MSc Program
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EDUCATION

Electric cars in the Gulf Area an investment market and challenges to spread

A Master's Thesis submitted for the degree of
“Master of Science”

supervised by
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Vienna, 28.02.2023

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Affidavit

I, **KHALID KAMIL AJEL , BSC**, hereby declare

1. that I am the sole author of the present Master's Thesis, "ELECTRIC CARS IN THE GULF AREA AN INVESTMENT MARKET AND CHALLENGES TO SPREAD", 75 pages, bound, and that I have not used any source or tool other than those referenced or any other illicit aid or tool, and
2. that I have not prior to this date submitted the topic of this Master's Thesis or parts of it in any form for assessment as an examination paper, either in Austria or abroad.

Vienna, 28.02.2023

_____
Signature

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- **Abstract**

Will the use of 50% of the world's oil be eliminated by electric cars?
Will the Gulf's primary source of energy still be oil?

Global automakers hurried to switch to electric motors at the same time as Europe declared war on oil and gas emissions that contribute to global warming, which sparked a broad debate about the future of oil and how the Gulf countries will handle this transformation. The European Commission released last July that it is going to study a strategy to halt the sale and production of cars that run on fossil fuels by 2035 and motivate the shift towards electric vehicles and transportation, which will seriously impact the economies of the petroleum countries, and Arab countries in particular. This is due to the growing threat of climate change as well as the sharp increase in oil prices around the world.

Based on the most recent data for 2019, the world's transportation industry is responsible for close to 60% of the yearly oil demand. It is well recognized that the transportation industry encompasses not just automobiles, buses, and trucks, but also ships, aircraft, and military hardware.

Although experts predict that charging car batteries will needs electricity produced by power plants using oil derivatives, data from 2019 showed that the amount of oil used to generate electricity does not increase 5% of the estimated worldwide consumption of oil, with the majority of it being consumed in developing nations. In addition to depending on nuclear energy and renewable energy sources, the technological advancement in the battery business would also lessen reliance on oil for the production of power. Considering the findings of the study that I received, vehicle sales in the UAE and KSA would be able to withstand a flood of EVs of up to 30% by 2030. Saudi Arabia aims for at least 30 percent of its cars to be electric powered by 2030, following its pledge to reach net zero carbon emissions by 2060. Last year, EV manufacturer Lucid announced a long-term plan to build the first international manufacturing plant in Saudi Arabia, targeting 150,000 vehicles per year at the King Abdullah Economic City. Meanwhile, the UAE is pushing for 42,000 EVs to be on its streets within the next decade. To meet the rise in demand for green mobility, the UAE opened its first electric vehicle manufacturing facility in Dubai Industrial City last month, built at a total cost of $408 million. The facility is expected to produce 55,000 cars per year.

Electric cars in the Gulf Area an investment market and challenges to spread

- **Introduction**

Electrification of vehicles is inevitable.

Some nations, like the UK and France, have taken the decision to restrict the use of gasoline- and petrol engine vehicles by the year 2040. Some automakers have also made the decision to ramp up their production of electric vehicles, like BMW in Germany or Volvo in Sweden, which has set a 2030 production cap. Although they seem to be the strictest and to have taken some steps to encourage the use of electric vehicles, European nations are no longer the primary drivers of worldwide development in consumption and manufacturing. Likewise Latin America. Approximately 10 million out of 1.2 billion vehicles on all seven continents, or less than 1%, are electric vehicles, according to aggregate reports from multiple sources. According to a report by the International Energy Agency, there will be roughly 145 million electric cars on the road in 2030, out of a total of 1.5 billion vehicles, which reflects the number of all vehicle production up to that point. This indicates that the percentage is just below 10%. The Energy Agency anticipates that although the number of electric vehicles will grow, the fossil fuel consumption in the transportation sector will raise by nearly 30%, from the current rate of 54 million barrels per day to 70 million barrels per day. The switch to electric vehicles can take decades, and it is challenging to replace the hundreds of millions of fossil-fuel-powered vehicles currently on the road. Automakers are still developing the 2022 models, which are just beginning to hit the market, with fossil fuels. On the other hand, projections show that oil consumption will rise in the coming years. Building an electric car plant, which will establish the Kingdom as a leader in this field, which is still in its infancy and will make it a money-making horse.

- **The effect of electric vehicles on Gulf nations**

The rise in oil prices not only led to a decrease in demand for it, but also opened the door wide to the search for other environmentally friendly and cheap energy sources in the short the economies of the oil-producing nations, particularly the Gulf states, whose oil profits account for about 80% of their governments' revenue, are at serious risk. This is especially true given that the majority of oil is

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consumed by conventional cars, which have started to lose the war against their electric counterparts.

In a report for "CNBC," "Barclays" experts forecast that the adoption of electric cars and improved fuel efficiency, in addition to the European countries' ongoing efforts to reduce the use of energy sources, would have an impact on OPEC's daily oil production. By 2025, the daily oil consumption will drop by 3.5 million barrels as a result of these causes. As a result, there may be a significant decline in demand for Gulf oil, and it may sooner or later become less expensive than water, as some predict. This could force the Gulf countries to look for sources of revenue other than oil, such as translating their industries and investments and experiencing a genuine economic renaissance.

[https://www.trtarabi.com/explainers]

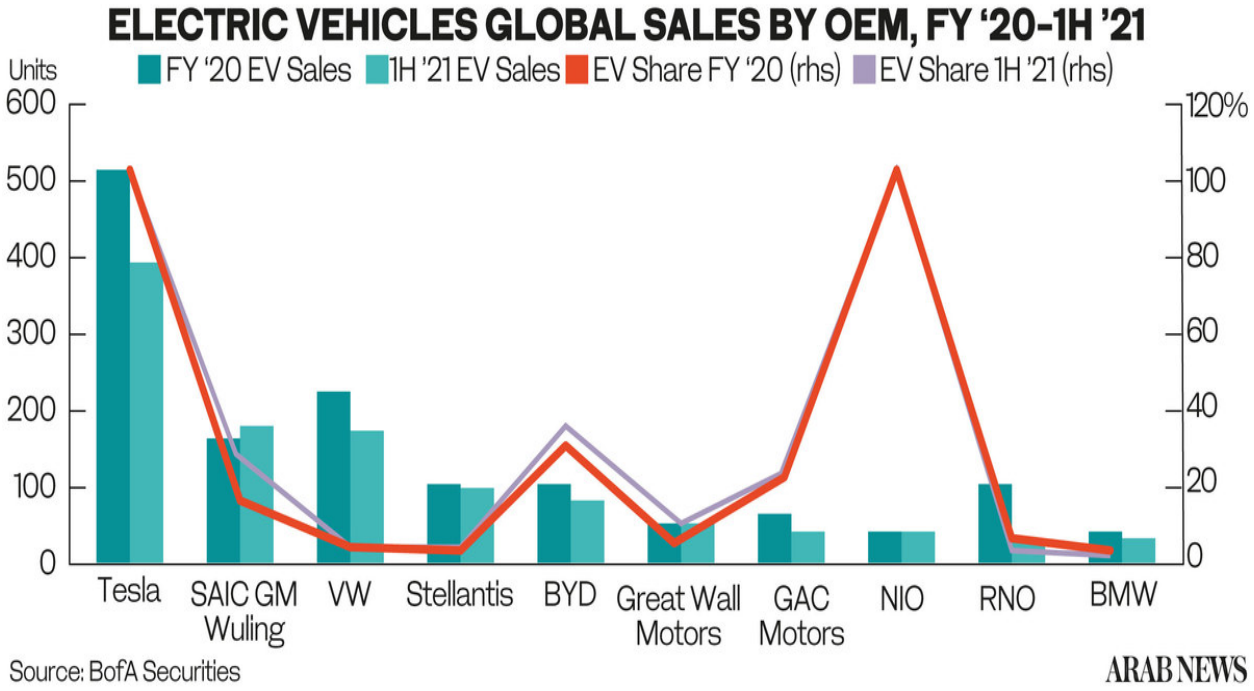

Figure (1) : electric vehicles global sales by OEM

[https://www.arabnews.com/]

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- **Background**

Automobile manufacturers all around the world are making the change and shifting their focus to electric vehicles in response to expanding demand, higher awareness of climate change, and pressure to conform to ever-stricter emissions requirements. Electric vehicles started to gain popularity in the Gulf market a few years ago, but they continue to encounter several obstacles in the majority of the nations that have started importing them. The UAE launched the Green Charger project in 2015 to entice consumers to purchase electric vehicles. This system enables electric cars to be charged in specific parking spaces In accordance with a press release from representation of a sector , managing director and CEO of the Dubai Electricity and Water Authority, "the authority offers more than 240 electric charging stations throughout the emirate of Dubai, and customers can know the areas of the stations through the authority's smart application or its website, or by using more than 14 platforms. For digital maps. In Dubai alone, the number of green charger card holders increased to 1,764 over the course of five years, giving them access to free charging even before the launch of the program and through December 2021. In contrast, the Saudi government authorized the industrial import of electric vehicles and their chargers into Saudi Arabia in June 2020. This paved the way for the arrival and widespread use of electric vehicles by agents and was a continuation of the strategy for a transitional stage to new and renewable energy within the 2030 goal of a clean environment. Using special cards, which have helped the market in the UAE slowly, expand.

Several years after trying to adopt them in the nation's capital, Doha, Qatar is aiming to convert 3% to 5% of all cars in the country to environmentally friendly electric vehicles by 2022. This strategic goal is based on Qatar's commitment to convert 25% of public transportation bus services to electric buses in the same year, in accordance with the Qatari newspaper. The 2022 World Cup in Qatar will mark the first World Cup being to ever feature environment conscious electric public transportation buses thanks to the Qatari government's implementations of electric buses in the major service locations. As part of its strategic plan "Kuwait 2035," which aims to expand reliance on alternative energy, Kuwait decided to import electric cars in 2019. According to information provided by the Bahrain

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News Agency it is predicted that electric vehicles will enter Bahrain in the first half of 2021 as a result of the government allowing their proliferation on the market. This is especially true given the many requests for the import of goods of electric vehicles that have been made to the government.[https://www.trade.gov/market] Through a variety of national and Gulf regulatory programs relevant to efficiency that serve to rationalize energy usage, Bahrain has been working to protect energy and environmental health by employing clean energy and lowering carbon emissions from earlier years. As for the Sultanate of Oman, it has made it much easier for electric cars to enter the nation as of 2019 and has also worked to distribute them throughout the local market by drastically lowering their pricing. According to the daily Oman, Omani commercial enterprises anticipate a reduction in the cost of electric vehicles in the Sultanate over the next several years, and the government is investigating the possibility of enhancing the infrastructure that supports them.

- Get to know the electric vehicle purchases made by Arab nations.

According to statistics, the overall amount spent on electric cars by Arab nations in 2018 was over $159.5 million, or 2.6% of the $10.6 billion estimated worldwide total for this category of vehicles. Over the $139.5 million from the prior year, this represents a significant increase. Published by the Canadian WTEx website, which focuses on the top exporting and importing nations while covering news and trends influencing the worldwide market. Additionally, it is seeking to publish studies and electronic reports on crucial export issues as well as tracking and monitoring international trade activity. According to the data, worldwide sales of electric vehicles reached 10.6 billion US dollars in 2018, a 35.6% increase over 2017. Fully electric vehicles made up around 1.4% of all passenger car sales worldwide, including those powered by diesel and gasoline engines. Jordan is the top consumer among Arab nations; last year, Jordan spent $105.1 million, or 1% of the total production, on electric automobiles, leading all other Arab nations. With a share of 0.5%, the United Arab Emirates, which managed to import electric vehicles worth $50.4 million, finished in second. Saudi Arabia arrives in third on the list of Arab nations importing electric vehicles, with a $1.5 million value and a share of 0.01%. Oman managed to gain the fourth place in the list of purchasing electric automobiles with a value of $0.92 million, with a participation of 0.01% of the total global purchases. Lebanon ranked fifth on the list with a share of 0.01%

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and imported $0.92 million worth of electric automobiles. As for the other Arab nations represented by Bahrain, Iraq, and Qatar, the total value of their imports of electric cars amounted to 1.1 million dollars, with a share of 0.01%. Morocco took sixth position, being able to import electric automobiles worth 0.74 million dollars, with a participation of 0.01%. The list is empty of Egypt. Despite exempting electric vehicles from customs, Egypt did not appear on the list of Arab nations that import the most electric vehicles. In the first quarter of 2018, the Ministry of Trade and Industry declared that all electric vehicles would be exempt from customs taxes and that they may be imported used. The action is a part of the Egyptian government's push to promote electric vehicles in an effort to preserve the environment and stay up with the global automotive industry's development. The marketplace for electric vehicles in the Middle East and Africa was estimated to be worth 35 million in 2020, and it is anticipated to increase to USD 84 million by 2026, registering a CAGR of over 15% over the forecast period (2021 - 2026).The COVID-19 global epidemic will undoubtedly have an impact on the Middle East and African electric vehicle marketplaces, just as it did on nearly every other sector of the market. Due to ongoing closings, social segregation rules, and a lack of workers to operate production lines with appropriate precautionary measures, manufacturing facilities have been forced to close due to the regional downturn of the electric vehicle industry. The sustainable energy expert emphasized the need for incentives to promote purchases, noting that Egypt and other Arab nations are now working on several fronts.

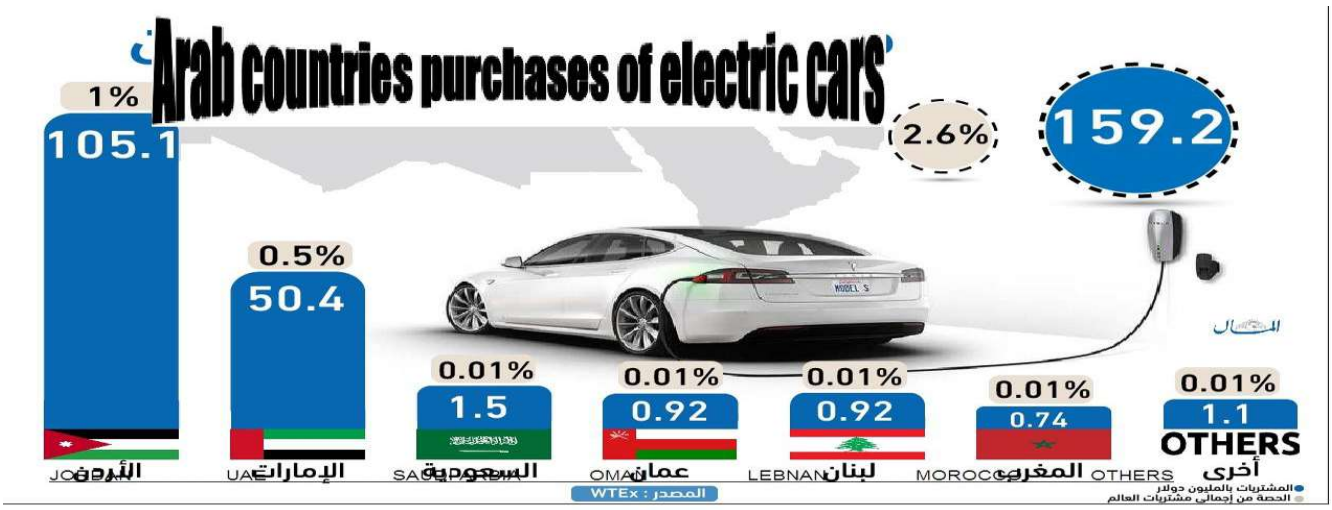

Figure (2) : Arab countries purchases of electrics cars - [https://almalnews.com]

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- **Goals of this work**

Challenges to spreading, an investment market and electric cars in the Gulf

In light of the technological acceleration that is invading the world, most of the Gulf countries are keeping pace with the technical developments taking place in it, especially those that are compatible with preserving the environment and reducing pollution rates. Electric cars have become one of the rapidly developing technologies, which are occupying a special place in many technologically advanced countries, especially the Gulf countries, which are trying to play a role in them. The introduction of EVs, particularly across Saudi Arabia & the UAE, is expected to be a promising option to address rampant environmental pollution & future economy-related fears. In this regard, the governments of the member countries are taking initiatives and proposing a set of policies, enabling these countries to pace up their efforts and achieve the intended Green House Gas (GHG) emission reduction goals. Besides, UAE & Qatar are making notable efforts toward adopting Green Mobility solutions by introducing several policies to promote sustainable transportation through EVs. Additionally, Saudi Arabia, in 2021, unveiled its first zero-carbon city, The Line, at NEOM, which is in line with its Saudi Vision 2030 national development program.

Important market for investments

A number of Gulf nations have made significant investments in the rapidly expanding global electric vehicle market as they look for alternative investment sources to oil. The "Lucid" company for electric automobiles pledged to develop a start making for electric cars in Saudi Arabia after receiving a billion dollars from the Saudi State Investment Fund in 2018, according to the American publication "The Wall Street Journal" in this context. The company "expects the creation of manufacturing facilities in a number of countries throughout the world in the next years, such as the regions of Asia and the Pacific, the Middle East, and potentially Europe," a representative for "Lucid" told the newspaper on March 10, 2021. W Motors has begun construction on a facility in the Emirate of Dubai producing a variation of automobiles, including electric and self-driving vehicles. The factory will cost $100 million, and processes are expected to begin in 2021.

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- **Part 1 : Gulf Area Electric Vehicle**

State of Kuwait

Strategies are still being made to introduce electric vehicles to the market, and the ministry is eager to simplify the process. Before the dealerships start selling their electrical cars in the Kuwaiti market, the government agencies willing to take responsibility for electrical cars have begun to frame the proposals and scenarios created by the organizations in charge of putting the required infrastructure in place in coordination with local automakers. According to Al-Rai newspaper, one of the dealerships is anticipated to start selling electric vehicles in the beginning of 2022. In anticipation that other ministries and government organizations would follow suit, the Ministry of Electricity and Water is investigating a method to put charging stations for electric vehicles in the ministry building and the buildings that belong to it. Informed ministry sources indicate that there is a plan to reserve these stations solely for the vehicles the ministry employs for the performance of their duties and to prohibit the use of those sockets by any other vehicles. They emphasized the keenness of every government agency on the interest of public finances when they said, "What is going on in the Ministry of Energy and Water in this regard is expected to roll out in the other ministries and other governmental agencies and institutions." The authority will ultimately hold the facility in which the car chargers are located, whether it is a commercial or industrial complex, public utility societies, or other organizations, based on the total consumption readings shown by this meter as per specific tariff for each sector, according to the sources, who explained that the issue of installing the charger sockets in different locations is not primarily a matter for the ministry. These facilities will be free to select which categories they are allowed to supply or whether to open their rechargeable batteries to the general public. Electrical chargers may

be fitted with specialized meters that display the amount of current used when recharging each car's battery. The Public Authority for Industry will look into the issue relating to the technical requirements of chargers for electronic automobiles, their overall perspective, the construction of their infrastructure, and the units of chargers. The sources confirmed the ministry's desire to streamline procedures for

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electrified vehicles. They stated that the ministry intended to ask the Fatwa and Legislation Department for its view in this matter by sending an official letter, especially given that the consumption tax varies by industry. This implies that the assistance offered by the state, as represented by the Ministry of Energy and Water, to those who utilize its services will vary depending on the industry. On the other hand, a number of experts in this field urged public authorities to learn from the experiences of nations where electrical cars are common, in terms of how to calculate costs or distribute filling stations, and to ascertain the effects of the proliferation of electrical cars on rising costs of electrical current consumption.

Is Kuwait ready to introduce electric vehicles to the local market?

Through the fourth structural plan 2040, which was first introduced four years ago, the City Council and the Municipality sought to make the nation a regional and global commercial and economic powerhouse, and while Eng. The late Amir of Kuwait had a noble vision for his nation to become a regional and global economic and commercial hub. said that plan is a translation of that noble vision. "Since more than four years ago," the City Council has considered that the 2008 structural plan had a deviation of 60% from development projects. The fourth state plan for 2040 was therefore authorized by the Supreme Council for Planning and Development prior to being sent to the Municipal Council for approval. is a municipal council member. Said posed inquiries to the Municipality's executive body regarding the scope of the fourth structural plan's comprehensive study when electric vehicles will arrive in Kuwait. This is because car dealerships have already begun selling electric cars significantly both internationally and in Kuwait, particularly considering the opulent features that these vehicles offer and their outstanding quality at very low fees for maintenance.

[http://www.arabtimesonline.com/news]

The proliferation of electric vehicles in Kuwait, according to representation of a sector , presents new challenges that the state's spatial structure must identify because they will order to support the development loads. This begs the question of how prepared Kuwait is for this transformation and how well plans have been put in place to handle the anticipated significant increase in power load that will result from charging at home. In addition, the objectives of Kuwait Council's leadership

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of its structural plans prior to the fourth planning process 2040 are broken down into three parts. The first phase entails gathering information about the requirements of various government agencies, the second phase involves presenting working papers about the economy, housing, and the environment, and the third phase involves putting Kuwait's plans to become a smart country into action. The stage of implementing the fourth planning process for the State of Kuwait, according to some Executive Office for Planning and Development members is one of the critical stages when it comes to the requirement to accomplish conformity and link the plan with the growth strategy and policies produced by the General Authority for Infrastructure and services were involved in the planning process (2015-2020), which the Constituent Assembly adopted. Having the private sector be able to conduct economic operations and having less government control over it is one of the most significant regulations pursued by the Supreme Council for Planning and Development, as was previously indicated.

- **Kuwait has electric vehicle charging facilities.**

In an effort to improve its services and keep up with local market demands, Al-Sour Fuel Marketing Company confirmed the installation of an electric vehicle charging unit for vehicles powered by electric power systems at the Alfa station in Mansourieh figure (3). The company also stated that it organized to steadily complete the electric charging service for vehicles at the rest of its stations. According to a statement from the business, Ahmed Yousef Al-Ghanim and Sons Company (Al-Ghanim Motors), the first authorized agent for the import and sale of electric cars in Kuwait since 2018, took part in the ceremony to launch the service and provided a Chevrolet Bolt EV to conduct the experiment with a media campaign to record the occasion. The production of electric-powered vehicles, in particular, has accelerated the provision of this service, allowing it to expand its offerings to meet local auto market demands and encourage the use of clean energy, in line with the state's efforts to take concrete steps toward realizing the development plan's goals. 2035: Kuwait As a participant in the Technical Committee for Infrastructure Equipment for Electric Vehicle Chargers, Al-Sour confirmed coordination with state government agencies and the creation of legislation for activating the service in Kuwait and establishing the price.

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Figure (3) : Al-Sour fuel charging electric cars - [https://www.alraimedia.com]

Dubai

Dubai to Implement GM Unit's Automated Vehicles in Emirate from 2023, Dubai's crown prince announced on newspaper . Dubai has signed a contract with General Motors Co.'s

With operations set to begin in Dubai in 2023, the large percentage Cruise subsidiary's self-driving car fleet.He said on Twitter that the auto fleet will have 4,000 vehicles by 2030 and that Dubai would have been the first country outside of the United States to use the technology. According to Sheikh Hamdan, Dubai wants to improve the effectiveness of the transportation industry by 2030 in order to reduce transportation costs by 900 million dirham’s annually, save 1.5 billion dirham’s annually by reducing environmental pollution, and generate 18 billion dirham’s annually in economic revenues. Since August 2015, the UAE's Ministry of Energy has implemented a policy of trade liberalization fuel prices, adopting a pricing methodology in line with market rates. Both gasoline and diesel pricing will be liberalized in an effort to reduce fuel use and encourage people to utilize environmentally friendly alternative forms of transportation. Additionally, it will influence the way people shop for fuel-efficient vehicles and hasten the market entry of electric and hybrid vehicles. Due to the cost savings they generate and the use of a spotless vehicle that upholds a safe and renewable environment, electric cars are drawing an increasing number of users. Following the introduction of several models, the most significant of which are the Tesla "Model S," "Model X,"

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and Nissan "Leaf," the country's auto market has developed into a significant market for electric vehicles. This is because numerous public and private organizations are collaborating to provide the charging stations required to fuel electric vehicles. to lessen greenhouse gases and shield the ecosystem from carbon emissions' consequences. There will be about 85 million new gasoline and diesel vehicles on the roads by 2025, and there will be close to 20 million hybrid and electric vehicles built globally. Due to their significance in supporting sustainable transportation initiatives and within the framework of the strategies launched by the UAE to promote the concept of sustainability, the availability of charging stations and their distribution throughout the nation will hasten the spread of electric cars on the roads of the Emirates. The need to invest in cutting-edge technology has arisen as a result of the global expansion of the electric vehicle battery sector, which has seen charging times for these batteries decrease from hours to just a few minutes, while also becoming lighter and more affordable. The authority clarified that Circular No. In order to increase the percentage of hybrid and electric vehicles in Dubai over the next few years, the General Authority of Energy set a target in Resolution 1/2016 for all authorities to include hybrid and electric vehicles in the total fleet of their cars and trucks without Just under 10% of the total new purchases from 2016 to 2020. When asked about the number of these vehicles present in Dubai and whether they will experience an increase in the years to come in light of awareness campaigns, the authority stated that

- **The UAE's adoption of electric vehicles is hampered by a lack of charging outlets.**

Millennial Emiratis who drive electric vehicles and have clean charger cards called for more programs and ideas to enhance overall service in the Emirates and motivate people to choose eco sustainable options. They outlined their demands for the need to increase the number of regular and express filling stations at the state level, particularly in the municipalities of Abu Dhabi and Al Ain, and also to abolish the value-added tax in order to save money and encourage people to purchase electric vehicles, similar to what is done in the United States and Europe, and to distinguish charging stations into areas for commercial vehicles the same as taxis and other non-commercial vehicles for personal use. a local person , a resident, revealed that he owns three electric vehicles and claimed that the government infrastructure made available through the Dubai Utility service Authority's Green Charger project in 2015 inspired him to switch to greener

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automobiles. The free recharging at public stations in Dubai, together with the individual charger, which costs no more than 3000 dirham's, at 2100 dirham's for the device and between 500 and 3000 dirham's for installation, contributed to making the charging process easier through a variety of outlets, he continued. According to a government official , it typically takes 5 hours to fully charge an automobile at home, depending on the model. Regarding the savings that can be realized when purchasing an electric vehicle, banks provide a reduced interest rate of up to 1.9% compared to the advantages of conventional vehicles, in addition to exemption from transaction fees, pointing out that his job requires him to travel 300 km per day to get from one emirate to the next, and here the maintenance process emerges, which is virtually non-existent in electric vehicles. For instance, over the course of the last year, he traveled 70,000 km, and he only changed the oil once On the other hand, the conventional car he had previously, which had a 6-cylinder engine, required fuel at a cost of 2000–3000 dirham's per month, in addition to the specifics of the regular small maintenance pertaining to parts that might cost more than 1000 dirham's per month if they were harmed or eroded as a result of driving far distances. In contrast to most other nations in the globe, which eliminate or cut taxes to encourage people to buy environmentally friendly options, he suggested that government organizations should offer more facilities and solutions to encourage people to choose this kind of vehicle. The environment is calling for an increase in the number of fast charging stations, especially in the Emirate of Abu Dhabi, where it appears to be very difficult for those whose car battery has run out and they need to charge it to continue their journey; they note that Masdar City is the only location that offers 5 or 6 chargers, and it is always crowded. As for Dubai, one can find a charging station roughly every 10 kilometers; however, the issue is with the taxi owners of the city's taxis. Because many regular dealers either find the station busy or not working and needs maintenance, the customer is forced to rely on himself through home charging, he made the point that cars that are charged multiple times at the station by owners of commercial cars or to supply their own stations should be violated. citizen who owns two electric vehicles, features this to government facilities made public by Dubai as portion of the Sustainable Charger initiative. He noted that his daily driving does not exceed 100 kilometers, so it may only need to be paid every three days. He claimed that installing the home charger costs 2000 dirham's for the device and 500 dirham's for the installation, and the required to charge process

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takes about five hours to fill the entire car battery to drive a distance ranging from 350 kilometers to 450 kilometers, depending on the model. In addition to the low benefits offered by banks to finance electric cars, which do not exceed 1.9%, and an exemption from transaction fees as well, he emphasized the importance of the green charger initiative to exempt the public from shipping costs until December 2021. However, the real issue is the lack of shipping stations in general in all of the country's emirates, particularly the "Super" fast charger and the absence of the abolition. He claimed that while the Dubai Electricity and Water Authority offers more than 200 green charging stations in the emirate, and the number of Supercharger stations is around 8, and may be busy most of the time, the Tesla Agency only provides four fast chargers in the country, with one each in Abu Dhabi, Hatta, the Last Exit area of Dubai, and the Dubai Mall. he emphasized that the absence of chargers is the main issue for owners of electric vehicles, particularly when moving between different parts of the nation. He claimed that Dubai's charging stations have a problem with taxi drivers hogging them all the time. According to him, the typical charger can charge at a rate of 11 to 22 kilowatts per hour, and the automobile takes roughly 4 hours to charge. Dewa's fast charger is outdated and only has a speed of 50 kilowatts/hour, but the Tesla fast charger can charge a car in as little as 30 minutes. Dewa's fast charger is outdated and only has a speed of 50 kilowatts/hour, but the Tesla fast charger can charge a car in as little as 30 minutes. The authority must build more quick charge stations and speed them up because the battery can be fully charged in just 40 minutes at a pace of 100 kilowatt-hours. citizen , a resident of the country, added that he owned two electric cars the previous year but had to sell them because there weren't enough charging stations in the country's emirates and they weren't divided into stations for commercial and non-commercial vehicles, particularly because his job requires him to travel daily over long distances. He made it clear that once the country's service for these vehicles has improved, he will eventually switch back to using electric vehicles. For its part, the Dubai Utility service Authority reported that 1,764 customers had obtained "green charger" cards since the initiative's launch in 2015 through July 15 of this year. The authority also stated that it continues to offer incentives to encourage people to use and buy electric cars, as well as free charging for those who already own them. Electricity registered in the "Green Charger" program from September 1, 2017 to December 31, 2019 was then extended for owners of non-commercial vehicles until December 31, 2021,

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provided that this was only available at public charging stations and not at home charging stations. A cost of 29 Fils per kilowatt-hour is charged to operators of commercial vehicles owned by companies, institutions, authorities, and semi. "The administrator provides more than 240 electric filling stations throughout the emirate of Dubai, and consumers can know the areas of the stations through the organization's smart application or its website, or by using over than 14 digital map platforms," a representative of authority , Managing Director and CEO of the Dubai Electricity and Water Authority. According to company representative, the authority offers three types of charging stations to its customers who have green charger cards for electric vehicles. The first type is a fast charger station, which has a "43 kilowatt AC current, with a second type plug, 50 kilowatt direct current of CHADEMO type, and dual sockets from CCS type," and can finish 80% of the charging process in anywhere between 20 and 45 minutes, depending on the battery's type and capacity. Gas stations typically have this kind of charging equipment installed. As for the second type of stations, these are public locations charger stations "2 x 22 kilowatts AC, with the dual plug of the second type", and the complete charging process can be performed in a period of two to four hours. The third type of wall chargers are "22 kilowatts AC, with a single plug of the second type," and depending on the kind of car and the battery size, they can finish the charging process in two to four hours

[https://www.alroeya.com]

- **SAUDI ARBIA**

A major oil producer like Saudi Arabia financing in the production of electric automobiles, which do not run on oil at first, seems to be a dubious decision in more ways than one. At first glance, it seems that the rise of electric vehicles will lead to the retirement of oil and its derivatives; however, given that roughly half of the world's oil production is used for transportation, crude oil continues to be the raw material that generates enormous revenues for the Saudi treasury. The Public Investment Fund (PIF), on the other hand, is searching for a lucrative investment because that is the reason the fund was founded. It is the investor in the up-and-coming American electric car maker Lucid. However, a closer examination reveals that the Saudi strategy to combine the use of fossil fuels and renewable energy equally is centered on entering the field of clean energy, its products, and the

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mechanisms that work on it, and that investing in the production of these green cars is a component of the Saudi industry's strategy to be strengthened in line with the Kingdom's 2030 vision. Especially given the potential for future production of this kind of vehicle in Saudi Arabia. Whether electric cars will rapidly and easily take over the world is still up for debate, as is whether it will take decades. We are monitoring the possibility that the Saudi government's investment arm, the Public Investment Fund, may invest in high-end electric vehicles, as well as the opportunities presented by such an investment and whether it will have a detrimental impact on Saudi oil production. The Kingdom of Saudi Arabia has the means, the money, and the motivation to transition to the production of electric vehicles and the parts that go into them, most notably the manufacturing of batteries that can be charged. It is currently using its advantage in the price and demand of oil to effect a shift that others are finding difficult to accomplish. Saudi Arabia's geographic position furthers its focus on the electric vehicle market by enabling it to serve Europe and import materials from China and Australia. With a potential value of $1.3 trillion, the kingdom has started quickly examining and issuing mining licenses to capitalize on its mineral riches.

- **The sum invested by Saudi Arabia**

A $2.8 billion purchase of 8.3 million shares, or 4.9 percent of the total outstanding shares of the US corporation Tesla, was made by the Saudi Public Investment Fund in December 2018. Following a period of decreases in the value of Tesla shares, the fund withdrew from the company after roughly a year, more precisely in the fourth quarter of 2019, and kept a modest investment. The Public Investment Fund paid $1.3 billion to acquire 67 percent of electric vehicle startup Lucid Motors in 2019, the same year that Tesla announced its exit from the market. The business specializes on creating high-end automobiles. The technical capabilities of Lucid's substances have shown promise in tests. There are plans to build a car factory in Saudi Arabia, but there are currently no details on that. US-based electric car manufacturer Lucid Motors will start producing cars there by 2024 as competition for market share in the region's nascent industry heats up. The Saudi Standards, Metrology and Quality Organization's deputy governor and organization representative told Al-Arabiya TV that the paperwork for the agreement was being finalized when the announcement of the factory's construction in the Kingdom was made. The action was taken after Saudi Arabia's Public Investment Fund invested

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$1 billion in the business in April 2019, acquiring a 67% share in the company. Lucid will find it difficult to equal the success of prominent electric vehicle (EV) rival Tesla even with the investment. Only 11,000 orders have been placed for Lucid Motors' premium Lucid Air model, which costs over $70,000 and is scheduled to go on sale early next year.

[https://www.pif.gov.sa/]

Just around 388,000 vehicles were sold in Saudi Arabia in total in 2020, which is less than the amount of Teslas that have been sold each month in the US just this year. Just 20,000 automobiles are intended for manufacturing of the Lucid in 2019. The chief executive of Lucid Motors, Peter Rawlinson, acknowledges that his company has a ways to go before it can compete with Tesla, saying: "Tesla is in a pre-ascent job because it acknowledged that electrification is a future tech race. Lucid aspires to win the EV race by being 40% bigger than any other electric vehicle and going 17% longer with a battery pack that is similar in size to the long-range Tesla Model S. A Lucid automobile can travel over than 500 miles on a single charge, as opposed to the Tesla Model S's approximately 400 miles of range, thanks to its battery's capacity of per kilowatt-hour, 4.6 miles can be traveled. Despite recent drops in battery prices, internal combustion vehicles remain more expensive than electric vehicles. Before taxes, the cost of a vehicle is 25 to 35 percent made up by its batteries. According to Sue Magnusson, head of CMF design at Lucid Motors, the business also aspires to differentiate itself from its competitors through its design ethos. "A fundamental component of Lucia's design concept is the use of sustainably sourced materials. Every step of the way, we need to question our suppliers about the origin of the raw materials, how they are harvested, how the factories are run, and how they handle employee safety. Many manufacturers adhere to the belief that everything should be of the highest caliber. Despite being a significant aspect of what we do every day, we must also feel that achieving the highest quality in these fields without taking the influence of the procedures and supplies we employ into account is not at all sufficient. She discussed the sustainably sourced leather, wood, polyester, and wool used in the Lucid Air's interior in an August essay for Arab News, saying that sustainability "should be a mission, not a phase" across the whole electric car industry. There have also been two further, more expensive Lucid variants announced, each costing over $169,000. While the Dream Edition Range is built to maximize range,

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the Wish Edition Performance is built for speed and acceleration. These automobiles were only produced in 500 total, and they were immediately sold out early this year. The economy, employment, and the Vision 2030 would all benefit greatly from their manufacture here in the Kingdom. Graduates from Saudi Arabia may already apply for a PIF internship program that will run for six months starting in January and entail working at Lucid Motors' US locations in California, Newark, and Arizona. Although a fleet of Mercedes EQ electric cars is said to be in use at NEOM, only hybrid models are currently offered in Saudi Arabia, and outside of a few locations like one of the malls in Jeddah, there is no infrastructure for their charging, an auto industry insider told Arab News. As far as Arab News is aware, there is no platform law in place. According to the source, there are no battery recycling or disposal services in the Kingdom either. Even though that is the case, purchasing an electric vehicle in this country will be difficult. With more Lucid vehicles on the road in Saudi Arabia and worldwide, this is something that will likely alter. In an effort to minimize emissions that contribute to global warming, Saudi Arabia, the largest oil exporter in the world, declared that at least 30% of cars in its capital city will be electric by 2030. The goal, which was unveiled on Saturday at the opening of a climate conference in Saudi Arabia, is a component of a plan to cut carbon emissions in the 8 million-person metropolis in half over the following nine years, according to head of the Royal Commission for Riyadh City. As several nations work to minimize or phase out internal combustion engines that operate on gasoline and diesel, Riyadh has set a goal to increase the use of EVs. By 2025, China wants 25% of all new cars to be electric. By 2030, the U.K. intends to stop selling new fossil-fuel automobiles. Saudi Arabia considers launching a domestic electric vehicle manufacturer According to those with knowledge of the situation Saudi Arabia has engaged experts including Boston Consulting Group to examine the possibility of establishing its own domestic electric-car manufacturer. The persons, who asked not to be named since the discussions are private, claimed that the project is related to ongoing initiatives to strengthen the nation's automotive infrastructure and increase domestic production. While declining to comment on specific projects, a representative for Saudi Arabia's sovereign wealth fund said the organization is devoted to fostering growth and diversifying the oil-dependent economy of the country. Since a number of years ago, the $400 billion Public Investment Fund has been involved in the electric vehicle industry. It bought a minor investment in Tesla Inc. in 2018, and

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before Elon Musk tweeted about his plans, executives talked about supporting his efforts to take the firm private. The PIF nearly completely liquidated all of its Tesla shares before a historic surge that started in late 2019.According to persons familiar with the situation who spoke to Bloomberg News in January, the PIF and Lucid have been in discussions about constructing a facility close to the Red Sea city of Jeddah. Although Saudi Arabia has more money to invest in a project of its own, any new manufacturer would confront a wide spectrum of rivals emerging globally. The chairman of the kingdom's wealth fund, stated during a briefing in Riyadh that Saudi Arabia hopes to reach agreements this year or the following year to develop domestic manufacturing. Right now, we're taking a look at electric appliances," he remarked. According to those with knowledge of the situation, Saudi Arabia has engaged experts including Boston Consulting Group to examine the possibility of establishing its own domestic electric-car manufacturer. The persons, who asked not to be named since the discussions are private, claimed that the project is related to ongoing initiatives to strengthen the nation's automotive infrastructure and increase domestic production. In order to build 150,000 electric cars in the Kingdom within two years, he said, we have started the process of opening a factory for electric car assembly. This plant is one of three prospective factories in the Kingdom, The second plant's opening represents a new phase in Lucid's efforts to promote the use of sustainable energy technologies and solutions, the CEO noted. At the signing ceremony, he said, "We promised the world to extend the distance covered by (Lucid).

Figure (4) : electric cars Exhibition in Riyath - [www.bloombergquint.com/markets]

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Part 2 : Plans and obstacles in the Gulf Area

Saudi Arabia has electric vehicle charging facilities.

In recent years, environmentally friendly electric vehicles have become more common in Saudi Arabia. The Kingdom of Saudi Arabia has shifted toward supplying the demands of the car from dispersed, self-contained electric filling stations due to its numerous environmental and personal benefits. The government in the Kingdom of Saudi Arabia have planned to provide 5% of the total parking capacity in response to the demand for electric vehicle charging stations. In Saudi Arabia, every parking lot will have access to an electric vehicle charging station under the planned plan, which is intended to accommodate the requirements of the electronic automobile. The first level of the plan's car charging stations is designated for long-term parking and is divided into multiple levels based on the availability of space. In order supply car charging services in a fashion that is acceptable for their extended pauses, such as parking lots for residential buildings, railway and regional transit stations, as well as offices and airports. The second level is designated as short-term parking, which includes spaces found in commercial buildings such as markets, malls, theaters, and hotels. This classification is also set up so that it will be considered to be less congested. Owners of cars can leave their vehicles long enough to take advantage of adequate charging. Finally, the third floor was separated into parking lots that were positioned in front of stores and along major thoroughfares on both sides of the street. This is the split of the three tiers supplied to do is provide charging stations for electric cars in Saudi Arabia, in addition to gas stations, in order to help achieve the task of charging according to the time the car is parked.

- **Qatar opens a new electric vehicle plant**

The "Jussin Advance Mobility" company, a joint venture between the factory agent and the agent from Qatar, and the Qatar Free Zones Official released details of a 20 million Euro agreement to create an electric vehicle facility in the Ras Bufontas Free Zone. The deal, which was consummated via visual television technology, aims to boost the region's adoption of environmentally friendly vehicles by assembling electric cars. The organization's spokesman said , Minister

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of State and Director of the Company of Directors of the Free Zones Authority, stated that this partnership will enable to continue supporting well-known national businesses in addition to establishing a research and development facility to assist in the creation of vehicle technology and products, which will support the growth and success of these businesses in this significant sector in Qatar. The representative of the business, the Chairman of the Board of Directors of Al-Attiyah Automotive and Trading Company, stated that the partnership with "Gossen" includes the field of innovation at the global level, to bring the most cutting-edge independent technologies. CEO of Gossen, stated that executing the contract represents a positive step towards improving further progress for the company in Qatar and the Middle East, which supports the company's expansion plans. He emphasized that the contract will open the door for long-term collaboration to produce environmentally friendly automobiles. The "Ras Bufontas" area, which is about 4 square kilometers in size and is close to Hamad International Airport, is qualified to become a major centre for technology and supply chain in the region and has the capacity to draw business, trade, and investment from around the world that will help Qatar realize its goal of becoming a smart nation. It is significant that the Qatari Quality Company is constructing a facility in Doha as well to create a locally created product.

[https://www.dohanews.co/qatar]

The electric vehicle created in collaboration with a Japanese business. The Qatari Ministry of Transport and Communications recently revealed that it is nearing completion on the strategy and legislation for the nation's electric bus project, which aims to convert 25% of the nation's fleet of public transportation vehicles to electric buses by 2022 and use electric buses for the bulk of the World Cup's main services. It will be the first football event to use electric mass transport vehicles in 2022. Throughout order to promote hybrid - electric vehicles in the nation, the Qatar Electricity and Water Organization "KAHRAMAA" has established a number of electric vehicle charging stations. By the end of 2022, it plans to have 400 stations finished in collaboration with the private sector.

- **Qatar: There will be electric buses at the 2022 World Cup.**

The strategy and regulations for the country's electric bus project are currently being developed, based on the Qatari Ministry of Transport and Communications.

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By 2022, 25% of the fleet of public transportation vehicles is to be converted to electric buses, and the 2022 FIFA World Cup will feature a significant amount of electric bus service. to employ electric mass transport vehicles as part of being the first championship. The Official of Communications and Transport released a news release today that It was brought up in the report. stated that the Doha Metro feeder buses, government school buses, and public bus services will gradually be converted to electric buses in order to meet the required reduction in harmful carbon emissions from buses by 2030 and to maintain environmental sustainability. The strategy states that this transformation will aid in the development of an infrastructure for Qatar's integrated electric public transportation system because numerous permanent warehouses will be built in various locations and distributed according to a carefully considered geographic layout, containing parking areas, charging stations, and maintenance tools in addition to administrative buildings and housing for staff members and drivers. The ministry stated that the project's goals are to support the nation's transition to a greener future, achieve economic and environmental balance to guarantee the long-term viability of infrastructure projects for the transportation sector, support economic growth, and optimize the benefit from natural resources by strategies to grow revenues for the oil and gas sectors and developing means Transport that reduces harmful carbon emissions while utilizing alternative and clean energy in compliance with the most recent global environmental systems. This creates a clean, healthy, and safe environment for the next generation

- **Qatar consents to establish the first factory for electric vehicle charging equipment**

The Qatar Civil Works Administration and the Swiss business have entered into an agreement in advance of the construction of a factory for electric vehicle and bus charging stations. According to an article in the local newspaper Al-Arab, this is the initial production of its kind that the Swiss company has created in the Middle East for electricity transmission. The agreement was signed at the same time as the contract for the supply of electric bus charging stations as part of Qatar's Ministry of Transport and Communications' aim to transition to electric vehicles. The deal was reached in collaboration with the Qatar Free Zones Commission, which controls the site where the plant is planned to be built and is essential in offering expansion opportunities for investors. The agreement calls for cadres to be trained

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and qualified to run the new facility and supply workers with the necessary knowledge and information. In the report it was mentioned. the head of the Qatari Civil Works Administration, stated that the signing was a result of the administration's decision to put requirements in the contracts the Civil Works Authority agrees to set up industries in the free zones. The latest smart charging solutions are being used by the firm to help reach the full potential of electric mobility, according to organization representative , General Manager of Electric Transportation at ABB. The plant is anticipated to help promote and support the Qatari public transportation strategy, and the Civil Works Authority will create bus stops and warehouses that meet the strictest environmental standards in collaboration with the "Karwa" transportation firm. The Doha plan and its aim to assist the environment within the scope of the 2030 plan are supported by these stations, which, according to the Qatari newspaper, are among the biggest electric bus charging stations in the world. About 41 electric charging locations that are being constructed as part of the public transportation bus infrastructure initiative will receive 653 chargers and 713 electric transformers from the Public Works Authority. These locations will provide service for the electric bus fleet that will be run in accordance with the Ministry of Transport and Communications of Qatar's plan. In this context, Transport Organization approved 14 new contracts for the construction of bus stops and depots, at a value of 2.4 billion riyals (660 million dollars), as part of the public bus infrastructure program. Transport Organization will establish various electrical charging points inside and outside of Doha, and will provide electrical installations and all the infrastructure needed to connect charging devices to electrical transformers and various power stations. Eight major bus stations have been established as part of the new parking and warehouse development in West Bay, Msheireb, Industrial Area, Each station can accommodate roughly 25 buses on average, and four enormous bus depots will be built in Lusail, Al Rayyan, the Industrial Area, and Al Wakra. In addition to the installation of 2,700 bus stops on all major routes, each area is between 129,000 and 190,000 square meters. With the delivery of air-conditioned waiting rooms, thousands of people should be able to use the buses in different locations while being protected from heat and humidity.

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- **Saudi Arabia's proposed project's objectives**

This project was set up by the relevant parties in the Kingdom of Saudi Arabia to fully fulfill the needs of the electric vehicle market, including not only supplying electrical charging for the vehicles but also all other necessities for all electric vehicles. This idea is in line with the widespread trend toward employing clean energy and environment conscious vehicles. Additionally, this movement represents a move away from the usage of oil-powered vehicles, which have shown over time to be harmful, either to the environment in general or to residents in particular. Which produces dangerous exhaust that can cause major illnesses?

Additionally, the Saudi Ministry of Public utilities and Rural Affairs noted that the country's decision to switch to electric cars was in accordance with the worldwide movement toward the use of clean, ecologically friendly energy sources. This action is taken rather than utilizing oil engines to minimize air pollution and prevent the progression of global climate change, which has recently gotten worse and caused many issues. It is therefore time to replace them in order to save the rest of the environment. The involvement and investment of international automakers and sellers in the development of environmentally friendly electric automobiles and their ability to keep up with and surpass conventional cars are recent indications of this awareness. The rising demand for this car as well as its greater market appeal encouraged manufacturers to invest more in research and development. As a result, the cost of one car will reduce as production and sales rise, which is now taking place sequentially and continuously and encouraging an expansion in manufacturing. the first electric vehicle charging point in Jeddah , Before discussing the first electric vehicle charging stations in Saudi Arabia, we should first discuss the "Design of the Diyar Al Salam project," which has lately gained notoriety in the Kingdom of Saudi Arabia due to the fact that it is the Kingdom's first residential project. The people in charge of that design stated that they wanted to receive a LEED certification from the American Green Building Association. According specialist statement to the network ." According to Net, CEO of Schneider Electric, one of the firms working on the , the Diyar Al Salam project was primarily created to be ecologically benign by meeting requirements that ensure sustainability. In order to ensure the success of energy and water savings, as well as a comprehensive program to enable residents to recycle

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consumer goods, the development of bicycle parking and chargers for environmentally friendly electric automobiles was one of those priority for the design of that project. Due to this, the first station for charging electric vehicles has already been set up in Saudi Arabia on the western side of the Kingdom, specifically in the city of Jeddah. This addition was made as part of the "Diyar Al-Salam project," making this station the first charging station for electric vehicles in Saudi Arabia. He further noted that the commercial business's belief in its part in fulfilling the vision of striving to beautify the Kingdom was the reason why the "Diyar Al-Salam proposal" had developed from its first seed. In addition to establishing sustainability, which calls for motivating all other business sector, whether they are investors; How can we encourage them to contribute to project execution and progression?

As for encouraging the purpose of government in ongoing advancement and modernization, and keeping up with the times by creating such stations, which apply to charging gas electric vehicles to the Saudi market in recent times, as well as enabling cutting-edge technologies that ensure renewable energy addition provided by electric vehicle charging stations in Jeddah In order to continue what a representative of authority , CEO of Schneider Electric, launched, he said that the project is already servicing seven electric cars that are located in specific locations, driven by consumers, and sharing information with them through a programmed electronic chip that involves the car owner. This enables the owner to understand and supervise the level of regular electricity consumption. He continued by saying that Jeddah is only the beginning of the aforementioned initiative, which would eventually extend to all of Saudi Arabia's major cities as well as the country's center and eastern areas. He finished speaking to newspaper stated that the market has been more thoroughly researched by Schneider's marketing department, and this has been done over the past year by advancing steps with government agencies and other private parties, and it is anticipated that by the near future, car companies in Saudi Arabia will be able to offer and sell electric cars. Where agents will be able to offer and sell cutting-edge automobiles financially within the project land, which will lead to a rise in demand for the construction of electric car charging stations in Saudi Arabia "and within the Diyar Al Salam project. It is important to note that "Schneider Electric" is one of those international electronic firms with a history spanning more than a century and presence in more than a hundred nations.

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It specializes in energy management, information centers, architecture, and manufacturing. it has a history that spans more than a century, as well as being represented in more than a hundred nations worldwide.

- **The typical price of delivering a car**

After learning about the Saudi Arabian electric vehicle charging infrastructure, it is important to note that the cost of charging an electric vehicle has undergone a number of changes before becoming significantly less expensive than filling the tank of a conventional vehicle with fuel. These changes include places and charging level. You can determine the expected cost of charging the car battery by figuring out the cost of electricity (either at the public charging station or in your home), and you can then calculate the total cost. The capacity of an electric car battery is measured in kilowatt-hours, and this refers to the amount or amount stored inside the battery. The equation required to accomplish this is as follows: The value of fully charging an electric car battery is determined by multiplying the battery size (in kilowatt hours) by the cost of energy (in cents per kilowatt hour). The place and kind of the delivery will determine the shipping cost. If you assume that your home serves as the location for charging and that you have a garage or access to a public electrical network, employing this method is simpler and more practical than using public spaces for charging. This method of home charging, known as level one charging, will cost you approximately $10.50 to fully charge the automobile from empty to full. When a charging device of 110 volts is linked to a regular electrical supply, it also takes eight to twenty-four hours to fully charge a battery. However, if you invest between $250 and $400 installing 240-volt lines in your garage, you might be able to benefit of the number two charging level, which provides an empty battery only four hours to start functioning. Considering that the electricity prices is more stable than the cost of conventional fossil fuels, the requirement for an electric car service device may also materialize since it will be employed as an external unit for charging level 2. The gadget's price may range between $300 and $1,200. In terms of the second level, which involves charging in public locations, you can go 250 kilometers after an hour of nonstop charge. Public charging stations offer Level 3 charging, also known as DC fast charging, which is faster and more efficient than Level 2 charging. Using this technique, you may charge the battery to 80% of its maximum capacity in 35 to 45 minutes. Additionally, it must be paid for upon shipping, which is done at a rate of $15 per

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hour and is computed by the minute. Since this procedure is thought to be the fastest, it is also expected to be the highest costly.

- **Saudi Arabia and the UAE both see the emergence of electric vehicle markets**

When people think of the countries in the Arabian Gulf and the Middle East as a whole, they typically associate them with oil. Since the start of the 20th century, the Middle East has played a vital role in determining the global energy economy and has continued to do so. Despite the fact that all of the countries in the Arabian Gulf still primarily rely on oil as their domestic fuel and source of revenue, new green energy and renewable transportation technologies, energy and resource diversification, worries about pollution and climate change, and assistance for sustainable growth are now driving some of the oil-rich Arab countries' new economic agendas. In the Arabian Gulf, Saudi Arabia and the United Arab Emirates (UAE) are particularly becoming early adopters of electric cars (EVs). And while though driving an internal combustion engine vehicle is still less expensive in both countries than driving an EV, their efforts are commendable. The UAE is the region's top user of electric vehicles and the seventh-largest crude oil exporter. The UAE has a bold plan to grow its EV market over the next 20 years while promoting itself as a nation dedicated to a reduced and sustainable economy. The Emirati government intends to boost its own EV usage by 20% this year and deploy 42,000 EVs nationwide by 2030.The world's most EV charging stations are located in the United Arab Emirates. Dubai, which boasts of having already erected 200 of them, has the highest number of charging stations among the seven Emirates in the United Arab Emirates. As additional charging stations are put in, it is projected that the country's EV market would grow. In reality, the UAE, especially Dubai, has the potential to lead the world in the adoption of electric and zero-emission vehicles. Dubai has been successful in pushing its inhabitants and businesses to utilize electric and hybrid vehicles through the Dubai Green Mobility Program, which promotes the use of low-carbon transportation. Dubai is leading the UAE's sustainable energy revolution transportation industry. To assist in achieving Dubai Renewable Energy Strategy 2050's goal of generating 75% of the Emirate's energy from renewable sources. According to the Dubai National Committee of Energy, 10% of all brand-new automobiles in the Emirate must be electric or hybrid vehicles by 2020, and 10% of all automobiles must be

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environmentally friendly by 2030. The local government has been promoting residents to select electric vehicles over conventional cars ever before Tesla's shop opened in Dubai in 2017. According to the Dubai National Committee of Energy, 10% of all brand-new automobiles in the Emirate must be electric or hybrid vehicles by 2020, and 10% of all automobiles must be environmentally friendly by 2030. The local government has been promoting residents to select electric vehicles over conventional cars ever before Tesla's shop opened in Dubai in 2017. The local authorities have been promoting EV purchases over conventional cars ever since Tesla opened a dealership there in 2017. Dubai now offers a variety of EV options, including models from Toyota, Mitsubishi, and Renault. Throughout the Emirate, taxis are also powered by electricity and hydrogen. The Dubai Energy and Water Authority predict that in the years to come, EVs will not only become more competitive with internal combustion engines, but will also be 80 percent less expensive to charge than filling up a gasoline-powered car. Currently, there are 200 charging stations in operation. Incentives and perks for EV owners in Dubai include free charging stations through 2021, a bonus warranty for EVs, reduced registration and renewal fees, free parking in some locations, toll exemptions, and savings of almost 6,000 USD. For local enterprises to start utilizing EVs, the UAE government has also offered incentives and a variety of electric vehicle options. Businesses in Dubai now see EVs as advantageous to their public image, branding, and commitment to reducing greenhouse gas emissions. Although Saudi Arabia lags behind the UAE in the use of electric vehicles, EVs are gradually gaining popularity in the country. The Saudi Crown Prince Vision 2030 plan, which intends to lessen the nation's reliance on oil, diversifies the economy, and enacts a number of social changes, is compatible with efforts to develop a market for EVs. EVs would assist Saudi Arabia achieve its aim of lowering its dependency on oil, improving vehicle energy efficiency, and reducing pollution because the transport industry consumes roughly a quarter of the country's total energy, and consumption levels are expected to increase in the coming year. In Riyadh the year before, Saudi Arabia set up the nation's first public EV charging station. This year, more facilities are anticipated to go online. The government-run Saudi Electric Company signed agreements with Takaoka Toko, Nissan Motor, and the Japanese utility Tokyo Electric Power Co. to set up fast-charging stations for EVs in the nation. Additionally, Saudi officials started permitting residents to import EVs for private usage. But because the nation is just beginning to adopt EVs, it hasn't set up an

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incentive program like the one in the UAE, which offers things like free charging stations, subsidized vehicle registrations, toll exemptions, and other benefits. Until it can provide significant benefits to the populace, the nation will struggle to raise its part of the EV market. The availability of charging stations will also affect how much EV use is done. There are now very few of them in Saudi Arabia. Saudi Arabia has made significant investments in foreign EV manufacturers despite the kingdom's still-small EV market. In 2018, the 320 billion USD Public Investment Fund , a Saudi sovereign wealth fund, invested $1 billion in Lucid Motors, an electric vehicle startup in California. Prior to PIF's funding, Lucid was having trouble finding money to construct its Lucid Air electric vehicle. At around the same time, PIF also decided to support the American EV manufacturer Tesla. The UAE and Saudi Arabia's adoption of a progressive energy policy is relevant and laudable, yet PIF sold almost all of their Tesla shares at the end of 2019. These two wealthy countries have the resources to develop a large EV industry in order to achieve their ambitious sustainability and energy diversification goals, in contrast to other Middle Eastern countries. However, it will be difficult for them to grow the usage of electrical vehicles if they don't take aggressive measures to increase low domestic gasoline prices and remove significant energy subsidies - which might be laden with opposition from a populace that is used to cheap fuel. They will find it difficult to use electrical vehicles more frequently.

Figure (4) :The Tesla stand at the Dubai Motor Show in the United Arab Emirates. Nov. 14, 2017. [https://insidearabia.com]

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- **Assistance for the solar and electric vehicle industries**

The challenge of storing solar energy in various ways so that it can be used during power outages has been successfully solved thanks to the advancements in solar energy technology, which have increased panel productivity and dramatically lowered the cost of making electrical energy from them. Because it is one of the most effective ways to lower the price of the car battery and hence lower the value of the car itself, this source of renewable and green energy will be a great way for governments to cut the costs of generation and energy support. Creating and altering the infrastructure of electric current networks does not come at a great expense. Parking the car while it is being charged, whether it be wireless or via a wired charger at a public or home charger. While on the road, the car can be remotely charged (dynamic charging). incorporating solar panels onto the car's roofs in order to self-charge the vehicle. Despite the difficulties associated with each, solar energy can be employed in each of these situations. These innovative technologies are revolutionizing self-reliance, easing financial constraints, and contributing to a better future for humanity by lowering harmful emissions to the environment. The most crucial details for charging the car in each of these three scenarios will now be reviewed. The first example stands out: charging the automobile while in front of the house.

Why is solar energy favored for usage in homes?

Solar energy has a number of benefits, including being the least expensive option because solar panels are cheaper in the long term than buying electricity from the grid, whether you're using them to power your electric car at home or other equipment. In some circumstances, it is more affordable to generate solar energy at home than to buy grid power. It is simple to install enough solar panels to meet all of the home's energy requirements, charge the automobile, and save hundreds of pounds over time. Solar panels are a reliable, inexpensive source of energy that, with routine maintenance, may produce electricity for at least 25 years. Increasing investment value Studies have shown that installing a solar energy system boosts a home's market value and helps it sell more quickly than the typical home. lowering the demand for crude materials, which saves millions of pounds that would otherwise be spent on treating infections brought on by pollution.

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- **How much does it cost to recharge an electric vehicle using solar power versus not using it?**

I am aware that this may be the most crucial question for a lot of people, but answering it is the most challenging due to the complexity of the cost calculation. The cost varies depending on the size and type of the battery, the amount of daily driving, the price of electricity during peak hours, and a number of other factors. It was decided that the cost would be determined against each kilowatt hour in order to provide a uniform system for the computation (KWH). According to a report by the US Department of Transportation and a study created by the Consultants in oil and energy company website to study energy and fuel prices, I will give you one example that will explain the significant difference in the cost of shipping in both cases in order to avoid equations and computational complications. For instance, in the United States, using the local grid to charge the battery resulted in an average cost of nearly $13 per kilowatt-hour at the current price, while using solar power decreased the average cost per kilowatt-hour to $1.56. This translates to a cost reduction of up to 80% on average. This is how the comparison looks right now, but electricity rates in local networks are rising like any other service. This average yearly increase in electricity prices can reach a minimum of 2 to 3%, and over the life of your car, these increases will add up to at least that much. These figures correspond to the average cost as stated in the study and may vary from one country to another depending on the cost of using the electric current. How many solar panels are needed for an electric car charging station at home?

The capacity of your electric vehicle's battery will determine how many panels are required to charge it. We first have to know how much energy the solar panels can produce, which varies depending on the solar panels' quality and the intensity of the sun's rays, in order to determine how many panels you need to charge your electric car. The international standard system is based on estimating the amount of energy needed to charge a battery so that it can carry a car 40 miles, which is the same criterion used to evaluate the batteries of various cars. Once more, staying away from the intricate mathematical formulae, I will use the following example to demonstrate how to determine the necessary number of solar panels:

Depending on the location, an advanced, mid-grade solar panel can produce about 350W in full sun during the 3–7 hours of daily peak sunlight. In other words, it

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generates between 1.05 and 2.45 kilowatt-hours of power every day, with the minimum value being (350 x 3) and the maximum value being (350 x 7) as products. We anticipate that each panel will produce at least 1.75 kWh per day. To generate enough electricity to charge a 10 kWh battery and go 40 kilometers, we would need six solar panels. You may calculate how often panels are required to charge your automobile at home using the same formula. Using low-yield solar panels as a basis, this estimate is quite conservative. It goes without saying that the number of panels rises if you require more than 40 miles or 10 kWh and falls as the quality level rises. The battery won't usually be completely discharged. In fact, it was shown that 10 to 12 solar panels are the ideal quantity for residences.

Does storing solar energy at home require special batteries?

Many people are concerned that they will want a battery in order to store solar energy for usage after sundown. They have every right to be worried because, in addition to the expense of the automobile, solar panels, and their accessories, a sufficient battery that can store enough energy to recharge a car battery from stored solar energy costs at least $10,000. Due to the exorbitant cost of this service, researchers in the field have developed a highly workable solution, namely the implementation of the "net metering" system, also known as the "smart charging system," which benefits both the client and the local energy network. where the client uses the local electrical network to charge their car at night after pumping excess solar energy into the grid throughout the day. Utilizing the value of the energy differential between the two scenarios, which means that the network serves as the "home battery," net metering may be advantageous for both parties. When solar panels generate electricity during the day, you receive credits from the electrical energy that is pumped into the electricity grid during peak hours during the day, while you charge the car during the night at lower prices. The balance difference can be used to pay the bill for other services, for instance, if your power panels pump about 15 kWh of electricity into the grid while you are at work during the day. In this case, you have the right to receive a credit of $1.50 for each hour that you charge your car during the night. The residual energy difference from withdrawals of less than 15 kilowatt hours is credited to your account with the power company for future use. The issue with this method is that in order to exchange energy with households, it has to change the structure of the power distribution network.

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- **What elements are necessary for solar energy projects in the State of Kuwait to be successful?**

Kuwait's past

Kuwait is a tiny nation with a land area of 17,820 square kilometers in the northeastern part of the Arabian Gulf. Kuwait is home to 4.2 million people. The weather is very hot and humid in the summer, with typical highs of 42 to 48 °C, and warm with little likelihood of rains in the winter. In Kuwait, oil is mostly used to produce energy. The Electricity National Company began supplying electricity to Kuwait in 1934, and the original power plant had two generators. Each generator had a 30 kilowatt output. A 500 kilowatt generator was first used by the Electricity National Company in 1951. The need for power was at that point growing and developing. As a result, the authorities chose to establish a new ministry named the Ministry of Energy and Water , which is in charge of giving consumers access to energy and water. In Kuwait there are Plant are the six power plants that Kuwait now has. From Kuwait City to the far south, the majority of the country is exposed to radiation in excess of 6 kilowatts. Hours per square meter per day, fewer than 20 days a year when clouds are present for the majority of the day, and a rise in total radiation from north to south that reaches a value of 5 kilowatts. Near the North Coast, an hour per square meter each day, and over 7 kilowatts. In the extreme south of Kuwait, an hour per square meter per day. More than 7 kilowatts of direct sun radiation are received by the majority of the nation, from Kuwait City to the far south. Hour/m2/day, although there are more than 4,000 hours of sunshine each year. Some of the highest numbers ever recorded are in this list. In Kuwait's far north, where it outweighs 2 kilowatts, the value of the dispersed solar radiation reached its greatest value. up to 40% of the value of the solar radiation there, or hour/sqm/day. While the dispersed radiation reduces to around 20% only in the deep south, this is one that can be ignored when installing solar systems in these places.

- **In Kuwait, a comparison between solar energy versus natural gas**

Prices for Energy

It has been determined that switching to Solar Power Farms that use photovoltaic technology will produce a better result over the long-term, cost-wise, than using

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natural gas as a power source. However, there is enough evidence to support this claim that switching to solar power farms that use photovoltaic technology is the more cost-effective long-term option.

Solar Power

Discounts provided by the solar panel manufacturers may be used to the cost of renewable energy in Kuwait. The Kuwaiti government wants to create a long-term plan where discounts can be given at a percentage of 6.7, and this is also part of their goal. Currently, there is a 0–20% discount offered on solar panel purchases. However, if the authorities were to grant the 6.7 percent reduction, Kuwaitis would be able to save by trimming their annual expenses.

Natural Gas from Kuwait

Natural gas costs in Kuwait are higher than those associated with solar energy. The Kuwaiti dinar will be used as the unit of measurement for 1,000,000 British thermal units in this study. The price of natural gas in August 2016 was KD 0.84. The price in September 2016 was KD 0.90. This was a 44.6% increase from the previous month. The price was KD 0.89 in October 2016, changing by -0.31 percent. The price was 0.76 in November 2016 with a -14.95 change %. The price in December 2016 was KD 1.09, with a change percentage of 44.12%. The cost was expected to be KD 1.00 in January 2017, which represented a change of -8.99 percent compared to the previous month. These numbers make it clear that natural gas is exceedingly expensive and likely out of reach for certain people in the general public. The numbers are also not consistent, making it impossible to predict with accuracy how much money an individual will spend each year. The difficulty of this occasion is budgeting for it because prices are constantly fluctuating. It would be advised that Kuwait's utility providers produce at least an approximate figure that the populace can use to decide whether to employ solar energy or natural gas as a source of electricity. It will also support the formulation of wise financial judgments. This is helpful not only in Kuwait, but also in other regions of the world where a comparison between the generated by solar energy and natural gas is being considered.

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- **Kuwait Natural Resource Effect**

Solar Energy

The price of natural gas is more expensive in Kuwait than the price of solar energy. For the purposes of this study, 1,000,000 British thermal units will be measured in Kuwaiti dinars. In August 2016, the cost of natural gas was KD 0.84. KD 0.90 was the cost in September 2016. This was an increase of 44.6% from the prior month. In October 2016, the price changed by -0.31 percent to KD 0.89. In November 2016, the cost was 0.76, representing a -14.95 change%. KD 1.09 was paid in December 2016, representing a change of 44.12%. In January 2017, the price was anticipated to be KD 1.00, which reflected a change of -8.99 percent from the month before. These figures demonstrate how expensive natural gas is, making it almost certainly unobtainable for certain members of the general population. It is impossible to accurately forecast how much money an individual will spend annually because the data are inconsistent. Budgeting for this occasion is challenging because prices are always changing. It is suggested that Kuwait's utility companies produce at least a rough estimate so that the population can choose between using solar energy or natural gas to generate power. Additionally, it will aid in the development of sound financial decisions. This is beneficial not just for Kuwait, but also for other parts of the world where a contrast between renewable radiation and natural gas is being thought about.

Natural Gas from Kuwait

In state of Kuwait natural gas energy is considered unsustainable It cannot be renewed once it has been used. Aside from that, the costs of producing and delivering natural gas are substantial. The demand for power rises rapidly along with the population. As a result, continuous consumption of the natural gas will exhaust Kuwait's supply totally. Kuwait has a number of oil resources, but if the current mining continues, the oil fields are at risk of being depleted. In the future, it's likely that Kuwait's future generations won't have any natural gas available to them from which they can benefit. The current generation in Kuwait is responsible for making sure that the natural resources are used effectively so that no waste is committed in order to guarantee that the needs of future generations are met in an

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equitable manner. By taking these steps, we can ensure that future generations have access to natural resources for all of their different activities.

Capacity

Depending on the sort of power the plant uses to produce electricity, capacities may change.

Solar Power

Kuwait now has a 2 gigawatt generation of solar energy available. This is in spite of the predicted 12 Gig watt need for such energy, which is expected to increase to 30 Gig watts by the year 2025. Meanwhile, Kuwait's Authority of Energy and Water has put up proposals that will enable it to produce at least 4.5 gigawatt of solar energy by 2030. This will help meet Kuwaiti inhabitants' requests for the supply of electrical power by extending the natural gas's capacity.

Kuwait uses solar energy

Kuwait has one of the greatest needs for electricity among all nations in the world, it may be noted. Its high average per capita energy usage is caused by four main sources. In the first place, Kuwait boasts a variety of highly harsh weather conditions. Second, Kuwait's government generously provides its inhabitants with hefty electricity subsidies. Third, there has been a continual increase in Kuwait's population throughout the years, which has contributed to the high demand. Last but not least, Kuwait has facilities for desalinating water, but due to their energy-intensive nature, they can only run efficiently if there is a lot of electricity available. Between 2003 and 2013, Kuwait saw a growth in the need for electrical power up to two times more than the country's average consumption. The Kuwaiti government is planning to engage with international energy corporations in a three-phase energy project to accommodate this rise. The primary objective of this project is to generate at least 2,000 Megawatts of power from renewable sources. Only a small portion—roughly 15%—of the entire amount of energy that the nation needs is represented by the reported two thousand Megawatts. Kuwait initially planned to create an energy park with at least 70 Megawatts, and the project was scheduled to be finished in 2016. Figure 5.1 illustrates the operation that was carried out in Kuwait's Al-Shagaya desert, which is 39 square miles in

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size (or rather 100 square kilometers). The desert may be found roughly 100 kilometers west of Kuwait City. In the second and third phases, the country intended to build facilities that could generate a total of 1000 and 930 Megawatts of electrical energy, respectively. It borders both Iraq and the Kingdom of Saudi Arabia. Plans are being made to guarantee the completion of solar installations. [https://krex.k-state.edu/]

Whilst on the road, the car can be wirelessly charged (dynamic charging)

If you reside in an area with few public charging stations, as was indicated in the previous article, you may find them to be inconvenient, especially if there is a long line of people waiting to charge their cars. Additionally, given the reasons we previously indicated, using solar energy for household electricity production may not be a realistic alternative. Even installing a solar battery inside the house to store energy would be impractically expensive but would give flexibility for charging during blackouts or sunsets. These difficulties made scientists realize how crucial it is to use renewable energy such as solar the wireless charging system for automobiles in order to benefit from the many benefits we mentioned in the previous article. This will save a significant amount of money on the architecture of the power network where solar panels are installed on both sides of the road. As charging can be done while driving with this technology, drivers won't have to stop their cars to replenish their batteries or worry that their car will break down from running out of power if there aren't enough charging stations available. Third: Self-charging for vehicles with integrated solar panels recently, some automakers have started integrating solar cells into the roofs of their vehicles in an effort to improve reliability while extending the range between recharges. This technology is still in its infancy and does not yet hold the key to solving all of the world's issues in this area. At present, these solar cells will only be able to generate sufficient electricity to extend the car's range by 20 to 30 kilometers when it is sunny. As a result, several of these businesses have devoted substantial sums of money to improving the efficiency of this technology in the hope that it will serve as one of the key pillars for the growth of the electric vehicle sector. For instance, Sono Motors, a German technology start-up with headquarters in Munich, thinks that adding a small amount of solar power to cars will have a significant impact on the outcomes. With its integrated solar charging system, Sono Motors anticipates that its €25,500 ($27,600) electric vehicle Sono will have an increased travel range of

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up to an additional 30 km per day in Germany, depending on the season and weather. a vehicle. In nations with higher sunshine intensity, this additional distance can be increased. The company said that the energy from the solar panels helped lower the consumption of diesel fuel for the bus by 7%, or roughly 1.7 liters per 100 kilometers, even though it is utilized to power the electronic systems in the car rather than the engine (62 miles). There are so many more instances that this page just does not have room to cover them all. According to experts, 107,380 vehicles will have integrated solar cells on their roofs by 2030, with a cumulative growth rate of 36.4%. In conclusion, solar energy will win because it is still the least expensive source of electricity when compared to the cost of oil or gas derivatives or the cost of electricity from the local distribution firm. Customers will also find it more handy and acceptable than waiting at charging stations, which may or may not be distributed throughout various locations. Additionally, this kind of clean, renewable energy offers a great way for governments to cut back on their energy assistance and production costs. It will also be one of the most effective ways for automakers to lower the price of car batteries, which will lower the value of the vehicle itself.

- **The pivotal moment in the anticipated conflict between oil giants and electric cars**

The expansion of the electric vehicle market poses the greatest challenge and threat to the oil industry because it threatens the highest level of oil consumption—60%—which is the level of consumption for vehicles with internal combustion engines. Many people thought that this day would arrive decades in the future because the electric revolution is still ongoing. However, studies and analyses from experts have shown that one thing is now certain: the massive oil empire needs to be concerned about its near future. Oil and automotive experts responded to this by saying: "We foresee a clash" oil corporations' lobbying efforts and the growth of the electric vehicle market, , as we will witness tremendous competition between them for market share like we have never seen." Consequently, a crucial query arose: When will this confrontation take place? In this search, we'll attempt to address this. at a time when selling newer, environmental friendly electric vehicles is a top priority for governments and automakers worldwide in an effort to combat climate change. Before this technology significantly lowers greenhouse gas

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emissions, it might take years or perhaps decades. This is due in part to the fact that the vast majority of gasoline-powered vehicles currently in use will take a very couple of years to reach the conclusion of their useful lives. Analysts said that as internal combustion engine-powered conventional vehicles and trucks become more and more dependable, with fewer failures, and hence last longer on the road, "vehicle turnover" is slowing down day by day. For instance, in the United States, the average lifespan of a light vehicle has expanded from 9.6 years in 2002 to 12 years in the present. IHS Market's research indicates. Customers still purchase more than 65 million gasoline-powered vehicles per year all across the world. As a result, we anticipate that the majority of these automobiles and light trucks will continue to operate for the next 10 to 20 years while being bought and sold in used car markets all over the world. In order to achieve this, it will probably be necessary to replace almost all gasoline-powered cars and trucks with greener electric cars and trucks that are primarily charged by renewable energy sources like solar, wind, or nuclear plants (nuclear power plants are really no longer among the safe energy production options, particularly after a crash). owing to the infamous earthquake in March 2011, the Fukushima reactor in Japan). And that objective might be reachable if manufacturers are able to completely discontinue producing and selling petrol cars by 2035 as anticipated, given the low turnover. IHS Market analysts also forecasted that if sales of electric vehicles climbed gradually by up to 60% over the subsequent 30 years, as they did last year. Due to the effectiveness of contemporary technology in meeting the environmental criteria required by industrialized countries regarding the pollution problems of cars that use internal combustion engines, approximately 40% of cars on the road in 2040 will be electric. According to other economic studies, even if automakers gradually stop selling new petrol cars, older gasoline-powered cars could still survive longer on the roads because people who can't afford newer, more costly electric cars will convert to those that are newer and more expensive. Used, they travel farther and for less money. He demonstrated in Bloomberg research how 2 million less barrels of oil may be consumed daily by electric automobiles by 2023. This would result in an oil surplus comparable to the one that led to the oil crisis in 2014. The study came to the conclusion that the oil breakdown point to the limitations of 2 million barrels would be after a very few years - especially during the year 2023 - if the annual growth rates of electric cars continue, which approach 60%. [https://about.bnef.com/electric-vehicle-outlook]

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four main factors must be met:

1. That governments offer assistance or incentives to lower the cost of making electric cars.

2. Manufacturers consent to extremely small profit margins.

3. Buyers are prepared to spend more to move an electric vehicle.

4- That as the number of rapid charging points rises, battery prices and charge times will as well. governments that assist the development of electric vehicles can instantly see the first three benefits, but if battery prices do not fall quickly, this support will not last. Another challenge facing the auto industry is where all of this electricity will come from. Electric vehicles will require more than 1,900 TWh of electricity by 2040, which is 10% of the electricity that humans generated in 2017. Around 1,290 TWh will be used by ride electric vehicles, of which 389 TWh will be used by buses, 216 TWh by commercial vehicles, and 69 TWh by two-wheeled electric vehicles. This only increases the need for electricity globally by 5.2%. Renewable and sustainable energy sources are still out of reach in the majority of developing and poor countries, which still rely on oil and natural gas to generate electric power. This can delay the point at which oil companies and the electric car industry clash. Even if strategies are adopted to spread electric cars at a rapid rate in most countries of the world. There aren't enough fast charging stations currently, especially in developing nations, to allow for convenient long-distance travel since electric car makers must continuously lowering electric car prices to the level of competitiveness. Therefore, the impact of the proliferation of electric cars will be outweighed by the rise in oil consumption from developing nations, particularly if crude oil prices drop to $ 20 per barrel and stay there. The research's findings, which were based on the aforementioned elements, revealed that there are anticipated scenarios regarding the number of electric cars and their effect on the drop in oil demand, hence identifying the anticipated conflict points, which are:3.4 million barrels per day of crude oil demand would be eliminated by 2030 and 13.8 million barrels per day by 2040 in the moderate case, which assumes that another 97 million internal combustion engine vehicles will be replaced by electric vehicles during the 2021–2030 period and another 319 million during the 2031–2040 period. - In the optimistic case, the number of electric cars will rise from 10 million

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by the end of 2020 (2.7% of the total cars), to reach 227 million. The daily demand for crude oil falls from 0.3 million barrels in 2020 to 7.5 million in 2030 and then to 38.9 million in 2040.As a result, it is now certain that there will be a conflict between the oil industry and the industry for electric vehicles; the only question is when it will occur.

- **Gas pumps and renewable energy**

Petrol stations and storage take up a lot of space because they only serve one main function; they are not reinvested to generate profits or pay for the station's operating expenses. That's why we're here, and it's our crucial and important job to use the stations wisely and cut back on operating expenses so that we can focus on what matters most: protecting the planet. By building energy cells to produce renewable energy and reduce pollution in petrol stations, which in switch will play an important role to providing a safe environment and tidy, Oman Oil Marketing Company has committed its assets to help and d By seeing cooperation potential throughout its processes, the company has helped a number of business owners expand their enterprises and become essential components of Oman Oil.

Figure (5) . Oman Oil Marketing Company to Use Solar Energy to Generate Electricity to Its Service Stations

[https://www.albawaba.com/]

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The implementation of renewable sources has been accomplished in more than five major oil petrol stations, for example: four of them in the Governorate of Muscat and one in the Governorate of Al Batinah North. The operation results revealed the positive outcomes of the test and the efficiency of the energy produced from t he natural resources used by Oman Oil Marketing Company to generate electric power from a clean and sustainable source. The station will enhance the emission reduction of carbon pollution from the station and from the factory nearby in in addition to minimizing the impacts of global warming, which will help to ensure the stability of future generations of resources. The station serves a significant number of clients using the Muscat Expressway.

- **The availability of renewable energy in Arab nations**

With the exception of Sudan, which primarily relies on the Nile River for electrical energy from the watery oil side, roughly 94 percent of the Arab countries rely on fossil fuels as a source of electricity production. In these nations, renewable energy sources like solar and wind energy account for a relatively tiny fraction of the entire energy mix.

Arab Countries' Regional Trends for Renewable Energy Policies

During its third session, the Arab Development Summit: Economic and Social made its verdict. Regarding the acceptance of the Arab Strategy for the Growth of Uses of Green Sources (2010– 2030) as a framework for coordinated Arab action, in Riyadh on January 22, 2013, Regarding renewable energy, which also encompasses the proportion of energy sources According to the stated aims of the Arab countries, renewable electricity output in the area will reach 1.5% by 2020.

- **Case study (electric vehicle station)**

With plans to gradually finish the recharging service for cars on the rest of the Alfa stations, Al-Soor Fuel Marketing Company has announced the provision of an electric charging unit for cars powered by the electric power system at Alfa Al-Mansouriya Station as a way to improve its services and keep up with local market demands. According to a statement from the business, Al-Ghanim Motors is the first official partner to supply and sell electric vehicles in Kuwait since 2018. It also took part in the launch of the electric charging service by supplying a Chevrolet (Bolt EV) to run an experiment with a media campaign. They continued,

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"The Al-Soor Company accelerated the provision of this service as a result of developments in the automotive industry, most notably the production of electric-powered cars, with the aim of developing its services in line with the needs of the local auto market, as well as encouraging the use of clean energy, in line with the state's efforts as a practical step by achieving ambitions." Development plan for Kuwait by 2035 and a fresh vision for Kuwait. Al-Soor Company also stated that cooperation with state government agencies (the technical committee for creating the infrastructure for electric car chargers) is ongoing. The company is a productive member of the committee and is developing legislation for launching the service in Kuwait and establishing the "tariff" for this service, which is the first of its kind in Kuwait. Associated with subject The representative of the business , the chairman of the board of directors at Oula Fuel Marketing Company, announced that the company has started conducting the required studies to offer electric vehicle charging service at its stations, with the expectation that the results will be available by the end of the year.

According to him, before establishing the official price for them at the stations, the study focuses on the amount of investment necessary to provide the service, the cost of the necessary equipment, and the service price from the relevant authorities. As a result, it is likely that the cost of charging electric cars is less than the cost of fuel. He informed newspaper that it is anticipated to begin offering the service formally to customers in less than two years. He also noted that the company needs the General Assembly's approval before ramping up its electric car charging operations and notifying relevant agencies like the Capital Markets Authority and others about the situation. He continued, "The equipment needed to provide the service includes the installation of electric pumps and shades that shield the cars from the sun, as well as some supplies above and below the ground, especially if there is a need for high-voltage electricity lines of conduit, and to put in place all the necessary safeguards to protect customers and their safety," noting that the sector companies. The cost of servicing the stations will only be borne by the private sector. The company's spokesperson, CEO of Al-Soor Fuel Marketing Company, stated that his organization is ready to offer the service at its stations but that it is awaiting the willingness of governmental organizations to thoroughly research the matter and begin putting it into practice. He added to newspaper that the task of the government sector will be restricted to offering support, official

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approvals, and figuring out the necessary tariff before officially moving forward with this project. The private sector companies will be the ones to install the shipping platforms and the necessary equipment. Newspaper was informed by oil sources that the Petroleum Corporation is conducting comprehensive research into the equipment of its gas stations with relation to electric vehicles. The sources noted that there are a number of difficulties that will arise when these studies are put into practice, as the primary business of gas stations is selling gasoline, whereas National Petroleum bases its operations on profitability. This presents a significant obstacle when it comes to offering services for electrical charging station in the local market. By offering a vast network of electric charging stations around Kuwait for new generation electric automobiles, the company continues to make unrelenting efforts and demonstrate its commitment to sustainable practical development. In order to expand the wide range of services it offers, the company provides its customers with a vast network of electric charging stations wherever they may be, taking advantage of the notable increase in the use of electric vehicles in 2022 compared to the previous year. priced home charging wall charger, which allows customers to charge their cars from home at their preferred time. These electric charging stations will help to provide the charging services that customers need to operate their electric cars and enjoy the future driving experience of electric cars.

Figure (6) . Al-Soor Fuel electric vehicle charging [https://www.alaraby.co.uk/]

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Part 3 : The Gulf region's electric vehicle challenges

Do electric vehicles pose a danger to oil's future?

Electric vehicles are frequently cited as the biggest threat to the future of oil, but predictions show that improvements in the quality of gasoline and diesel engines will actually cause the biggest decline in demand for oil. Whatever the reason, electric automobiles are a reality with an undeniable wide spread. However, several institutions and advisory bodies that were created explicitly to oppose oil and fossil fuels on the one hand and OPEC on the other have significantly overstated the influence of electric cars on the oil market. While some people mistakenly believe that electric cars pose the greatest threat to the future of oil, all long-term predictions, including those made by anti-oil organizations and bodies, show that the greatest decline in oil demand will come from increasing the quality of gasoline and diesel engines, with the result being a decrease in oil demand that is double or triple that caused by the proliferation of electric cars. The intriguing thing is that, contrary to what advocates of electric vehicles had anticipated, China was the place where their hopes were realized. Is the effect of electric vehicles on the oil markets actually overstated?

Of course, especially given that the rise in electric vehicle sales is one thing and how it affects the oil market is another. Due to the following factors: Compressed gas vehicles have largely been replaced with electric vehicles and buses. In California, for instance, electric buses have supplanted buses that run on compressed gas. Additionally, compressed gas was most commonly used in the Chinese provinces where electric car adoption was greatest.

Some Chinese provinces initially had intentions to increase the use of liquefied and compressed gas, but they later switched to electric buses and vehicles. This indicates that some of the current electric vehicles, such as cars and buses, were purchased using gas rather than with gasoline or diesel. I have evidence that certain consulting firms purposefully publish overstated numbers while knowing about the gas issue, and the problem is that published predictions of the drop in oil consumption due to vehicles and electric buses totally ignore the truth. The volume of crude oil rises during refinery processing. Oil is heated in refineries, which are enormous pots; as with water and other liquids, this causes the amount of the oil to rise. It is typical for us to acquire oil products with volumes greater than 100 barrels and occasionally even 120 gallons or more if we enter a refinery with 100 gallons of crude oil. The issue is that oil consumption is overstated when it comes to electric vehicles, because organizations and bodies do not account for this

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growth. For instance, if electricity replaced 120 gallons of gasoline, it would only be accurate to say that it replaced 100 gallons of oil in accordance with the above example (other products were ignored for simplicity). Often, electric vehicles take the place of fuel-efficient ones. It is not typical for a wealthy person to switch from a luxury vehicle with significant fuel consumption to a small electric vehicle. The issue is that the published data, instead of using the average of very petroleum

Automobiles use the average fuel consumption of cars when calculating the drop in oil consumption as a result of electric cars. In other words, it is exaggerated to say that the rise of electric vehicles has reduced the demand for oil. Last but not least, when we examine the various projections for the growth in the number of electric vehicles, we see that their impact on lowering oil demand is less than the growth in oil demand brought on by strong development, notably in Asia and other developing nations. This implies that the demand for oil will increase even if we believe that electric cars will be widely used. Electric vehicles will therefore have an impact on the "growth" of the oil demand rather than the demand itself. In other words, although oil demand will increase, it will do so more slowly than in the past.

- **Dubai's locations of electric vehicle charging stations**

The Dubai energy and water Organization has installed 200 charging stations for electric vehicles throughout the emirate, including at petrol stations, airports, government buildings, shopping centers, real estate developments, some medical centers, and numerous office buildings and apartment buildings. Fast charger stations are available in many locations, and you can view their precise locations by visiting the Authority's smart application or website. The Authority is keen to provide a constantly updated list, enabling you to browse for the locations of electric vehicle charging stations by accessing your current location.

- **Charger Card in Green**

The green charger card, which entitles its holders to use electric car charging stations in Dubai, can be obtained by registering with the Dubai Energy and Water Administration. The authority will send your card to the address you provided while finishing the application form, so you can have it three days from the date of registration.

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- **Different kinds of electric vehicle charging stations in Dubai, along with usage instructions**

Three different types of charging stations—quick chargers, public chargers, and wall chargers—have been established by the Dubai Energy and Water Administrative power. You can use these after obtaining the green charger card for electric vehicles, which has usage instructions displayed on the side of every green charger station. working hours in the UAE's automobile charging stations , Since work within the charging stations housed in the Customer Happiness Centers of the Dubai Water and Electricity Authority starts at 07:30 in the morning and goes until 12:00 midnight every day, work inside charging stations in public locations and gas stations are open 24 hours a day.

- Fast charger

That very many fast charging stations are found at petrol stations, and this one has two plugs: one for direct current with a capacity of 50 kW and a second for dc power with a power of 43 kW. This power supply can accomplish 80% of the charging period in just 20 to 40 minutes, depending on the model of battery and its storage capacity..

- public places charger

Two 22 kW each AC plugs are provided by this charger. Depending on the type of car and the storage battery size, the charging process for electric vehicles in Dubai can be finished in 2 to 4 hours at stations located in public areas like malls and hospitals.

- wall charger

The processes for using it are nearly identical to those for using a charger in public locations. This charger offers one AC socket with a power of 22 kW, and the charging process can be finished in 2 to 4 hours depending on the kind of car and its storage battery capacity. the best times to use Dubai's electric vehicle charging stations The green charging stations are available Sunday through Saturday from 07:30 am to 12:00 am in the DEWA customer happiness centers. While charging stations are still accessible 24 hours a day, 7 days a week in petrol stations and public spaces.

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- **Cost of charging an electric car**

One of the difficulties facing the green charger program may be the high cost of electric vehicles in Dubai, but when you look at it more thoroughly, you may see that you will ultimately save money. When compared to the fuel costs of conventional cars, the cost of charging at electric vehicle charging stations in Dubai in September 2017 was around 29 fills per kilowatt. All Dubai electric vehicle owners who registered for the Green Charger project between September 1, 2017, and December 31, 2019, would receive free charging from the Dubai Water and Power Administration. Not at home, but in public charging stations. Along with the rewards offered by the Roads and Transport Organization, such as:

- Parking is free.
- Enrollment and renewal fees are waived.
- Waiver of Salik card issuing costs.
- Place customized decals on license plates.

- **Home charging for electric vehicles**

The electricity used during the charging process can be added to the household electricity account at the same cost as the electric rate for residential usage if the electric car charging device is installed at home on the property's electricity meter.

[https://www.bayut.com/mybayut/ar]

- **Establishing 100 electric vehicle charging stations a year in Qatar is a challenge.**

The head of the Department of Sustainability and Efficiency at the Qatar Public Electricity and Water Corporation , reported plans to build 100 EV charging stations annual basis, saying the stations would be built either directly by Authorized staff or in partnership with the public and private sectors. He explained that the current electric cars were introduced through car owners' permits in an exclusive interview with Al-Raya Al-Eqtisadiah, adding that hybrid cars are available in the local market and have been sold for a few years. He claimed that the import of electric vehicles has not yet been legalized for car agencies in Qatar. He continued, aims to promote the use of electric vehicles by establishing the infrastructure needed, which contributes to reducing harmful carbon emissions in

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accordance with Qatar Vision 2030 and the National Development Strategy 2018–2022. This is done through the National Program for Sustainability and Energy Efficiency which is in line with Qatar Vision 2030.In order to set up and apply the architecture for the channel of recharging stations, he confirmed cooperation with the Department of Transport and Communications and several other government agencies. He noted that charging an electric vehicle takes several minutes for the fast charger offered and a few hours for the home charger. He emphasized that the costs of charging electric cars are significantly less expensive than the costs of supplying them with oil, showing that electric cars have very low maintenance costs in comparison to their conventional counterparts. He also noted that the prices of electric car production are gradually falling worldwide. In order to promote the use of electric vehicles and promote the use of solar energy in the State of Qatar, he noted that the officer program offers a distinguished architecture of charging stations. He highlighted that these efforts help turn Qatar into a developed nation capable of achieving green economy. The growth of a diverse economy, whose reliance on fossil fuels is waning, investment in it going to the knowledge-based economy and its smart technology, and the importance of the private sector rising...to the specifics of the conversation.

- How many electric vehicle charging outlets are there in 3rd parties?

In collaboration with the public and commercial sectors, the Qatar Public Water and Energy Corporation have set up 10 electric vehicle charging stations. Different charging rates and capacities are available at these stations. These data include two -owned charging stations that were erected and tested by "3rd parties" and used to power electric buses. These charging stations belong to the Ministry of Transport and Communications.

- What are the major objectives of 3rd parties expansion into electric car charging stations?

Associations aims to promote the use of electric vehicles in the nation through the National Program for Sustainability and Efficiency in accordance with Qatar Vision 2030 and the National Growth Strategy 2018–2022, which both call for diversifying energy sources and maximizing their benefits in an economy that protects a greener environment for future generations. By building the necessary infrastructure, the nation's damaging carbon emissions

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are decreased. Through the provision of a distinctive infrastructure of charging stations, this program seeks to promote the use of solar energy and increase the usage of electric vehicles in the State of Qatar. These initiatives help turn Qatar into a developed nation capable of attaining sustainable development, creating a diverse economy, reducing its reliance on hydrocarbons, investing in its knowledge-based economy and smart technology, and elevating the role of the private sector in society.

- **Do you have any specific data on the number of electric vehicles in Qatar**?

The Traffic Department of the Commission has the precise numbers of electric cars in the State of Qatar, and we would like to emphasize that the electric cars on the local market were introduced through authorizations for the car owners themselves because the shipment of electric cars has not yet been recognized for car agencies, even though hybrid cars are already available. It has been offered for a while in Qatar.

- In the plans to set up electric vehicle charging stations, who is the cooperating partner?

In order to coordinate plans for the network of filling stations, organization Corporation has a permanent working relationship with the Department of Transportation and Communications. The company will also work with other relevant government agencies to plan and implement the infrastructure needed for electric vehicle charging stations.

- Is the electric car's charging process lengthy?

When purchasing an electric car, it typically comes with its own home charger, and depending on the type of charger, the charging time can range from a few minutes for the fast charger,

- Is there collaboration between the Standardization Authority, car agencies, and the import of electric vehicles?

The organization works with the Standardization Authority to establish electric vehicle charging stations. The Ministry of Transport and Communications, in collaboration with the Standardization and Standardization Authority, is in charge of setting the requirements of electric vehicles imported into the State of Qatar.

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- How much does it cost to set up a charging station for electric cars?

The price of electric filling stations depending on the type of charger, and the faster the charger is, the more expensive it is. When a consumer purchases an electric automobile, home chargers are free of charge.

- How many charging stations are there in total based on the plan that was drawn?

Prior to the implementation phase, we are now researching and creating the final network model in collaboration with a consulting firm. According to the 2018–2022 strategic plan, the agency plans to build 100 charging stations each year until the entire nation is covered. This can be done either by the agency alone or in partnership with the public and private sectors.

- What distinguishes standard electric charging stations from those that use solar energy to generate the electricity needed to charge vehicles?

Batteries are used to store the energy produced by solar panels so that cars can be charged at night using solar or other renewable energy sources, further minimizing the hazardous carbon pollution. A photovoltaic application station for storing energy and refueling electric vehicles was recently opened by the agency at the agency premises. It is 270 square meters in size, or the same as 24 parking spaces. The panels may produce up to 72 kW of power in total. a 100 kW maximum charging capacity, a fast charging level of 15 to 20 minutes for the automobile, and the ability to charge two vehicles at once. It has a battery storage unit with a 170 kWh capacity, and a charging unit with a 100 kW charging capability, which is enough to charge three automobiles. The station's ability to export excess energy to the grid after charging the battery and its ability to use grid electricity to power vehicle charging in the event that solar panels or the battery run out of power are what set it apart from other charging stations. The station uses a main transformer to regulate the flow of electricity from and to the power system.

- How do electric charging stations contribute to the reduction of dangerous carbon emissions?

In contrast to conventional vehicles, electric vehicles don't emit any toxic gases. The rise in electric vehicle ownership helps cities' air become cleaner, which is good for everyone's health.

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- Are conventional and electric cars different in terms of energy efficiency?

Most of the time, electric automobiles need fewer repairs than conventional vehicles, don't emit loud or bothersome noises, and cost far less to charge via electricity than to refuel conventional vehicles.

- Are there any plans to build "bus" electric charging stations?

In collaboration with the Ministry of Transport and Communications, the State of Qatar's network of electric vehicle charging stations will undoubtedly be very effective at recharging all varieties of electric .

- Why aren't there more electric car sales in Qatar?

There are many causes for this, the most important of which may be that the country's car dealerships have not yet applied for the license necessary to import electric vehicles, and the "garages" required for maintenance are still lacking in addition to the limited number of charging stations that are currently available. The infrastructure required to increase the usage of electric vehicles is being prepared in Qatar. The mechanisms for distributing electric car

charging stations are being studied by agency in collaboration with the relevant authorities, and there are plans to have these stations dispersed throughout locations where consumers spend more than an hour, like malls, hotels, airports, and workplaces.

- lack of purchase of electric vehicles due to price ?

Electric cars cost more than their conventional counterparts, although at reasonable premiums, and prices are on the decline, especially under the leadership of all major international organizations involved in the manufacturing of electric vehicles. Everyone has to understand that charging cars costs significantly less than fueling them, allowing the consumer to save money. As part of the Qatar Development Vision 2030, awareness must be raised about the significance of electric automobiles in protecting the environment and lowering harmful carbon emissions. Electric cars are distinguished by having very low maintenance expenses when compared to their conventional equivalents.

[www.raya.com /]

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- **Conclusion**

What is the Gulf region's electric car future like?

Economists confirm the report electric cars exist at a time when businesses that specialize in the production of electric cars saw significant increases in their sales during the latest year 2021, with the Energy Information Administration anticipating that the number of electric cars will increase to between 150 and 250 million by the 2030. Infrastructure and significant investments in charging stations are needed in the Kingdom, with Saudi Arabia having entered this promising market through the Public Investment Fund of Lucid Company in 2018. The Fund currently owns about 67% of the company's shares, and it has established a local company to produce electric vehicles and train local cadres by sending them to the American parent company of Lucid; Mention that the Kingdom is fully aware of the magnitude and future of electric cars both locally and worldwide to illustrate what makes Saudi Arabia a pioneer in this field. The Saudi Standards and Mechatronics Organization's statement to legalize the business trading of electric automobiles and their chargers was the most significant of the new rules and permits that were enacted to encourage such investments. According to an economist, Saudi Arabia started to enter this promising field through the Public Investment Fund in Lucid Company in 2018 and as of right now, the fund owns roughly 67% of the company's shares. This is due to the widespread use of electric cars around the world and the fierce competition in the manufacture of electric cars and their components, from batteries to engines. "The company will launch its first car in the coming months, and the entry of the Public Investment Fund into the company is evidence that the future of electric cars and that it is a wide field for investments in it in terms of diversification in the production of vehicles, trucks, regular and motorcycles, and charging stations," he claimed that the Public Investment Fund formed a local firm to produce electric cars and train national cadres by sending them to Lucid's American parent company, Due to this, Saudi Arabia is a pioneer in this area; nonetheless, these vehicles call for significant infrastructure improvements. An electric automobile demands consideration and research before being purchased due to a lack of infrastructure for charging and post-sale services.

- **A future wager and a steady strategy**

An expert in the oil and energy sector explained that discussing electric cars and their future is difficult, especially given the global switch forward toward renewable and lowering carbon pollution. In this context, some nations, including

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the United Kingdom and France, have agreed to carry out the use of gasoline-powered cars by the year 2040. Then some auto plants tended to restrict their output to electric vehicles by 2030. We have seen proactive steps taken by the Kingdom towards these opportunities, especially with the predicted number of Cars in the Kingdom will have 25 million cars by 2020, which required building a gradual policy and plan to adopt electric cars, he said. The International Energy Agency estimates that between 150 and 250 million electric vehicles will be on the road by 2030.

Securing funding and overcoming challenges

The expert explained that new laws and authorizations were issued to attract such investments because the Kingdom and the decision-makers were fully aware of the size and potential of electric cars both locally and globally. The most significant of these was the announcement by the Saudi Standards and Mechatronics Authority to permit the commercial import of electric cars and their chargers, as well as the beginning of receiving requests from electric car manufacturers. Additionally, the Administrative Structure Document for Charging of Electric Vehicles Activities has been authorized by the Electricity and Cogeneration Regulatory Authority, All of these technologies, he said, would contribute to the expansion of electric vehicles in the Kingdom, but more work has to be done to foster the adoption of electric vehicles and remove barriers to their expansion.

- **Kuwait in 2040 and electric vehicles.**

According to a legal document obtained by newspaper, the fourth structural plan anticipates that within 10 to 20 years, this sort of automobile would make up a large percentage of new vehicles in Kuwait, and may even be the only one that uses the roads. The irony is that the impact of the introduction of electric vehicles in Kuwait was not examined during the creation of the State of Kuwait's fourth structural plan (2016–2021). The government report expresses dismay that the topic has not been investigated as part of the plan and notes that "The document was not reviewed prior to the arrival of many of them at the time.

What about charging stations for vehicles?

The paper responds: Since the master plan was created, there are a few rapid facilities in the parking lots. The difficulty of the present electrical networks of the housing units to charge their own automobiles, if they are fully approved, suggests that there will be a major demand for more common charging stations for public

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usage. A government goal for vehicle shipping An initial concept for the establishment of a national strategy for electric vehicle charging from two perspectives—first, domestic charging, and second, public charging—was presented by a party in the Kuwait Council, according to official books. The same vision states that this necessitates the integration of high-energy loads into the general electrical grid.

Are we prepared for this societal change?

The recognized responses: Energy infrastructure stress is substantially exacerbated by relying on electric vehicles; therefore, remedies are required.

What treatments are suggested?

The official responses: In order to minimize new energy requirements and maintain the anticipated load as much as feasible, the introduction of these vehicles to Kuwait must be done in conjunction with other significant sustainable initiatives. And given the problem with the loads, how should this development be accommodated? The official's response: We have made a request to the relevant authorities to lower the loads in preparation for this, and one of the primary tools for carrying it out is hiking the power bill. The official's testimony brought us to this crucial point in the story of the launch of electric automobiles by pointing out that raising electricity costs requires a statute that is adopted by the National Assembly, which is a very difficult process. However, why is a rate increase required? According to the administration narrative, low rates will prevent consumers from implementing sustainable plans that would drive down costs and help preserve the environment. In this scenario, the electricity system would continue to expand pointlessly and endlessly in order to satisfy needs. Following is a summary of the government documents' predictions for the future of electric vehicles:

01- Kuwait requires charging stations everywhere.

02- Changing the electricity industry's policies and rising the rate.

03- Local shipping is approved in addition to international shipping.

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A study conducted by researchers at the British Anglia Ruskin University confirms that the cars are the ones that will illuminate millions of homes around the world in the coming years with energy stored in their batteries, a technology that has already started to be used in Japan. Government documents have stated that charging Kuwait's electric cars is likely to be divided between home charging and charging stations. The world is currently investing a significant amount of money to encourage the electrification of vehicles, motivated by a long term vision that is moving quickly to provide renewable sources of energy to generate electricity. However, the government car was "embedded" in the General Reserve Fund's liquidity charging station years ago; what will this mean for our current situation with electric charging stations?

Given the various economic advantages of this kind of vehicle, economists verified that fuel consumption rates will undoubtedly change when electric cars begin to dominate the "conventional" market in Kuwait. Separately, they told newspaper that adopting electric vehicles was a move that should have been prepared previously because other nations had done it before us, praising them and coming up with energy-saving alternatives. They cited proposals to establish a joint Gulf factory for the production of electric cars with the participation of private sector companies, pointing out that it is a crucial economic project whose financial benefits must be realized. Most notably, they noted that electric cars reduce dependence on petroleum and its derivatives and will benefit the environment globally. The government was urged to adopt this experience in Kuwait, especially in light of the attempts to form a committee of experts to begin preparing the infrastructure for electric vehicle specifications and guidelines from many agencies. They urged car companies operating in the local market to support this experiment and help create a competitive market at fair prices. The development and accelerated adoption of electric vehicles on the roads of the most significant nations in the world are supported by three fundamental factors, the first of which is technological advancement. These economists emphasized the necessity of accelerating the provision of the needed items for these cars, including charging stations and parking, while improving the infrastructure to help electric traffic in Kuwait's streets. Regulations pertaining to the environment, and reducing reliance on oil and its derivatives. According to oil expert in Kuwait the introduction of electric automobiles and their subsequent share of the market would surely lead to a decline in gasoline consumption in Kuwait he stated that the effect will manifest in the upcoming years with the infrastructure being ready and this experiment being introduced to the market. He indicated that Kuwait's

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average fuel consumption is around 100,000 barrels per day, while the country consumes about 350 thousand barrels of oil and 300 thousand equivalent barrels of gas overall. He claims that this is the direction of the present government trend. He claims that this is the direction of the present government trend. For instance, the Ministry of Electricity has plans to rely more on gas than oil because it is safer, more environmentally friendly, and less expensive, and this is consistent with Kuwait's trend to lessen its reliance on oil in general. In aviation fuel as well as in gasoline for automobiles. He emphasized that the influence on conventional automobiles would be felt in the medium and long terms when asked about the arrival of electric cars, the success of this experiment in the Kuwaiti market, and its impact on conventional cars. He noted that the lack of growth of this type of vehicle may be attributed to the electric vehicle's high price, which is double that of a conventional vehicle, as well as Kuwait's lack of infrastructure-related mechanisms for electric vehicles, in contrast to the rest of the world, particularly the European Union, and filling stations in Britain, Switzerland, and other countries, such as Kuwait. It has not yet begun constructing the infrastructure needed to accommodate this kind of vehicle. Indicating that European nations are working to reduce their reliance on oil to be competitive with the normal car with the current government support to motivate electric cars to preserve the environment, he said that using electric cars is the fashion and a global "trend," but it depends on the car manufacturers to lower the price of the electric car. Emissions of gases. According to a researcher in energy economics, electric cars constitute a new culture that more effectively advances environmental causes than oil. Additionally, it will lessen emissions and contribute to raising environmental consciousness. Regarding the effect on oil, he said that Kuwait's fuel consumption rate is really relatively low when compared to other nations in the region like Saudi Arabia and the UAE. As their use is prevalent in nations with limited oil resources, their prices are high, and the costs of electricity and car operation there are competitive, he believed that the experience with electric cars would not have a significant impact on Kuwait's fuel consumption at this time. In addition, we find that these countries pay more attention to environmental issues and work to maintain low levels of air pollution. Regarding the likelihood of this experiment's success and its scope if implemented in Kuwait, he observed that it will fail in the lack of competitive maintenance, operation, and protection prices, particularly given the country's hot climate. A new age and a shift have begun for one of the most significant oil industries, the transportation sector, since electric cars are currently in the process of going from being an idea to a reality on the streets of cities all over the world. According to him, three fundamental factors are supporting the growth and acceleration of the introduction of electric vehicles onto the roads of the world's most significant nations. The first of these factors is

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technological advancement, followed by environmental laws, and finally, a decline in reliance on oil and its derivatives. The introduction of electric vehicles in Kuwait, according to representative, a member of the Association of Kuwaiti Industries, was a tardy move that should have happened earlier. He added that it is a possibility that must be planned for, especially given that the global trend is for traditional cars to become electric by the year 2022. He emphasized that he is a proponent of the use of electric vehicles in Kuwait. Particularly, "we have been late in this experience in which many countries preceded us, as we must benefit from oil derivatives in Other Industries. We are going through a tremendous revolution with regard to alternative and renewable power, and cars are a vital component of this issue. And about lowering reliance on oil in the event that electric cars are widely embraced, he highlighted the necessity to develop substitutes for the oil resource because we must use energy to obtain power. From it, we may create and grow a variety of industries. He claimed that building the infrastructure for electric cars will be a success for the industrial and transportation sectors, particularly since we currently rely on only one resource, whereas there are many other ingredients we can use to build an industrial environment, a solid industrial base, and be one of the fundamental resources that must be relied upon. It must serve as an oil alternative. He questioned why the region wasn't able to produce the autos. He wished for the creation of a joint Gulf plant to produce electric vehicles at the level of the GCC nations and in collaboration with private businesses, particularly given that businesspeople back the government's propensity to build infrastructure more quickly. He emphasized that this strategy serves the environmental aspect and that the state's orientation should be with the countries of the world and support it as well as follow Executive steps with regard to the viability of electric cars in the local market given that they operate on a different energy from conventional and clean ones and play a significant role in preserving the environment, which is caused by car exhaust pollution. Regarding the provision of charging infrastructure to facilitate its spread, he claimed that since it already exists in the UAE and some Gulf nations, it is preferable that it also exists in Kuwait because, in the future, consumerist thought will change and shift toward electric cars, which are on the horizon. In reference to the future trend toward promoting a safe and healthy environment, he claimed that electric cars are advantageous from both an economic and environmental standpoint. Accordingly, renewable power must be supported, including diversifying sources of income, and we have seen crises as a result of the decline in oil prices.

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- **OUTLOOK**

Recently, the market for electric vehicles has seen impressive growth on a variety of fronts, including sales, production, and even initiatives to encourage the use of these vehicles. Sales of these vehicles increased sharply by 140% in the first quarter of this year, with a notable concentration of demand coming from the markets of China, Europe, and the United States, At a time when numerous traditional automakers using gasoline and diesel fuels announced their intentions to produce electric cars in some capacity. the German Volkswagen gathered a team of European automakers like Volvo, Jaguar, Audi, and others, along with the American company originally focused on the production of electric cars, "Tesla," and even Apple confirmed recently this year its direction towards the manufacturing of a self-driving electric car industry, fully or partially by 2030 or 2035 at the latest. In contrast to sales of gasoline-powered vehicles, which decreased by 33.7 percent in the fourth quarter of 2020, electric vehicle sales were amazing and diesel vehicle sales, which fell by 23%. Plug-in hybrid vehicle sales surged by 331 percent while sales of electric vehicles grew by 217 percent to assist the low cost of electric car charging batteries with the advancement of technology, which makes them simpler and less expensive, was remarkable. As for the supportive measures, which facilitate the purchase of electric cars and do not make them exclusive to the wealthy, several Chinese companies finally produced electric cars at a price of up to $5,000. Considering that European governments spend billions of Euros on aid and subsidies to purchase environmentally friendly cars, the cost of which ranges from 9 thousand Euros in Germany to 12 Alpha is in France, at a time when European cities like Brussels, Rome, and Paris are tightening up their regulations, as well as China's annual assistance for autonomous car battery charging stations of up to 20 billion dollars. Risk Many oil-exporting nations are clearly at risk from the rise of electric automobiles, particularly the Gulf States, which depend on oil income for at least 70% of their spending and Kuwait, which needs on oil revenues for more than 90% of its budget. Because conventional use accounts for up to 20–25 percent of worldwide oil production, the demand for petroleum will fall and possibly even increase as the market for electric and hybrid vehicles grows. The concept of converting all-electric or hybrid buses, trains, or airplanes puts further pressure on oil and, consequently, the Gulf countries that depend on it. Estimates from European automakers predict that by

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2030, electric vehicle sales would represent 15% of all automobile sales globally, and by 2040, that figure will rise to 35%, increasing the hazards associated with relying on the price of oil to finance budgets. Transformations Of course, the risks posed by the Gulf oil states rise if we connect the issue of the incredible rise in the market for electric cars with the worldwide trend toward both renewable power and the emergence of what is known as the "green face" of established international oil companies, particularly Total, Royal Dutch Shell, and British Petroleum, who have already announced billions of dollars in financial assets in projects for renewable power, coinciding with a worldwide trend to protect the climate through .

- **Competition**

In addition, a number of economic obstacles, such as the ones our countries already face, have been added by the expansion of the electric vehicle market for oil producers, particularly those in the Gulf. Aside from the impacts brought on by "Covid 19," there are also self-challenges surrounding the Gulf's inability to handle the low oil price crisis because the majority of them concentrate on addressing spending policies in the short term by paying debt obligations, and they frequently make the same mistakes. The financial boom policies, some of which Kuwait has adopted, are immediately on course to use the accrued surpluses to cover immediate expenses. There is no question that the development of electric vehicles and the growth of their market share still face many obstacles, including low oil prices, high charging costs for many manufacturers, and increasing the fuel efficiency of conventional vehicles. On the other hand, the introduction of electric vehicles cannot be disregarded. as a rival or substitute for its established equivalent. The globe has recently experienced swift and unexpected changes, arguably the fastest in human history.

[https://www.aljarida.com/articles/]

Saudi Arabia is planning to erect the first plant for electric vehicles. According to sources with knowledge of the situation, Lucid Motors is in discussions to develop the first electric car manufacturing in Saudi Arabia, probably close to the city of Jeddah on the Red Sea. According to the sources, Lucid raised around $1 billion from the Public Financing Fund in 2018, with the investment being contingent upon the business building a location in the kingdom. The second-largest city in Saudi Arabia, Jeddah, is situated about 97 kilometers to the north of King Abdullah

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Economic City. Since then, Lucid has made plans to produce the Air, a $ 169,000 sedan with a range of more than 805 kilometers, according to the business. Deliveries of the model to American clients are anticipated to start in the second quarter of this year after the construction of a facility in the Arizona desert. In 2022, the business intends to release a less expensive $ 75,000 vehicle that can go more than 400 miles on a single charge. It also aims to build in the future it covered the suggestions and advice for the introduction of autos. In the study published by the Authority in 2018 on the best worldwide practices for the introduction of light-electric vehicles for the domestic market, electricity in the state of Kuwait was explained together with the most crucial details.

The Electricity Regulatory Agency's Executive Director stated that the field of electric vehicle technology is rapidly developing around the world and that the Authority is prepared to assist and advance this cutting-edge technology. And encourage the electrical sector's capacity to supply the necessary infrastructure for charging stations. Vehicles on the road are essential for safe driving, as well as for individuals who want to charge their vehicles at home and for regulatory purposes. In light of the fact that electric vehicles are a contemporary technology, he continued, the authority looked at the best practices currently being used around the globe in this area. It is necessary for it to have a framework of regulations noting that the authority released its report on electric cars in 2018 and that I worked this year to update its data on this topic, indicating that the main obstacles to the adoption of In Kuwait, the price of an electric automobile is equal to the price of the vehicle. Electric car costs are anticipated to rise by the years 2020 and 2021, but customers in the Sultanate will still be able to afford them thanks to high levels of electrification. They clarified that, in terms of technical specification, cooperation is now being conducted with the Ministry of Trade and Industry and the Royal Oman Police, adding that the General Administration In collaboration with the relevant authorities, the Electricity Regulatory Agency works to eliminate any barriers that prevent the widespread use of automobiles. As for him, the experts explained that the Regulatory Agency, in coordination with the Ministry of Trade and Industry, is cooperating with the Industry standards Organization of the GCC countries with regard to specifications and standards. A regulatory engineer at the Supervisory Authority explained Electricity. Coordination with the Arab Gulf states on developing uniform standards for automobile electricity, showing that 80% of the electricity used to power electric vehicles will come from residential sources and that some parties have taken initiatives to give electric cars parking and priority. Electric vehicles improve air quality and minimize noise and carbon dioxide emissions. The committee addressed with many parties specialists and members of the two sectors criteria for public and individual use of electric vehicles It is necessary to introduce these vehicles to the local market, and various

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aspects of the global vision and policies for electric vehicles have been studied. Commercial cars, the infrastructure for auto charging stations, and their effects are also mentioned. The Electricity Regulatory Agency's suggestions were to employ In charges, which are reflected in price, electric vehicles are considered. It said that the price of maintaining and charging electric vehicles will continue to be less expensive than Benefits of internal combustion engines in automobiles If electric car charging is promoted during off-peak hours, it is economical and increases the effectiveness of the usage of energy networks. The restricted number of cars on the road is one of the primary challenges for electric vehicles. Electrical, especially with degrees, that are in accordance with the weather in Kuwait In addition to the local market's limited size, the high temperature, and drivers' preferences, There aren't many auto charging facilities in Oman for family vehicles. The widespread usage of electric power, consumers' lack of knowledge and desire to buy electric vehicles, and the high initial cost of electric vehicles there are no incentives for dealers compared to vehicles powered by internal combustion engines. to market electric vehicles. According to company representative, and director of product development for the Middle East , which also produces Peugeot, Citroen, and Opel automobiles, electric cars have the advantage of being simple to update and may be fitted with cutting-edge technology, particularly autonomous driving. Driving enjoyment is also attained thanks to the engine's silence, the driver's lack of discomfort, and the presence of loud noises in the cockpit, as is the case with many models of conventional cars.

- **The steps to take right away**

1. Setting up the physical and administrative infrastructure, such as electric charging stations, to facilitate the usage and adoption of electric vehicles.
2. Spending should be increased on specialized smart networks and tools for electricity distribution and transmission.
3. An examination of the viability of hybrid systems that use both solar and gas-powered energy generation.
4. Quicken efforts to put the idea of full source to electrical networks into action in order to assist the expansion of a competitive market.
5. Creating a blueprint to help the public and private sectors work together to transition to a circular economy.
6. Promoting the adoption of specialized curricula by educational and training organizations that support the modern skills demanded by the job market, such as cyber security, smart meters, and renewable energy.
7. Benefit from the numerous uses for power grid, intelligent cities, and the Web of Things.

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- **Summary**

Restrictions and challenges, the first of these is the very little electric technology as well as the limited amount of these cars from the consumers' point of view, which ranges between 100-200 km. From there, purchasers fear that cars will keep when their batteries run out in the middle of a road, which is a major barrier for the widespread adoption of the electric car industry. Apart from the lack of required facilities, such as charging stations, as well as the cost of the cars themselves in several nations throughout the world, other adverse conditions include being alone or in another unfavorable environment. Accordingly, the UAE aspires to a sustainable environment in terms of air quality, protection of water supplies, increased reliance on renewable power, and adoption of green development.
The State of Kuwait's streets will soon be filled with electric-powered vehicles, which are the transportation industry's future. We are proud of the contribution we play in establishing the fundamental principles for this qualitative change in the Middle East and everywhere in the world, and we are grateful for the opportunity to participate in the Middle East's electric car development. With the introduction of electric vehicle travel in the Middle East, additional electric charging stations will be made available.

- The difficulties of advancing electric vehicles

To expand reliance on electric vehicles, there are a few obstacles that must be overcome, and these obstacles include: Weak infrastructure caused by inadequate development of cars and their proliferation in a manner similar to ordinary cars, which necessitates work, time, and money to grow the establishment, particularly with regard to places to recharge car batteries chargers for automobiles. With the development of payment and accounting systems based on smart systems, it is essential to build the infrastructure for charging electric cars, as they are readily available at suitable distances on roads, particularly highways, and close to public transportation stations. This will significantly improve the performance of electric car charging operations and boost consumer confidence.

Arab nations and electric vehicles

Many Arab nations, including the UAE, Saudi Arabia, Egypt, and Jordan, carried out various tests before expanding their use of electric vehicles. The "Green Charger" initiative was started by the UAE to construct infrastructure and electric vehicle charging stations all across Dubai. In Dubai, the percentage of hybrid

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electric vehicles grew to 2% in 2020 and is predicted to reach 10% by 2030. According to an estimate, sales and inventories of vehicles with internal combustion engines would be surpassed by electric vehicle sales in 2033 and 2044, respectively. This could spell the end for gasoline-powered automobiles. Sales of internal combustion engine-powered vehicles are dwindling, with sales anticipated to account for only 20% of new vehicles by 2050. The Energy Agency estimates that by 2030, the percentage of electric vehicles in the worldwide fleet will increase from 5% to 60%.

[https://attaqa.net/]

Saudi Arabia : We can start from a very solid industrial platform thanks to our vast financial capacity, energy, and human resources, and we have already done so by using the automobile industry as a launching pad since it appeals to other sectors, especially the electric vehicle sector. Saudi Arabia's mining sector, which includes the production of metals, aluminum, lithium, and other materials, will play a role in the global electric vehicle market.

UAE : According to a research by the Clean Energy Industries Council for the Middle East and North Africa, the United Arab Emirates is leading the way in the adoption of electric vehicles in the area. According to the official news agency WAM, the rate of electric vehicle charging stations in the UAE is among the highest in the world, according to a recently released report.

Egypt : The first "Egyptian" electric car will be produced with a local manufacturing rate of 58% at the beginning of 2022, making Egypt the top Arab nation to manufacture and produce electric vehicles. Egypt made an official announcement that it would manufacture electric vehicles, becoming the first Arab nation to do so since the 1970s. Additionally, it will develop a fully electric vehicle for the first time in the Arab world. Egypt purchased 13 electric vehicles of the "E70" model, which will be manufactured there, in July 2021 to test on Egyptian roads with the intention of manufacturing them at Al-Nasr Automotive Industry in the middle of 2022 Kuwait: When the Kuwait Ports Corporation announced in August 2021 that EV City would be the first Middle Eastern city to serve electric vehicle manufacturers, it signaled Kuwait's intention to enter the world of electric vehicles.

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Sultanate of Oman : The Sultanate of Oman, one of the Oman Technology Fund's investments in this potential industry, also announced its intention to introduce an electric vehicle, marking the maiden manufacturing of Mais Motors. With plans to first launch 100 automobiles, the company was able to design a prototype of the vehicle in order to get manufacturing orders. He continued by saying that this first model is one of the emerging Omani innovations that will mark a new beginning for the Sultanate of Oman's electric vehicle industry. It will also help to create an integrated system of automotive-related industries, boost the Sultanate of Oman's added value, and generate more income by utilizing locally produced raw materials. It is noteworthy that the electric "Miss" automobile is distinguished by a distinctive futuristic design in addition to excellent technologies on the same level as global cars that are compliant with international regulations and requirements.

- **Growing Gulf investment in the electric vehicle industry**

As Kuwait announced the creation of the first city to service electric automobile manufacturers in the Middle East, it will be developed on an area of 30,000 meters at a cost of about 30 million Kuwaiti dinars. Gulf investments in the electric car sector are growing dramatically as a result. With a 62% ownership stake in the company's shares, Saudi Arabia is a key investor in one of the leading businesses with a focus on the production of electric vehicles. The Saudi Public Equity Fund made the investment, which started in 2018, with the development of a factory to build electric automobiles close to Jeddah. A 4.7% share in an electric vehicle lithium battery manufacturing, estimated at $445 million, is being invested in by Qatar. The number of electric charging stations in the UAE has increased to 240, and 20% of government vehicles are being converted to run on electricity. 42,000 electric vehicles are expected to be driving on UAE streets by 2030.In the first half of 2021, Bahrain permitted the import of electric vehicles, and in the following 20 years, it is anticipated that global sales will rise by 20%, An authorized representative for electric vehicles comments on the difficulties that employers may encounter: "There is still fear among insurance companies to invest in such cars, because their market is still new, as well as the high cost of batteries and compensation complaints, but I am confident that these companies will turn a corner." With more people using them, electric vehicles are growing more aggressive. The demand for electric vehicles in his nation and the challenges he

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experienced as a businessman were described by an Egyptian member of the Global Trade Group board of directors as follows: "Acquisition of such cars is a new culture for people, but it has started to spread gradually. It was challenging, even for traffic charges and licensing. At start, getting a license for an electric car today is similar to getting one for any other ordinary car. In addition to being imported, these cars are also being manufactured in the Arab world. In preparation for the local production of electric vehicles in line with the nation's goal of becoming carbon neutral by 2050, the Emirates Transport Authority signed a memorandum of understanding with the Chinese Machinery Engineering Company CMEC in October 2021 as part of the "Hala China" initiative. The "Miss" Automotive Company, one of the Oman Technology Fund's investments in this industry, has also revealed that the Sultanate of Oman aims to introduce an electric vehicle, According to the official news agency, the business claimed that it was able to create a prototype of the automobile to collect production orders, with the company intending to launch 100 cars as a first stage.

[https://m.akhbarelyom.com/]

- **Gulf shifts into new gear with electric vehicles**

Although gas-guzzling automobiles may be prevalent in the Gulf, an era of electric vehicles zooming through the region's superhighways is soon to arrive. Drivers in the region have been comparatively slow to switch to electric vehicles compared to their counterparts in markets like China because of the region's affordable fuel and love of fast, opulent cars, A "gigafactory" for electric car batteries is set to be built in Morocco, according to recent announcements from Rabat , this agreement strengthens Morocco's status as a pioneer in environmentally friendly transportation in the Middle East and North Africa area. In order to strengthen the role of carbon-neutral transportation in the battle against climate change, this step is a development of great significance for the Kingdom as a global center for automobile manufacture. It is also crucial to ensure the robustness of the Western supply chain. Rabat has the capacity to spearhead the green transportation revolution by supplying renewable energy to the production of electric car batteries in Morocco thanks to the availability of solar and wind energy resources, as well as

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infrastructure on the scale of existing facilities. In order to achieve its strategic vision for 2030 and preserve the dominance of its economy in the region and the world, the Kingdom of Saudi Arabia is quickening the pace of its economic diversification efforts and discovering viable alternatives to crude oil earnings, In light of this, the Kingdom recently shifted its attention to the mining industry and took advantage of its abundance in minerals and rocks, particularly gold, copper, and other metals that are buried deep underground, to invest more than $50 billion in it. The most recent of these projects, at a cost of $6 billion, is the building of a steel plate complex and an electric vehicle battery metal factory. The CEO of a joint operations firm in Saudi Arabia emphasizes that electric cars are on the way, but that they won't be as affordable as traditional cars. However, they will be able to cover a current gap in the market, he says. Given that the advancement of their technology and the longer battery life are what pose the greatest challenges to electric vehicles, He continues, "It is predicted that huge organizations will enter this market after there is a straightforward rule, and there are huge car companies that have managed to enter the auto market, but we could not reduce them but since we do not have a regulatory for electric cars, therefore they require a special regulation, so even though Their requirements and demands are different, and their infrastructure is distinct from conventional cars, knowing that we have regulatory requirements for electric chargers, an. The initiative of His Highness the Crown Prince "Green Saudi Arabia," which includes reducing carbon emissions as one of its top goals, will increase the allure of the local market, which is one of the largest in the region and one of the most important markets targeted by manufacturers and importers

of cars in our region. According to a member of the Kia Council, electric cars are coming and will have a share of the Saudi auto market in the near future. The key draws for these items, he continues, "are what we see in the development of networks and the beginning of the expansion of electric charging stations, as well as the support services for electric automobiles, which corresponded with the rise in global energy prices." Following recent efforts to achieve its goal of diversifying its economy away from oil, the US Bloomberg Agency highlighted Saudi Arabia's aspirations to become a center for the production of electric auto parts. In a study headlined "The world's oil capital intends to switch to electric vehicles and become

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more environmentally friendly, according to Saudi Electric Car Battery Bets A Warning to the World. In order to do this, it is gaining access to crucial battery materials and investing in the supply chain for electric vehicles." According to Bloomberg, Saudi Arabia is making a bet on producing automobile batteries, something that no other nation in the world has done aside from China. the kingdom has attracted lithium miners and battery manufacturers to launch operations and cover a vital gap as shortages loom and businesses scramble to obtain pricey materials in an effort to accelerate up manufacturing. By the end of this decade, Saudi Arabia wants 30% of the vehicles on the highways in its capital to be electric. Creating factories and processing facilities for electric vehicles, according to her, is a "smart decision" that would ultimately not only assist save costs but also guarantee that Saudi Arabia becomes "a big part of the global electric vehicle manufacturing chain." And among the Gulf states, Bahrain makes the least effort to promote electric vehicles. According to the Bahrain Insurance Organization, Bahrain has an extremely low ratio of electric vehicles—less than 1%, this is because individuals, not dealers, brought these automobiles into the country from abroad, according to the Bahraini expert, it will take the Kingdom roughly 10 years for consumers to start buying electric automobiles on a regular basis. When looking at the Arab world as a whole, it is clear that electric vehicle technology is advancing quickly, particularly in Egypt and Jordan. This year, with a local manufacturing rate of 58%, the first "Egyptian" electric vehicle will go into production, making it the first Arab nation to do so. The transition to electric vehicles in the Arab world is inevitable, according to the technical director of the Regional Center for Renewable Energy and Energy Efficiency, but the timing will vary depending on the local market and the rate of absorption in each nation.

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