POLICY OUTLOOK

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Türkiye's TOGG and the Global Race for Electric Mobility

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(Arife Karakum - Anadolu Agency)

The global pursuit of electronic mobility has surged as countries and companies aim to reduce fossil fuel dependence and combat climate change. Electric vehicles (EVs) have become crucial in this transition, leading to substantial investments in research and development by governments and businesses. The momentum has intensified with the entry of new players like TOGG, Türkiye's first domestically produced EV brand. This research paper examines the catalysts, obstacles, and prospects of electric mobility in various regions worldwide, alongside implications for the automotive industry and the global energy transition. It also offers recommendations for governments and policymakers to boost EV demand and supply, drawing from TOGG's successful launch and execution.

The opinions expressed in this policy outlook represent the views of the author(s) and do not necessarily reflect the views of the TRT World Research Centre.

Introduction

The global race for electronic mobility has accelerated in recent years as countries and companies seek to reduce their reliance on fossil fuels and decrease carbon emissions. The shift towards electric vehicles has become a critical component of the fight against climate change, with governments and businesses investing heavily in research and development to increase the efficiency and accessibility of this technology. The emergence of new players, such as Türkiye's first homegrown domestic electric vehicle brand known as TOGG, in the automotive industry and the rapid advancement of battery technology has added to the momentum, making this a crucial time for understanding the current state of the global race for electronic mobility. This research paper will explore the key drivers, challenges, and opportunities for electric mobility in various regions of the world, as well as the implications for the automotive industry and the global energy transition.

Background on Electric Mobility

Electric mobility refers to using electric vehicles (EVs) as a means of transportation. This includes all types of vehicles that use electricity as their primary source of energy, including battery EVs (BEVs), plug-in hybrid EVs (PHEVs), and fuel cell EVs (FCEVs). Electric mobility also includes the supporting infrastructure necessary for charging or refuelling EVs, such as charging stations, battery swapping stations, and hydrogen fuelling stations. Electric mobility aims to provide a more sustainable and environmentally friendly transportation option to reduce greenhouse gas emissions and improve air quality.

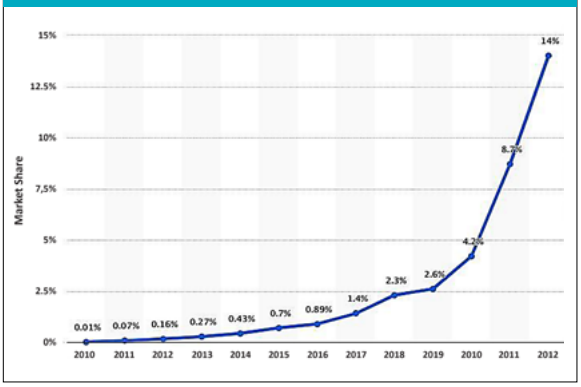
The industry has a long and varied history, dating back to the early 19th century when inventors began experimenting with EVs. In the following decades, inventors in Europe and the United States continued to improve the design of EVs. Though this may be surprising to some, by the late 1800s, EVs had become a popular choice for urban transportation, particularly for wealthier individuals. They were quieter and cleaner than their gasoline-powered counterparts, making them a preferred choice for inner-city travel. Electric taxis and delivery vehicles were common in many cities around the world.

One major obstacle was the limited range of EVs due to the limitations of battery technology at the time. Moreover, the advent of mass-produced gasoline vehicles in the early 20th century changed the transportation landscape. The development of the assembly line and improvements in gasoline engine technology made gasoline vehicles more affordable and accessible to the public. As a result, EVs declined in popularity and production. Despite the challenges faced by electric mobility, it continued to be explored and developed throughout the 20th century. In the 1960s and 1970s, interest in EVs grew as a response to the oil crisis and concerns about air pollution. During this time, several automakers developed experimental EVs, which were limited in range and impractical for everyday use.

In the 1990s, developing the first lithium-ion batteries revolutionised the potential for EVs. These batteries offered significantly improved energy density, allowing EVs to travel farther on a single charge. This technology also paved the way for hybrid EVs, which combined electric motors with gasoline engines to improve fuel efficiency. In the early 2000s, the first mass-produced EVs were introduced, including the Nissan Leaf and the Tesla Roadster. These cars had longer ranges and faster charging times than previous EVs, making them more practical for everyday use. Governments worldwide also began to offer incentives and subsidies to encourage the adoption of EVs, further driving their growth.

Today, electric mobility is experiencing a resurgence, with governments, businesses, and consumers increasingly turning to EVs as a more sustainable transportation solution. In 2022, EVs accounted for approximately 14 per cent of global passenger car sales, reflecting a year-over-year increase of around 5.3 percentage points (see Figure 1). The growth of EV sales has been rapid, especially since 2017, when they surpassed the one per cent mark in the market. Notably, the pace of adoption has significantly accelerated since 2020. This upward trend indicates a strong global demand for EVs and highlights their increasing prominence in the international automotive industry.

***Figure 1:* Global market share of EVs within passenger car sales** (2010-2022)



In terms of actual sales, the global sales of EVs exceeded 10 million units in 2022. Consequently, the number of electric cars on global roads reached over 26 million in 2022, reflecting a 60 per cent uptake compared to the previous year. Remarkably, the first quarter of 2022 alone witnessed the sale of 2.3 million EVs, representing a 25 per cent increase compared to the same period in 2021. Projections indicate that sales are expected to reach 14 million by the end of 2023, potentially accounting for 18 per cent

of total car sales. These statistics underscore the significant and ongoing growth of the electric vehicle market globally. With the development of more advanced battery technologies, improvements in charging infrastructure, and the increasing availability of electric vehicle models, it is likely that electric mobility will play an increasingly important role in the transportation sector in the years to come.

Overview of the Global Race for Electric Mobility

The global race for electric mobility had its roots in the early 2000s when a handful of automakers began introducing mass-produced EVs. At the time, the technology was still in its infancy, with limited range and high costs, but these early EVs provided a glimpse into the future of transportation. As governments worldwide began to recognise the need to reduce greenhouse gas emissions and improve air quality, they began to offer incentives and subsidies for the adoption of EVs. In 2010, the US government introduced the Electric Drive Vehicle Battery and Component Manufacturing Initiative, which funded R&D related to advanced batteries and electric drive components. Other countries, including China, Germany, and France, also introduced similar programs to support the growth of electric mobility.

The launch of the Tesla Model S in 2012 marked a significant milestone in the global race for electric mobility. The Model S was the first electric vehicle with a range of over 200 miles, making it practical for everyday use. It also had advanced features, such as over-the-air software updates and a large touchscreen display, which set it apart from other EVs on the market. In the years following the launch of the Model S, the electric vehicle market began to grow rapidly, with more automakers introducing electric models and governments around the world introducing new policies to support the growth of electric mobility. In 2018, China introduced a policy requiring all automakers to produce a certain percentage of EVs each year, further driving the growth of electric mobility. As the electric vehicle market continued to grow, automakers began to invest heavily in battery technology to improve the range and reduce the costs of EVs. This move introduced new battery chemistries and advancements in battery manufacturing, resulting in lower costs and longer ranges for EVs. In addition, new players entered the electric vehicle market, including startups such as Rivian and Lucid Motors, which brought innovative new designs and technology to the market. The global race for electric mobility also led to the development of new infrastructure to support the growth of EVs. International governments introduced policies to support the development of charging networks and hydrogen fuelling stations, making it easier for electric vehicle owners to recharge their vehicles while on the road. Private companies also began investing in charging networks, with Tesla building its Supercharger network and other companies such as Electrify America and ChargePoint developing charging networks open to all EV owners. The Covid-19 pandemic significantly impacted the quest for electric mobility, with the market for EVs experiencing a downturn in the early stages of the pandemic. However, as governments around the world introduced stimulus packages to support economic recovery, many included incentives and subsidies for the purchase of EVs, leading to a resurgence in the EV market.

The global race for electric mobility is expected to continue, with many countries setting ambitious targets for the adoption of EVs in the coming years. For example, the European Union (EU) has set a target of reducing greenhouse gas emissions by 55 per cent by 2030 and achieving net-zero emissions by 2050, with EVs expected to play a major role in achieving these goals. In 2021, the sales of EVs soared to a new record of 6.6 million, marking a two-fold increase from the previous year. In contrast, only 120,000 electric cars were sold globally in 2012, which is now being exceeded weekly. EVs accounted for almost 10 per cent of global car sales in 2021, indicating a four-fold increase from 2019. Consequently, the number of electric cars on the roads worldwide has surged to approximately 16.5 million, triple the amount in 2018. The trend continues to flourish in 2022, with electric car sales rising by 75 per cent in the first quarter, selling over 2 million units.

China led the increase in EV sales in 2021, with 3.3 million vehicles sold, accounting for half of the growth. Europe also showed strong growth with 2.3 million sales, while sales in the United States increased to 630,000. In the first quarter of 2022, sales in China more than doubled compared to the same period in 2021, while the US saw a 60 per cent increase and Europe a 25 per cent increase. EVs in China are typically smaller, contributing to decreased price gaps with conventional cars, and the country leads in registrations of electric two- and three-wheeler vehicles, electric buses, and trucks. In contrast, EV sales remain low in other emerging and developing economies, such as Brazil, India and Indonesia, where few affordable models are available. However, EV sales doubled in some of those same regions in 2021, indicating the potential for quicker uptake by 2030 with proper investments and policies. It is projected that the global market value for electricity used in EV charging will experience significant growth in the upcoming decade, increasing over 20 times in the Asia-Pacific region alone. This growth is expected to result in a market value of approximately USD 190 billion by 2030, roughly equivalent to one-tenth of the current market value of diesel and gasoline.

Developing a national EV ecosystem involves various key players, including automobile manufacturers, battery manufacturers, charging infrastructure providers, governments, energy companies, and startups. Major automakers such as Volkswagen, General Motors, Ford, Toyota, and Tesla are investing heavily in EVs and have announced plans to shift their focus towards EVs in the coming years. Battery

manufacturers like Panasonic, LG Chem, and CATL supply batteries to automakers. Charging infrastructure providers such as ChargePoint, EVgo, and Tesla are investing in the necessary charging infrastructure to support EVs.

Governments worldwide, including Türkiye, Norway, the Netherlands, China and the United States, offer various incentives to encourage the adoption of EVs and invest in building the necessary charging infrastructure. Energy companies such as EDF, Enel, and Duke Energy are also playing a significant role in the global race for electric mobility by investing in renewable energy sources and developing new technologies for charging EVs. In addition to these players, many startups are emerging in the electric vehicle industry, focusing on areas such as battery technology, charging infrastructure, and mobility services.

Türkiye's Electric Mobility Sector Growth

Türkiye's automotive sector is a vital part of its manufacturing industry, employing over half a million people and attracting investments totalling 15 billion USD since 2000. Türkiye is the 15th largest automotive manufacturer globally and the 5th largest in Europe. The country›s growing population and trend towards urban migration make traffic management a crucial issue, driving local municipalities to invest heavily in Intelligent Transportation Systems (ITS). As per research from 2016, the Ministry of Industry and Trade in Türkiye explored the trend towards electric and hybrid-powered vehicles, intending to establish the country as a leading manufacturer of EVs. The government provided incentives and investments in R&D for EV manufacturers, and efforts are being made to introduce charging stations by entering into agreements with electric distributors and oil stations. The Turkish government has offered substantial investment to subsidise EV manufacturers, EV charging network operators and buyers.

Consequently, amongst other international and local investors, Ford announced a 2.4 billion USD investment in an electric vehicle and battery factory in the country, the largest commercial vehicle production hub for Ford in Europe, in March 2021. By April 2022, there were around 48,000 hybrid and 2,000 EVs on Turkish roads and 2,223 alternating current (AC) charging stations and 200 direct current (DC) charging stations by the end of 2022. Most were in urban cities, including Istanbul, Ankara and Izmir. It is anticipated that EV sales in Türkiye will increase to 40,000 units by the end of 2023, considering other automakers› addition of new models. This step would result in EVs accounting for 7 per cent of total vehicle sales.

Further, Türkiye's homegrown domestic electric vehicle brand, TOGG, launched in 2023, adding to the growing demand for related technologies and aftermarket EV auto parts and accessories (see Figure 2). TOGG stands for Türkiye'nin Otomobili Girişim Grubu A.Ş. which translates to Türkiye's Automobile Joint Venture Group Inc. in English. It is a consortium of five Turkish companies established in 2018 to develop and produce Türkiye's first domestically produced electric vehicle. The five companies are Anadolu Group, BMC, Koç Group, Turkcell, and Zorlu Holding. The first prototype of TOGG's electric SUV was unveiled in December 2019. TOGG plans to introduce a range of EVs, including sedans, SUVs, and crossovers, to produce 175,000 units annually by 2030. The TOGG EVs are intended for domestic and international markets as part of the national effort to establish Türkiye as a major player in the global EV industry.

Factors Driving the Global Race for Electric Mobility

The significant growth of the global electric mobility industry can be attributed to several factors, including government policies and regulations, technological advancements, consumer demand, corporate sustainability goals, economic competitiveness and more.

Firstly, government policies and regulations are key drivers of the EV industry. As noted above, many countries are implementing policies and regulations to promote the adoption of EVs, such as tax incentives, subsidies, and emissions standards. These measures aim to reduce greenhouse gas emissions, improve air quality, and reduce dependence on fossil fuels. EVs are a critical component in global efforts to address climate change. They play a prominent role in mitigation strategies designed to limit global warming to below 2 degrees Celsius or 1.5 degrees Celsius, consistent with the goals of the Paris Agreement. EVs significantly reduce emissions across Europe compared to traditional internal combustion engine vehicles.[1] Notably, in the UK, a Nissan Leaf EV produced lifetime emissions per kilometre that were approximately three times lower than an average conventional car in 2019, even before accounting for the declining carbon intensity of electricity generation over the vehicle's lifetime. This situation underscores the potential of EVs to assist countries in achieving their climate targets. People's awareness also led to the rising consumer demand for EVs, particularly in urban areas where air pollution is a major concern. According to a 2021 survey conducted by YouGov among drivers, the primary motivation

[3] However, the extent of this reduction depends on the carbon intensity of electricity generation in each country. In regions where electricity is generated primarily from coal-intensive processes, the environmental benefits of EVs may be less significant, and their emission reduction may be comparable to that of the most efficient conventional vehicles, such as hybrid-electric models. Particularly as countries transition to low-carbon electricity generation, the emissions associated with driving EVs will decrease. This trend, combined with a reduction in manufacturing emissions for new EVs, will further enhance their environmental benefits.



(Afyonkarahisar Belediyesi - Anadolu Agency)

for contemplating the purchase of an EV was to safeguard the environment. Furthermore, another 2021 study by CarMax revealed that many vehicle owners were apprehensive about fuel emissions and believed that the chief benefit of EVs was their positive impact on the environment.

Secondly, advancements in battery technology and electric drivetrains have made EVs more practical and affordable, with longer driving ranges and faster charging times. The European Patent Office reported a significant growth in the number of international patent families related to electricity storage, with an annual growth rate of 14 per cent between 2005 and 2018, compared to 3.5 per cent for all technology areas. Lithium-ion batteries remained the most actively researched technology area, with 8,300 patents filed outside China in 2019 alone. The use of lithium increased as cobalt became increasingly controversial due to restrictive supply chains (60 per cent of the world's entire cobalt deposits lie in the Democratic Republic of Congo alone). To help diversify away from lithium supply sources and to help stabilise supply further, solid-state batteries and the use of sodium as an alternative to lithium are also being explored. Hydrogen fuel-cell cars are locally emission-free, but the infrastructure for hydrogen fuel is limited (very few charging stations), and the cars are expensive. Battery technology is likely to continue dominating the majority of EVs, while hydrogen's high energy density may have an advantage in certain forms of transport, such as buses, which can be refuelled at a central depot, or scooters, which do not require much room for storing fuel.

Thirdly, EVs have started to make very sound economic sense for consumers. Consumer demand for EVs is growing as EVs offer potential cost savings due to the lower cost of electricity than gasoline, resulting in reduced fuel expenses. Secondly, EVs generally require less maintenance since they have fewer mechanical components and do not require oil changes, leading to potential long-term cost reductions (approximately 8,000 USD to 12,000 USD throughout the car's lifespan). Additionally, governments often provide tax credits, rebates, and other financial benefits to promote EV adoption, which can help offset the initial purchase cost. However, it is crucial to consider factors such as regional electricity pricing, and the individual's driving needs to accurately assess the economic feasibility of EVs in specific circumstances for individual consumers. With that said, the International Renewable Energy Agency (IRENA) reported a significant decline in the cost of photovoltaic (PV) cells, with a decrease from 2.15 USD per watt in 2010 to 0.27 USD per watt in 2022 - previous higher costs have been the reason behind solar cells not being used to power EVs, even though it appears sensible to do so. This substantial cost reduction suggests that integrating solar cells into cars will likely become more economically feasible. As a result, the growing presence of vehicles equipped with solar cells can soon be anticipated. Effective use of solar cells in EVs will likely make EVs more economically attractive going forward. Additionally, market trends are 'showing that luxury EVs are growing in popularity' due to the 'cool factor', particularly linked to Tesla.

Corporate sustainability goals also drive demand for EVs

and lead to investments in EV charging infrastructure and related technologies. Many companies are setting ambitious sustainability goals, including electrifying their vehicle fleets, to become more attractive to consumers. Interestingly, EV-based carbon credits are gaining momentum. A carbon credit is a government-calculated «tradable certificate or permit representing the right to emit a set amount of carbon dioxide or the equivalent amount of a different greenhouse gas (tCO2e)". As per SBC Global, EV credits are "carbon credits generated using EV charging systems, where greenhouse gas emission reductions are achieved by replacing vehicles that use traditional fossil fuels with electrified vehicles".

Regarding sustainability goals, "net zero emissions" can be achieved by any corporation using carbon credits. As per Sue Hall, CEO of Climate Neutral Business Network, companies usually buy carbon credits in the sectors they operate in, and, for example, if a ride-sharing company or a taxi app can electrify their system, they can earn EV credits, meeting financial and sustainability goals at the same time. In another example, a charging infrastructure provider can switch to renewable energy like solar power instead of grid electricity. This move could qualify them to earn and trade EV credits while remaining committed to sustainability provisions.

Finally, the EV industry's economic competitiveness and potential drive substantial investment as it evolves into a more financially viable option than traditional automotive manufacturing. Consequently, there is a notable influx of investment in EV production and associated industries, leading to new job opportunities, including in the design and development of EVs, battery manufacturing, and charging network development and maintenance.

Geopolitical and Social Implications of Electric Mobility

The adoption of electric mobility and the subsequent transition from fossil fuel-powered vehicles carry significant implications for countries, particularly regarding energy independence and security. By shifting the focus towards renewable energy sources to meet the power demands of EVs, nations can markedly reduce their reliance on imported fossil fuels, notably oil. This transition also presents a unique opportunity for countries to tap into their domestic renewable energy resources, such as solar, wind, hydro, and geothermal power. By capitalising on these renewable sources, nations can effectively harness their energy potential, thereby diminishing their dependence on external suppliers and thus enhancing their energy security, which is deeply linked with national security. This shift not only has the potential to strengthen energy independence but also bolsters resilience by mitigating vulnerabilities to geopolitical tensions and disruptions in fossil fuel markets. From an energy security standpoint, electric mobility's primary advantage is the reduced exposure to price fluctuations in global oil markets. Various factors, including political instability, conflicts, supply disruptions, and shifts in global demand, influence oil prices. By embracing EVs and powering them with domestically generated renewable energy, countries can mitigate their susceptibility to these volatile oil market dynamics that negatively impact their economic and social stability. Consequently, they can stabilise their energy costs, minimising the risks associated with fluctuations in oil prices and fostering a more stable economic environment.

The resulting energy crisis is one of the most significant consequences of the Russian invasion of Ukraine. The global energy landscape has shifted dramatically one year after Russia's war on Ukraine, leading to soaring prices and heightened concerns about energy security. The European Union (EU) has, in particular, increasingly relied on Russian gas imports in the last decade, while its domestic gas production has declined, leading to a growing call for an accelerated energy transition towards renewables and their applications. By promoting EVs and electrification (or solarising) of transportation, the EU could greatly offset the demand for Russian oil. However, the energy crisis caused by the war in Ukraine has also increased electricity prices, which has diminished the 'notion of cheaper running costs for EVs compared with traditional fuel run vehicles, as residential and commercial EV charging rates have surged'. With that said, efforts to increase renewable electricity capacity in the EU are underway and projected to double over the next five years. This will likely lead to greater government promotion and consumer adoption of EVs not just in the EU but also in the rest of the world. Given the lessons learned from the war in Ukraine related to the dangers of over-reliance on foreign sources of energy, the global race for electric mobility is likely to gain more momentum.

In terms of the social implications of electric mobility, the widespread adoption of EVs, as noted above, necessitates the development of supportive infrastructure, including charging stations and grid enhancements. This presents a significant opportunity for governments to invest in modernising transportation infrastructure and aligning with sustainable urban planning principles. By strategically locating charging stations in urban areas, governments can encourage the adoption of EVs and reduce dependence on fossil fuel-powered vehicles. This, in turn, leads to improved air quality, reduced greenhouse gas emissions, and mitigates the negative impacts of transportation on public health and the environment. Sustainable urban planning principles include promoting pedestrian-friendly spaces, developing dedicated EV parking areas, and integrating charging infrastructure with public transportation systems. Another key social advantage of investing in EV infrastructure is the creation of new job opportunities, as

noted above. The installation, operation, and maintenance of charging stations require a skilled workforce, contributing to employment growth in the renewable energy and transportation sectors. This job creation can stimulate economic development and support local communities. Moreover, governments can leverage public-private partnerships to develop the EV industry offsetting the costs, as corporations and businesses can also meet their sustainability goals while earning EV credits, greatly benefiting their bottom line.

Challenges to the Global Race for Electric Mobility

Despite the significant benefits of electric mobility for consumers and governments, some challenges must be overcome before widespread adoption, which appears similar for all countries engaged in the global race to develop state-of-the-art EVs. One major one is that EVs require a robust charging infrastructure. Establishing an extensive network of charging stations, including fast-charging options, is essential. However, building and expanding this infrastructure can be costly and time-consuming, requiring significant investments and coordination between public and private entities. Countries that hope to develop their domestic EV infrastructure must have the political and economic stability to foster an environment that facilitates public-private partnerships and cooperation. A good example is the Turkish EV developer TOGG, as noted above.

EVs are generally more expensive upfront compared to traditional internal combustion engine vehicles. The high cost of EVs, particularly due to the expensive battery technology, can be a barrier to widespread adoption. Efforts to reduce manufacturing costs, increase economies of scale, and provide financial incentives and subsidies are crucial to make EVs more affordable and accessible to a broader consumer base. Developing advanced battery technologies and increasing their affordability remains challenging for countries involved in the race for EVs. As noted above, this is being addressed in the form of extensive research and technological advancements in battery technology as well as seeking alternatives to help diversify sources of supply of batteries for EVs to ensure a secure and sustainable supply chain for them. Even more importantly, shifting consumer perceptions and behaviours towards EVs remains a significant challenge. Many consumers worldwide still have concerns about EV performance, range limitations, charging infrastructure availability, and the overall ownership experience. Unless countries engaged in the global race for electric mobility do not address this, the demand for EVs will remain low. It is important to remember that when there is no demand, there is no market.

Lessons Learned from TOGG: Policy and Programmatic Recommendations

Below are policy and programmatic recommendations for governments and lawmakers to support and promote the EV industry, considering its growing importance. These recommendations aim to stimulate demand and increase the supply of EVs while maximising the benefits of a robust national EV ecosystem in terms of energy security and societal advantages. The experiences of the Turkish government's mechanisms of support for TOGG serve as a reference for these recommendations.

Increasing Demand:

1. To engender demand, governments can implement financial incentives such as purchase subsidies, tax credits, or grants to reduce the upfront cost of EVs and make them more affordable for consumers. These incentives can encourage adoption and help stimulate the market. In the Turkish EV market, there is a proposal within the National Energy Efficiency Action Plan (2017-2023) framework to establish a modified tax system that differentiates based on fuel consumption and carbon dioxide emissions. The intention is to offer tax benefits for consumers that own vehicles with low carbon dioxide emissions, encourage the adoption of low-emission vehicles (EVs) and support environmental sustainability.

2. Governments must create a comprehensive plan for charging infrastructure deployment, as that is one of the biggest challenges facing countries looking to create more demand for EVs. They can either directly provide funding and support for charging infrastructure development or collaborate with private entities working on it for greater efficiency. In March 2022, the Turkish Industry and Technology Ministry allocated 20 million Turkish Liras (1.3 million USD at the time) to support 75 per cent of the charging station investments made by private companies.

3. Governments can launch and encourage educational campaigns to raise awareness about the benefits of electric mobility, dispel myths and misconceptions, and inform consumers about available incentives and charging infrastructure locations. The public in Türkiye is currently focused on the state-supported "local brand EV" project, i.e.., the aforementioned TOGG. However, the acceptance of EVs is low in the country, as in most other countries. To help address this, the Turkish government led by example by producing EVs for public transportation. A public-pri-

vate partnership has resulted in the joint production of the first 100 domestic EVs for public transportation to achieve higher visibility.

Increasing Supply:

1. On the supply side, governments and lawmakers can create supportive regulations and standards to facilitate EV adoption. This can include streamlining permitting processes for charging infrastructure, mandating a certain percentage of parking spaces to have charging capabilities in new buildings, and offering incentives for workplace charging. In the Turkish context, the government has implemented various support measures for stakeholders in the EV industry. These include exemptions from customs duties, value-added tax (VAT), and the possibility of VAT refunds. Additionally, there is support in the form of insurance premium employer's share assistance for ten years, income tax withholding support for ten years, tax deductions, qualified personnel support, interest payment support, and purchase guarantees.

2. Governments must actively collaborate with industry, utilities, and other stakeholders to establish a comprehensive approach to electric mobility and provide strategic support. Public-private partnerships are vital in leveraging expertise, resources, and investments to facilitate the successful deployment of EVs and associated infrastructure. A notable example is the Turkish government's provision of substantial land free of charge to TOGG as an investment. The designated area in Bursa-Gemlik enjoys advantageous proximity to a seaport, free zone, and major national highways. Furthermore, other prominent automobile factories, such as Fiat and Renault, in Bursa have created a favourable environment for TOGG by facilitating access to robust sub-industries.

3. Developing training programs and initiatives aimed at upskilling and reskilling workers in the automotive industry and related sectors must be prioritized by governments and lawmakers to address the evolving demands of electric mobility. These initiatives and programs can support technical training focusing on EV-relevant areas. In the case of TOGG, the Turkish government has offered long-term wage support for qualified personnel. This measure not only supports the industry but also attracts and nurtures a skilled workforce. By investing in training and skill development, governments can ensure that the workforce is equipped to meet the requirements of the growing electric mobility sector.

4. Industry stakeholders should actively participate in international collaborations to enhance the electric mobility sector. These collaborations facilitate sharing best practices, knowledge exchange, and standard harmonisation. It is crucial to collaborate with other countries to establish interoperability standards for charging infrastructure, enabling seamless cross-border travel for EVs. In line with this, TOGG has joined forces with Plug and Play, the world's largest innovation platform, to introduce a mobility acceleration program. This program aims to support international startups by providing mentoring and financial consultancy, leveraging the global Mobility Acceleration Program of TOGG and the extensive network of Plug and Play. This partnership exemplifies TOGG's dedication to fostering technological innovation and advancing the overall global mobility ecosystem.