brought to Saudi Arabia and UAE:** Admiral Mobility will launch 5,000 EV Lorrie in Saudi Arabia with Farizon Auto, supporting the Kingdom's sustainability agenda. The first 500 will be produced and sold by spring 2023. The move aligns with Saudi Arabia's efforts to reduce its carbon footprint and shift towards sustainable transportation.
- **Sabic Unveils BlueHero Initiative:** an initiative to support the automotive industry's shift towards more efficient and safer electric vehicles by improving structural battery components with unique flame-retardant materials and solution development expertise.
- **EV Metals Group (EVM)** is building the world's first integrated Battery Chemicals Complex in the Kingdom, as well as developing the Saudi supply chain for critical minerals in the energy transition with the support of lead agencies and Ministries.
- **Ivanhoe Electric and Ma'aden** have come together to form a joint venture to mine minerals that are crucial for energy production in Saudi Arabia. Both companies will hold a 50/50 stake in the venture.

5.3 Egypt

This part delves into the current state of electric mobility in Egypt, providing valuable insights into the market research, regulatory frameworks, innovations, and the adoption of EVs.

In recent years, Egypt has witnessed a growing interest in electric mobility, driven by environmental concerns, energy security, and the government's commitment to sustainable transportation solutions. Hence such potential needs a comprehensive analysis of the country's rapidly evolving electric vehicle landscape.

Market Analysis

Influenced by a variety of factors, the electric mobility landscape in Egypt is still in its nascent stage. With a large population and diverse consumer profiles, the adoption of electric vehicles is gradually gaining popularity. However, the relatively high prices of electric cars compared to internal combustion engine (ICE) vehicles, coupled with the concern of range anxiety, pose challenges to their widespread adoption. In a country where daily travel distances can be substantial, the limited availability of EV charging stations further contributes to the hesitance among potential buyers. As of now, Egypt's EV market remains relatively small compared to the overall automotive sector.

Through 2023, the anticipated number of EVs and EV charging stations is:

- **EV Total Numbers:** According to the market experts, around 3,500 to 4,000 on the road will increase from around 1,000 to 1,800 in 2021. However, according to the Egyptian Compulsory Insurance Pool 106, the number of electric cars in Egypt that were licensed in the period from July 1, 2021, to July 1, 2023, is around 2,618 registered electric cars, including private, transportation, and others, of which only 1,933 were private electric cars. Moreover, with reference to the Egyptian Cabinet of Information and Decision Support Center 107, the annual production of electric cars in Egypt is expected to reach about 20,000 electric cars by 2026, with more than 50% locally manufactured components with Egyptian government's support to the costs of the first 100,000 electric cars produced locally to enhance the process of manufacturing electric cars in the country.

- EV Charging Stations Numbers: Around 135 stations with more than 500 charging points in the whole country are installed by Infinity EV. Moreover, according to Chairman of the Clean Energy Committee at the Federation of Chambers of Commerce in Egypt 108, the country aims to reach 3,000 charging stations nationwide by the end of 2024.

Key trends and challenges insights into Egypt Automotive markets along with growth opportunities can be summed up as following

Several prospective to encourage the deployment of EVs:

- Urban density: The high density of Egyptian cities' urban environments encourages the usage of electric vehicles (EVs) and lowers the expenses associated with infrastructure investments and the space needed for gas stations.
- High stop-and-go traffic in cities: Compared to other scenarios with smoother driving cycles and high highway usage, the nature of the slow and frequent stop-and-go driving in Egyptian cities, which is associated with congestion and urban density, further increases the relative benefits of EV use compared to conventional vehicles in this scenario.
- Reduced grid emission factor due to nuclear power, CCGT (Combined Cycle Gas Turbine) power facilities, and increased use of renewable energy sources: With the expected growth of nuclear power, renewable energy, and higher efficiency CCGT plants, the power grid is expected to have a lower emission factor over time (average emissions per kWh of electricity). This suggests an even greater relative reduction of emissions due to the use of EVs compared to conventional vehicles or to carbon-intensive power sectors elsewhere.
- Institutional experience in pertinent incentive schemes: There are already several programs in place for the replacement and scrapping of vehicles (such as CNG buses, CNG taxis, and four-stroke motorcycles), demonstrating appropriate institutional experience and familiarity with these initiatives and reward schemes.
- Political will to support solutions for diesel consumption: The government is making cutting back on diesel fuel consumption in particular a top priority. This is because diesel is more expensive than gasoline and is more dependent on imports, which poses a risk to public health and the environment. It also has an impact on vehicle efficiency and performance.

However, the main obstacles to the sector's initiation are associated with:

- The slow pace of creating the necessary legislative and regulatory framework, even though these developments are in progress, as well as the lack of funding and other pressing issues on the national development agenda.

Stakeholders Mapping

The public authorities have demonstrated their interest in electric vehicles. These include the active custom duty exemption for electric cars, the upcoming new traffic law that recognizes EVs, age limits on old public transportation vehicles to encourage fleet renewal, and the recent historic agreement for the purchase of E-buses in Alexandria.

The private sector has also indicated its interest in EVs through initial sales of several electric cars and e-bikes to early adopters, advocacy for improved regulations and recognition, and the recent installation of demonstrational charging stations.

The below table includes a list of the existing stakeholders in the Egypt EV market.

Government Entities									
EV Manufacturers									
Investors & Developers									
Infrastructure Providers									

Infrastructure Providers



Insurance Companies



NGOs, Industry Associations, and Consulting Firms



Fleet Operators & Transportation Companies



Regulatory Environment

Egypt has implemented a series of incentives and regulations to encourage the adoption of electric vehicles (EVs) within the country. The aim of these measures is to establish a solid foundation for the localization and nationalization of EV manufacturing. Despite these efforts, Egypt is currently anticipating the much-anticipated launch of its very own domestically produced electric vehicle, proudly labeled as “Made in Egypt”.

Previous Regulations & Incentives:

- In 2018, the Egyptian government declared that electric vehicles (EVs) would be exempt from customs duties.
- In 2018, a decision was made to permit the importation of EVs that were not older than three years. However, this announcement was reversed in 2021 when the Minister of Trade and Industry put forth a proposal to prioritize the localization of EV manufacturing within the country [82].
- In April 2022, Infinity group obtained the necessary licenses to establish the first-ever EV charging station.

Current Regulations & Incentives

- From 28 June 2022 till now, The Egyptian Ministry of Electricity issued a tariff specifying the value of charging electric cars in Egypt, revealing that the tariff determines the value of AC and DC:

- AC slow chargers: it can take up to 4 hours to fully charge the EV with the tariff 1.89 EGP per kilowatt.
- DC chargers: they charge the car in 15 minutes with the cost of 3.75 EGP per kilowatt. The majority of these chargers are located on highways.
- In October 2022, the Egyptian Parliament gave its final approval to establishing the Supreme Council for the Automotive Industry and the Fund to Support Environmentally Friendly Cars.
- The Egyptian Electricity Regulatory and Consumer Protection Agency, under the Ministry of Electricity and Renewable Energy, has issued licenses for the establishment of electric vehicle

Charging stations which can be summarized in these points:

- **Step 1: Granting the License**
 - The agency grants a license for a duration of five years.
 - The company is authorized to establish a minimum of 250 charging stations during the license period.
 - The company is required to establish at least 50 stations per year or 150 charging points per year.
- **Step 2: Level 3 Charging Stations**
 - Within the charging points, a minimum of 10% must be Level 3 charging stations.
- **Step 3: Providing Required Data**
 - The company must notify the agency of all the necessary data for the charging stations.
 - This data is used to issue an annual license certificate.
- **Step 4: License Renewal**
 - The agency renews the license every five years.
 - The renewal process follows the regulations specified in Electricity Law No. 87 of 2015 and its executive regulations.
- In March 2023, the Egyptian Tax Authority announced that electric car chargers are subject to value-added tax at the general rate (14%).
- There are new conditions for importing electric vehicles, summarized in these points:
 - EV must be released for import within the model year.
 - Importing EVs should be treated similarly to conventional vehicles and is only allowed if they have not been previously used.

- All requirements specified in the implementing regulations of the Import and Export Law must be met.
- Customs are not collected on EVs imported from anywhere in the world, and only tax fees are collected on them.
- According to the Egyptian Minister of Finance, there are incentives outlined in the automotive industry strategy include the following:
 - Manufacturer Incentives: The EV manufacturer in Egypt will be eligible to receive a refund ranging from 30% to 40% of the production cost of the vehicle.
 - Incentives for Buyers: The government will offer a financial support incentive to anyone purchasing an EV with amount will range between 50,000 and 70,000 Egyptian pounds.

Project Landscape

- Fleet Electrification and Public Transportation Landscape: Egypt's public transportation landscape and fleet electrification efforts are crucial in addressing the environmental and public health impact of Greater Cairo's congested streets. With 63% of daily trips being on public transport and public buses contributing to a third of air pollution, the introduction of electric buses presents a significant opportunity to combat the city's pollution crisis. Coordinated efforts between government agencies, infrastructure planning, and the integration of electric vehicles into the transport and energy sectors will be key to achieving Egypt's vision for sustainable mass transit and transforming the city's future. Throughout the latest years, there are various initiatives released to support the Fleet and Public Transportation Electrification in Egypt such as:
 - During COP27, the government pivoted 260 e-buses in Sharm El-Sheikh to serve around 51,000 participants over a period of 18 days, indicating that the management of these buses was assigned to the private sector.
 - The governorate of Alexandria announced the incorporation of 14 e-buses into the public transport sector in 2019 in a project was directly sponsored by President Abdelfattah El-Sisi. Also, in March 2023, another 15 e-buses were added to the governorate public transportation sector with expectations for this number to reach 40 e-buses.

By the end of August 2023, the World Bank announced supporting the deployment of about 100 e-buses across the Greater Cairo area.

- Initiatives:
 - In February 2023, the Arab Academy for Science, Technology & Maritime Transport (AASTMT) announced on Tuesday that it would launch Egypt's first locally manufactured electric vehicle (EV) by the end of 2023 at an affordable price (95K EGP) in the Egyptian market with more than 60% local components and with a speed up to 60 km/hour.
 - For having the first national manufactured EV with El Nasr Automotive Manufacturing Company, there are various negotiations that the government went through can be summarized in the next few points:
 - The negotiations started with Dongfeng in early 2020 to nationally produce El Nasr E70 cars.
 - The framework agreement between Dongfeng, the previous Minister of Business Sector, and El Nasr Automotive Manufacturing Company, was signed in January 2021.
 - Al-Nasr Automotive Company imported 13 "E70" cars from Chinese Dongfeng Company for testing in Egypt with Uber drivers, determining final specifications for local production.
 - Negotiations came to a halt due to the inability to reach an agreement with the Chinese company on a sufficient reduction in the price of the imported component as the reduction was necessary for Nasr Automotive Company to produce and offer the car at a competitive price.
 - In September 2022, the new Minister of Business Sector held a meeting to review the negotiations between Nasr Automotive Company and a Chinese car manufacturer for the production of electric sedans, as El Nasr Automotive collaborated with German company FEV to select a global car manufacturer to manage the electric car production project.
 - In May 2023, the negotiation extended to be with 2 Indian companies specialized in EVs mainly the Hindoga and the Motherson companies in a meeting was held between the Minister of Business Sector and the mentioned companies' representatives.
 - In August 2023, the Minister of Higher Education and Scientific Research witnessed the signing of contracts to design and manufacture the first locally-made Egyptian electric car in the presence of representatives of the Academy of Scientific Research and Technology and companies from the private sector.

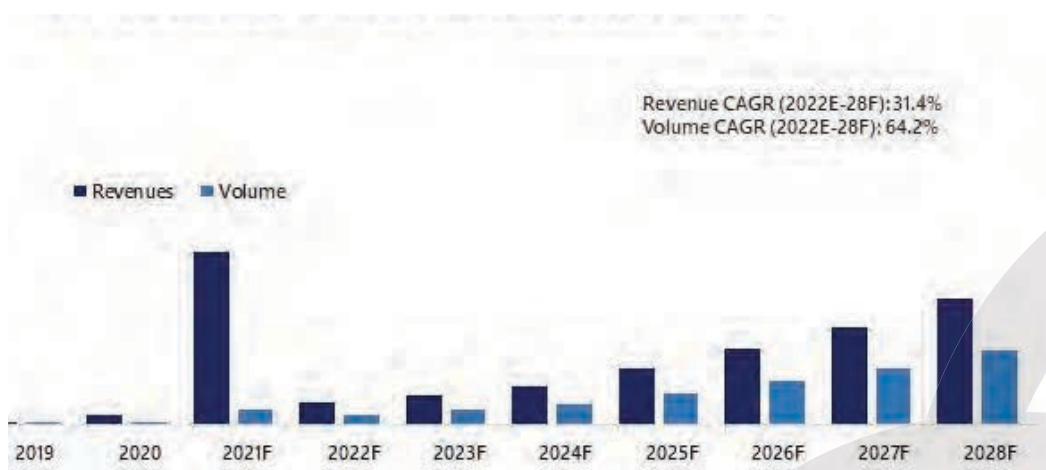
- For now, the negotiation to be continued to find the best partner with El Nasr Automotive Manufacturing Company for realizing the first “Made in Egypt” EV.
- In 2021, Ministry of Public Business Sector signed cooperation protocols with Bright Skies, Nasr Automotive, and Engineering Automotive Company for localizing and developing Egypt's electric vehicle industry via 2 protocols:
 1. Developing an electric bus model by El Nasr producing all the components while Bright Skies contributing to the battery and electric propulsion system development.
 2. Conducting a feasibility study aims to establish a research and development center for batteries, control systems, and electric propulsion for EVs.
- In March 2023, Misr Helwan Automotive, Dongfeng's authorized distributor, is now selling the E70 500 Pro for 897,000 Egyptian pounds (\$29,300). Meanwhile, Abou Ghaly Motors has released Geely's Geometry C, with the 400km charge variant costing \$36,900 and the 550km model costing \$39,900, both available only in US dollars because to Egypt's financial crisis.
- HSBC Bank launched a financing program in collaboration with Electrified Solutions to support the environment, offering loans up to 2 million EGP for purchasing EVs and energy-efficient products. The repayment period is up to 84 months with fixed and equal monthly installments.

5.4 Oman

This part serves as a valuable resource for an in-depth exploration of the burgeoning electric vehicle landscape in the Sultanate of Oman. It provides a comprehensive overview of the current state of electric mobility in the country, delving into market trends, regulatory developments, and any further expansions.

Market Analysis

Oman's National Strategy for an Orderly Transition to Net Zero also identifies electric vehicles (EVs) and EV infrastructure as key components of its emissions reduction plan. The strategy calls for the deployment of EV charging infrastructure and the electrification of public transportation, as well as the promotion of EV adoption through incentives and awareness campaigns. According to 6Wresearch, the Oman EV market would achieve a substantial growth rate of 31.4% between 2022 and 2028, and this growth is predicted to continue in the future as Oman aims to expand its non-oil industries and increase their contribution to GDP, while also manufacturing its first electric Omani car in 2023.



The government has set a target to have around 7,000 EVs on the road by 2030, which will constitute 35% of new light vehicles, and at least 22,000 new EVs on roads by 2040 and then all fossil fuel powered vehicles will be phased out by 2050.

In February 2022, Shell Oman has launched its first electric vehicle (EV) charging hub at Al Bandar Service Station in Seeb, Oman which offers a 50-kW electric charging point to cater to the growing number of EV drivers in the capital. In June 2023, the Ministry of Transport, Communications and Information Technology (MoTCIT) in Oman has announced the installation of 90 electric car charging stations on main and sub-main roads (49 in the governorate of Muscat, 10 in North AlBatinah governorate, 8 in AlDakhyliyah governorate, 4 in AlWusta governorate, 12 in the Dhofar governorate, one station for each governorate of Musandam, AlBuraimi, AlDhahirah, and South AlSharqiyah, and another four stations to be installed in the border areas) across the country. Moreover, in October 2022, the Omani government, Audi Oman, and EVO announced significant efforts to transition from ICE to EVs with 48 new chargers installed across the country, including Hatta and Buraimi. The aim of this initiative was to facilitate long-distance travel for EV owners while promoting sustainable growth in the e-mobility sector in Oman. Also, in October 2022, Siemens and OTE Group teamed up to accelerate EV Adoption in Oman. The companies planned to install charging stations for electric vehicles in key locations across Oman, including shopping centers, hotels, and tourist destinations.

For the EV Charging stations in the future, Oman aims to install over 140 electric vehicle chargers by the end of 2023 and more than 350 by the end of 2026.

Even if Oman is about to embrace electric mobility, overcoming the obstacles and seizing the chance will be essential to achieving the full potential of electric vehicles in the country.

Challenges

- **Limited Infrastructure:** Potential EV customers may be discouraged by range anxiety resulting from Oman's present dearth of charging stations.
- **High Initial Costs:** Despite having cheaper long-term operating costs, many consumers may find the initial cost of electric vehicles (EVs), including batteries, to be exorbitant.

- Lack of customer awareness can impede the adoption of electric vehicles in Oman, as many consumers may not be aware of their features and how they work.
- **Government Initiatives:** Robust government policies and incentives are necessary for the successful integration of electric mobility in Oman, and they may require additional development and implementation.
- **Battery Technology:** To increase the range of EVs and make them more suitable for Oman's long-distance travel needs, advances in battery technology are essential.

Opportunities:

- **Environmental Sustainability:** In line with international efforts to cut carbon emissions and tackle climate change, electric cars (EVs) provide a greener and more sustainable option to conventional combustion engine vehicles.
- **Economic Diversification:** Electric mobility is a strategic decision that might lead to job creation and the growth of a local EV industry in Oman, which is working to diversify its economy and lessen its reliance on oil.
- **Energy Independence:** By utilizing Omani renewable energy resources, such as solar electricity, EVs might lessen the country's dependency on imported fossil fuels.
- **Infrastructure Development:** As EV charging infrastructure grows, there are more jobs and opportunities for investment in the building, maintenance, and support services sectors.





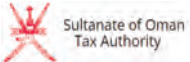



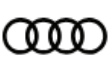


























Stakeholders Mapping

In Oman, the government is a key player in promoting electric vehicles. They make a contribution by creating laws and policies that encourage the use of EVs, providing incentives for their adoption such as tax breaks and lower import taxes, helping to build a reliable infrastructure for charging EVs, and funding the advancement of EV and battery storage technology. Public awareness campaigns run by the government can also help local manufacturing projects and educate the public about the benefits of electric mobility, therefore fostering the growth of the domestic EV industry.

Government regulations that cover energy efficiency, safety requirements, and emissions clear the path for a greater use of electric vehicles. The government of Oman is working with international organizations and industry players to advance the development of electric transportation and provide a good example through fleet.

The business sector is a major force behind the advancement of electric mobility in Oman, with leading corporations leading a number of initiatives. PDO is investigating the infrastructure needed for charging electric vehicles, and Sohar Aluminum wants to switch to electric cars for lower emissions. As a component of its sustainable investment strategy, Oman Investment Fund (OIF) is making calculated investments in clean energy and electric vehicle initiatives. The development of EV charging infrastructure is a top priority for the telecommunications company Nawras, which is currently a part of Ooredoo Oman. By investing in charging infrastructure and offering services, businesses like Oman Oil Marketing, Mazoon Electricity, and Shell Oman Marketing are promoting the expansion of electric mobility and supporting Oman's overarching objectives of lowering emissions and promoting environmentally friendly transportation options.

The below table includes a list of the existing stakeholders in the UAE EV market.

Investors & Developers						
						
						
EV Manufacturers & Brands						
						
						
Investors & Developers						
						
Infrastructure Providers						
						
Automotive Dealerships						
						
						

Insurance Companies



NGOs, Industry Associations, and Consulting Firms



Fleet Operators & Transportation Companies



Regulatory Environment

Oman has taken a significant step towards promoting the adoption of electric vehicles (EVs) in the Gulf region by introducing a range of tax breaks and incentives for potential EV buyers. The Tax Authority has announced some incentives include:

- Full exemption from customs tax and registration fees (The electric vehicle and its spare parts must meet the approved specifications and standards in Oman and be purchased from a person or entity holding a VAT account registered in Oman).
- Zero percent VAT rate for EVs and their spare parts (Specific conditions must be met for tax exemptions to apply, including the car being equipped with a fully electric or hydrogen-powered engine and registered in Oman as an electric or zero-emission vehicle).
- These incentives will take effect from July 1, 2023, and last for a minimum of three years.

Moreover, Oman has introduced a range of regulations and standards to promote sustainable mobility and the adoption of electric vehicles (EVs) in the country. These regulations include:

- ASPR Introduced Regulations for EV Chargers:
 - The Authority for Public Services Regulation (APSR) in Oman issued a decision (No 2023/15) to regulate EV chargers, mandating adherence to regulatory and technical requirements approved by APSR and relevant authorities.

- Article 3 of the law mandates that every person who owns or operates a private or public electric charging point must comply with regulatory and technical requirements approved by the Authority and concerned authorities.
- The tariff specified in accordance with the provisions of the approved tariff regulation for connection and supply of electricity shall be applied to the consumption of the electric charging point, as per Article 5 of the law.
- Article 8 of the law permits individuals to have private electric charging points at their homes. The property owner has the responsibility of installing and operating the charging point. If the property is rented, the tenant must obtain written consent from the property owner before installing or commissioning a private charging point. The property owner remains responsible for the tenant's obligations in case of non-compliance, including updating the subscriber's account data in the name of the lessee in the system of the licensed electricity supplier.
- Article 9 of the law states that the owner of a private electric charging point must bear the expenses of the sub-meter for measuring the electric vehicle charging consumption and the installation costs.
- Commercial use of private electric charging points is strictly prohibited, according to Article 10 of the law.
- On May 1, 2023, Oman adopted the Gulf Standardization Organization's technical standards and specifications for all imports of Electric Vehicles (EV) and related parts and accessories.

Fleet Electrification, Public Transportation, and Other Modes of Transportation Landscape:

Oman's transportation landscape is witnessing a promising shift towards electrification in fleet, public transportation, and other modes of transport. Although the market lacks specific targets and a well-organized framework, the country's dedication to mitigating climate change and promoting clean energy paves the way for substantial advancements. There are almost couple of initiatives announced which listed in:

- In June 2022, Oman Investment Authority Co-Partnered with Qatar's Mowasalat to Inaugurate Karwa Motors for Electric Bus Manufacturing.
- In January 2023, Sayarti became the Oman's first leasing and rental company to add an electric vehicle to its lineup, as it added the Audi e-tron Sportback to its premium fleet of rental cars. By cooperating with Sayarati to have Audi e-tron in its fleet, Kempinski Muscat became the first hotel in Oman to lease the EV, promoting sustainability and environmental conservation.
- In July 2023, the Royal Court Affairs (RCA) announced that it would integrate EVs into its fleet.

Project Landscape

Several projects for EV deployment in the Omani market have been launched in recent years. These activities ranged from having defined targets for EV and EV charging numbers in the future, releasing the first Omani EV, national and international investments in the EV market, and promoting EV with other partners; these initiatives are highlighted in the following points:

Several projects for EV deployment in the Omani market have been launched in recent years. These activities ranged from having defined targets for EV and EV charging numbers in the future, releasing the first Omani EV, national and international investments in the EV market, and promoting EV with other partners; these initiatives are highlighted in the following points:

- In February 2022, Mays Motors, in cooperation with Oman Technology Fund, launched the sultanate's first electric car, the Mays iE1. The Mays iE1 is priced at RO25,000, and 100 units have been pre-booked in the first stage of production. The car has a carbon fiber body, a large dash with displays and controls, and a battery that can be charged at home with a driving range of 500km+.
- In June 2023 and under the agreement signed between Oman Towers and the Public Establishment for Industrial Estates (Madayn), Oman Towers will install its iconic mosaic telecom towers equipped with electric vehicle charging facilities at industrial cities distributed across Oman.

The towers will serve a dual purpose of providing the latest generation of telecom services to customers and serving as charging stations for electric vehicles.

- Oman and Saudi Arabia have signed an agreement to invest \$3bn in various sectors, including lithium-ion battery manufacturing for EVs and stationary energy storage, renewable energy, healthcare, and food security initiatives in both countries.
- In April 2022, Egypt-based electric mobility startup Shift EV has raised an undisclosed Series A round, with Oman Technology Fund (OTF) joining existing investors Union Square Ventures, Algebra Ventures, and Wamda.
- In December 2022, Oman Investment Authority (OIA) has joined a consortium of international investors in providing \$214m in additional funding for Group14 Technologies, a US-based manufacturer of advanced silicon battery materials.

The opportunities in the EV sector in Oman span various areas, including market growth, infrastructure development, manufacturing, partnerships, and supporting industries. The supportive government policies and commitment to sustainability provide a conducive environment for businesses and investors to capitalize on these opportunities. Based on the previous scan for the Omani EV market, the opportunities in EV in Oman can be summarized in:

- **Government Support:** The Omani government has demonstrated its commitment to EV adoption by setting targets for EV numbers on the road. This creates a supportive policy environment for companies operating in the EV sector.
- **Market Growth:** The EV market in Oman has significant growth potential, with a predicted growth rate of 31.4% between 2022 and 2028. This presents opportunities for companies and investors to enter and expand in the EV industry.
- **Charging Infrastructure Development:** There is an opportunity to invest in the development of EV charging infrastructure, both in terms of expanding the number of charging stations and ensuring their availability across the country. This can include partnerships with international companies or local entities.

- **Manufacturing and Assembly:** As Oman aims to increase its non-oil industries and manufacturing capabilities, there is an opportunity to establish local manufacturing and assembly facilities for EV components and even complete vehicles. This can enhance local job creation and reduce dependence on imports.
- **Partnerships and Investments:** Collaboration with international companies and investors can bring expertise, technology, and funding to support the growth of the EV sector in Oman. Opportunities exist for partnerships in various areas, including manufacturing, charging infrastructure, and technology development.
- **Fleet Electrification:** There is an opportunity to promote the electrification of fleets, both in the public and private sectors. This can include partnerships with rental and leasing companies, government agencies, and private businesses to transition their vehicle fleets to EVs.
- **Supporting Industries:** The growth of the EV sector in Oman creates opportunities for supporting industries, such as battery recycling and repurposing, renewable energy integration, and smart grid technologies.
- **Export Potential:** Oman's strategic location and access to international markets can create export opportunities for EV-related products and services. This can include exporting EV components, charging infrastructure solutions, and expertise in EV technology and infrastructure development.

References

- Arab Democratic Center. (2023). The impact of the general budget deficit on inflation rates in Egypt 1990-2020.
- NREA. (2022). 2022 Annual Report.
- Invest in Egypt. (2023). Electricity and Renewable Energy.
- International Renewable Energy Agency (IRENA). (2018). Renewable Energy Outlook: Egypt.
- MESIA. (2023). Solar Outlook Report 2023.
- IRENA. (2023). Oman Energy Profile.
- IRENA. (2014). Renewables Readiness Assessment in Sultanate of Oman.
- IRENA. (2019). Renewables Energy Market Analysis GCC.
- Oman Vision 2040. (2022). The Sultanate of Oman's National Strategy for an Orderly Transition to Net Zero.
- International Trade Administration. (2022). Renewable Energy in Oman.
- Mondaq. (2019). Oman: Rooftop Solar Scheme Update – Sahim II.
- Authority for Public Services Regulation. (2022). Renewable Energy in Oman.
- Authority for Public Services Regulation. (2022). Permitted Tariffs.
- Omani Ministry of Energy and Minerals. (2023).
- Omani National Support system. (2023).
- Climate Action Tracker. (2023). KSA: Country Summary.
- Barnawi, A., Zohdy, M., & Hawsawi, T. (2023). Determining the Factors Affecting Solar Energy Utilization in Saudi Housing: A Case Study in Makkah. Energies.
- The Arab Gulf States Institute in Washington. (2019). Challenges to the Energy Transition in the Gulf Countries.
- The official portal of the UAE government. (2023).
- Abu Dhabi Fund for Development (ADFD). (2020).
- ICLG. (2023). Renewable Energy Laws and Regulations United Arab Emirates.
- Mordor Intelligence. (2023). Egypt Energy Efficiency Market - Growth, Trends, and Forecasts (2023 - 2028).
- Central Agency for Public Mobilization and Statistics (CAPMAS).
- Egyptian Ministry of Manpower. (2022). Labor Market Report.

- Egyptian Energy Efficiency Agency. (2023). Financial Incentives for Energy Efficiency. Retrieved from <http://egyptera.org/en/GenEfficient.aspx>
- Ministry of Energy and Minerals. (2021). National Energy Efficiency Strategy (2021-2040).
- Oman Power and Water Procurement Company. (2018). 7-Year Statement (2018-2024).
- Ministry of Energy and Infrastructure. (2013). National Energy Efficiency Strategy.
- Authority for Public Services Regulation (APSR). (2022). Oman Energy Efficiency Strategy 2020-2025.
- Emirates Energy Services Company (ESCO). (2023). Retrieved from <https://etihadesco.ae/>
- Dubai Supreme Council of Energy (DSCE). (2016). Dubai Integrated Energy Strategy 2030.
- UAE Ministry of Energy and Infrastructure. (2022). National Energy Efficiency and Renewable Energy Program (NEEREP).
- Mordor Intelligence. (2023). Agriculture in Egypt Market Size- Growth, Trends, and Forecasts (2023 - 2028).
- TechSci Research. (Year). Egypt Aquaculture Market.
- Agtech startups and Egypt are hot prospects for Mena funding (AGBI).
- The Opportunity for Smart Farming in the Middle East and North Africa. GSMA.
- Agriculture and Food Security | Egypt | U.S. Agency for International Development (USAID).
- Egypt: Food and Agricultural Import Regulations and Standards Country Report. USDA Foreign Agricultural Service.



**Enterprise
Ireland**

