

ARAŞTIRMA MAKALESİ / RESEARCH ARTICLE

THE IMPACT OF TAX POLICIES ON THE DEMAND FOR ELECTRIC AND HYBRID VEHICLES IN TÜRKİYE

TÜRKİYE'DE ELEKTRİKLİ VE HİBRİT ARAÇ TALEBİNDE VERGİ POLİTİKALARININ ETKİSİ

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ABSTRACT

The study is conducted to show the sample country applications regarding the demand for electric vehicles (EVs) and hybrid vehicles (HEVs) and the guiding role of tax policies for these instruments on the basis of tax legislation in Türkiye. In this context, the research evaluates regulatory frameworks and their impact on incentivizing the adoption of alternative fuel vehicles. The methodology employs a combination of qualitative analysis and benchmarking to assess the influence of tax policies on the demand for EVs and HEVs. Based on an examination of Türkiye's current legislation and data on existing vehicles, the study identifies a need for adjustments in the Value Added Tax (VAT), Motor Vehicles Tax (MVT), and Special Consumption Tax (SCT) frameworks, particularly within the scope of limiting climate change. Given the identified shortcomings in Türkiye's existing tax policies for promoting alternative fuel vehicles, the study aims to provide insights and recommendations to guide future research and policy development in this area.

Keywords: Climate Change, Tax Incentives, Tax Policy, Public Finance.

JEL Classification Codes: H2, H23, Q54, K32.

ÖZ

Bu çalışma, Türkiye'deki vergi mevzuatı temelinde elektrikli araç (EA) ve hibrit araç (HA) talebine ilişkin örnek ülke uygulamalarını ve bu araçlara yönelik vergi politikalarının yönlendirici rolünü ortaya koymak amacıyla gerçekleştirilmiştir. Bu bağlamda araştırma, düzenleyici çerçeveleri ve bunların alternatif yakıtlı araçların benimsenmesini teşvik etme üzerindeki etkisini değerlendirmektedir. Metodoloji, vergi politikalarının elektrikli ve hafif ticari araçlara yönelik talep üzerindeki etkisini değerlendirmek için nitel analiz ve kıyaslama yöntemlerini bir arada kullanmaktadır. Türkiye'nin mevcut mevzuatının ve mevcut araçlara ilişkin verilerin incelenmesine dayanan çalışma, özellikle iklim değişikliğinin sınırlandırılması kapsamında Katma Değer Vergisi (KDV), Motorlu Taşıtlar Vergisi (MTV) ve Özel Tüketim Vergisi (ÖTV) çerçevelerinde düzenleme yapılması gerektiğini ortaya koymaktadır. Türkiye'nin alternatif yakıtlı araçların teşvikine yönelik mevcut vergi politikalarında tespit edilen eksiklikler göz önüne alındığında, bu çalışma, bu alanda gelecekteki araştırma ve politika geliştirmeye rehberlik edecek içgörü ve öneriler sunmayı amaçlamaktadır.

Anahtar Kelimeler: İklim Değişikliği, Vergi Teşvikleri, Vergi Politikası, Kamu Maliyesi.

JEL Sınıflandırma Kodları: H2, H23, Q54, K32.

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EXTENDED SUMMARY

Amaç ve Kapsam:

Bu çalışma, Türkiye'deki vergi mevzuatı temelinde elektrikli araç (EA) ve hibrit araç (HA) talebine ilişkin örnek ülke uygulamalarını ve bu araçlara yönelik vergi politikalarının yönlendirici rolünü ortaya koymak amacıyla gerçekleştirilmiştir. Bu bağlamda araştırma, düzenleyici çerçeveleri ve bunların alternatif yakıtlı araçların benimsenmesini teşvik etme üzerindeki etkisini değerlendirmektedir. Literatüre olan katkı, iklim değişikliğiyle mücadele çerçevesinde 2000 yılı sonrası KDV, MTV ve ÖTV mevzuatında yapılan değişikliklerle alternatif yakıtlı otomobil talebinin değişimi ve söz konusu veriler ışığında mevcut vergi politikalarının etkisinin ortaya konulmasıdır.

Yöntem:

Metodoloji, vergi politikalarının elektrikli ve hafif ticari araçlara yönelik talep üzerindeki etkisini değerlendirmek için nitel analiz ve kıyaslama yöntemlerini bir arada kullanmaktadır. Türkiye'nin mevcut mevzuatının ve mevcut araçlara ilişkin verilerin incelenmesine dayanan çalışma, özellikle iklim değişikliğinin sınırlandırılması kapsamında KDV, MTV ve ÖTV çerçevelerinde gerçekleştirilen düzenlemeleri incelemektedir. Söz konusu vergiler 2000 yılı sonrası yasal düzenlemeler çerçevesinde incelenmiştir. Türkiye'de EA ve HA sayılarının gelişimi, söz konusu araçlara ilişkin emisyon salınımları dikkate alınarak sayısal verilerle değerlendirilmiştir.

Bulgular:

İklim değişikliğiyle mücadelede hükümetler, alternatif yakıtlı araçlara yönelik tüketici talebini artırmak için çeşitli teşvikler sunmaktadır. Literatür, talep yönlü mali sübvansiyonların elektrikli araç pazarının canlandırılmasında ve yönlendirilmesinde önemli bir rol oynadığını göstermektedir. Türkiye'de 2023 yılında satılan otomobillerin %10,8'i HA ve %7,5'i EA ve 2024 Şubat sonu itibarıyla kayıtlı araçlar içinde EA'ların payı %0,6, HA'ların payı ise %1,6'dır. Türkiye'de EA'lara yönelik vergi düzenlemeleri, otomobil alımına ilişkin KDV ve ÖTV'de ve sahipliğe ilişkin MTV'de görülmektedir. 7061 sayılı Kanun ile 01.01.2018 tarihinden itibaren, kayıt ve tescil edilmiş binek otomobillerin MTV'si, motor silindir hacmi ve araç yaşının yanı sıra aracın değeri esas alınarak belirlenmektedir. Daha yüksek motor silindir hacmine sahip araçlar daha yüksek emisyonla sahip olsa da, Türkiye'de eski otomobiller için daha düşük MTV uygulanması, yüksek emisyon üretiyor olsalar bile araçların uzun süre elde tutulmasını teşvik etmektedir. Türkiye'de kayıtlı araçların %54,6'sı 10 yaşından büyüktür. 2023 yılı itibarıyla satılan araçların %80,8'i motor hacmi 1600 cc'nin altında olan dizel ve benzinli araçlardan, %54,8'i ise 120 g/km'nin üzerinde emisyonla sahip araçlardan oluşmaktadır. HA'ların MTV'sinin hesaplanması için 197 sayılı MTV Kanununda herhangi bir teşvik bulunmamaktadır. EA'lar için ilk düzenleme 27.3.2018 tarihli ve 30373 (2. Mükerrer) sayılı Resmi Gazete'de yayımlanan 7103 sayılı "Vergi Kanunları ile Bazı Kanun Hükmünde Kararnamelerde Değişiklik Yapılması Hakkında Kanun" ile yapılmıştır. Elektrikli araçlar için MTV sadece kısmi bir teşvik içermektedir. Türkiye'de HA'lar için ilk ÖTV düzenlemesi 07.09.2016 tarih ve 29824 sayılı Resmi Gazete'de yayımlanan 6745 sayılı Kanun ile yapılmıştır. Yönetmelik sayısının oldukça fazla olduğu, sık sık yapılan değişikliklerin karmaşık bir yapı sergilediği ve mevzuatta sadeliğin sağlanması gerektiği görülmektedir. Oranlar ve matrahlar incelendiğinde, HA'lar için matrahların içten yanmalı motorlu araçlara göre daha yüksek tutularak vergi oranının düşürülmeye çalışıldığı, ancak oranlar açısından HA'ları teşvik edecek yeterli bir düzenleme yapılmadığı söylenebilir. Yapılan 26.07.2024 tarihli değişiklik ile sadece haricen şarj edilebilen HA'lar için ÖTV teşviki yürürlüğe girmiştir. Bu araçlar için ÖTV oranı %30 ile %80 arasında değişmektedir. Bu araçların emisyonlarının dikkate alınması olumlu bir düzenleme olmakla birlikte, yine de bu teşvikin sadece belirli model HA'lar için teşvik edici olacağı düşünülmektedir. Ayrıca bu düzenleme dışında hem EA hem de HA'lar için emisyon bazlı bir ÖTV sistemi bulunmamaktadır. İlk kez 25.02.2011 tarihli düzenleme ile sadece elektrik motorlu araçlar ÖTV kapsamına alınmıştır. Bu düzenleme ile EA'lar için uygulanacak en yüksek oran %15'tir. Bu oran 02.02.2021 tarihli düzenleme ile %60'a çıkarılmış, en düşük oran ise aynı düzenleme ile %3'ten %10'a yükseltilmiştir. EA'lar için ÖTV oranlarındaki artış, bu araçlara yönelik talep teşvikini zayıflatmıştır. EA'lar için 18.11.2023 tarihinde yapılan matrah düzenlemesi ile motor gücü 160 kW'ı geçmeyenler için %10 oranının uygulanacağı matrah yükseltilerek daha fazla aracın bu vergi oranından faydalanması amaçlanmıştır. Bu araçlar için ÖTV oranı daha düşük seviyelerde belirlenmiş olsa da diğer ülkelerdeki teşviklere kıyasla düşük kalmaktadır. ÖTV, belirli koşullar altında hem EA'lar hem de HA'lar için teşvik mekanizmaları içerse de, bu teşvikler genellikle sınırlı bir araç modeli yelpazesini dar bir şekilde hedeflemektedir. Ayrıca, yüksek ÖTV oranları bu teşviklerin etkinliğini önemli ölçüde azaltmaktadır. Buna ek olarak, araç alımlarında ÖTV'nin KDV hesaplamaları için vergiye tabi matraha dahil edilmesi, genel vergi yükünü daha da ağırlaştırmaktadır. KDV açısından Türk Vergi Sistemi'nde alternatif yakıtlı araçlar için herhangi bir özel hüküm veya teşvik bulunmamaktadır.

Sonuç ve Tartışma:

Türkiye'de EA ve HA'lara yönelik vergi düzenlemeleri, alternatif yakıtlı araçların yaygınlaşmasını hedeflemektedir. Ancak sınırlı kapsamlı teşvikler, yüksek ÖTV oranları ve karmaşık mevzuat, bu hedefe ulaşmada yetersizdir. Daha etkili bir politika için teşviklerin genişletilmesi, emisyon bazlı düzenlemelerin artırılması ve mevzuatın sadeleştirilmesi başta olmak üzere çeşitli düzenlemelerin yapılması gerekmektedir.

1. INTRODUCTION

Many stakeholders, especially governments, are developing various policies to solve the problem of increasing greenhouse gas emissions and global warming. The biggest source of these emissions is energy, and the high share of the transportation sector in emissions has revealed the necessity to produce policies on the transition to sustainable and clean energy in this field. In this context, alternative fuel vehicles play an important role in this transformation. Emissions in the transportation sector are tried to be limited through alternative fuel vehicles with lower emission release compared to fossil fuel vehicles. In increasing electrification in the transportation sector, governments direct this transition with supportive policies as well as coercive measures. Tax policies are one of the instruments commonly used to increase the share of alternative fuel vehicles in this sector. In the world, tax policies are used to increase both the supply and demand of these vehicles. Tax incentives are used as an effective tool for reducing purchase costs and increasing market liquidity. However, the diversity of policies in this area, which vary according to the economic, financial, and social dynamics specific to each country, necessitates that research be conducted in local contexts.

In the first part of the study, sustainable development goals (SDG) and the place of the transportation sector are discussed. Electric vehicles (EVs) contribute significantly to SDG 7, which focuses on providing affordable, reliable, sustainable, and modern energy access for all. By transitioning from fossil fuel vehicles to EVs, we can significantly reduce our dependence on non-renewable energy (RE) sources. This transition is crucial because the transportation sector accounts for a large portion of energy consumption, and a significant portion of global energy consumption comes from non-renewable sources like oil. EVs that can operate using RE sources like solar or wind power offer a more sustainable alternative. EVs also serve as a tool for achieving SDG 13. EVs hold great potential for reducing greenhouse gas emissions from the transportation sector. The benefits of reducing greenhouse gases in the fight against climate change further increase the importance of these technologies. In this section, numerical data on greenhouse gas emissions in the world and Türkiye are presented. The second part of the study evaluates the impact of tax policies on this process based on the literature and sample countries.

As a country with high dependence on energy imports, Türkiye attaches particular importance to policies targeting alternative fuel vehicles. However, the limited number of studies on the effectiveness of the current fiscal regime and tax policies in the adoption of these technologies makes it difficult to understand the dynamics of demand for alternative fuel vehicles in Türkiye and to contribute to future policy development processes. In particular, the role of tax policies that directly affect vehicle prices, such as Türkiye's SCT requires a detailed examination. In this context, the study is based on the question: What is the impact of tax policies on increasing demand for electric and hybrid vehicles (HEVs) in Türkiye, and what policy recommendations can be developed to optimize these effects within the context of the current fiscal regime? In the last part of the study, the regulations regarding the tax legislation for these vehicles in Türkiye are presented, and the tax burden arising from MVT, SCT and VAT is evaluated with numerical data on cars sold and registered to traffic in terms of emission values and fuel types. On the basis of these data, the guiding role of tax policies in the demand for alternative fuel vehicles in Türkiye is tried to be revealed.

2. METHOD

This study uses a combination of qualitative analysis and benchmarking methods to assess the impact of tax policies on the demand for electric and light commercial vehicles in Türkiye. The study is based on an analysis of the legal arrangements made in Türkiye after 2000 within the framework of VAT, MVT and SCT. In this process, the relevant legislation and legal regulations have been analysed in detail. The development of the number of EVs and HEVs in Türkiye and the emission emissions of these vehicles were taken into consideration. In this context, numerical data obtained from official institutions, sector reports and relevant literature have been evaluated. Türkiye's tax regulations have been compared with similar regulations in other countries. The legislation, policy, and implementation information obtained from these sources has been linked to reveal their effects on the demand for alternative fuel vehicles. In this context, the suitability of tax policies for vehicle demand and emission reduction targets has been evaluated. In this process, international practices for limiting climate change have been taken into consideration. The effects of tax policies on EVs and HEVs are evaluated with qualitative analysis method for vehicle demand and emission emissions. In particular, the environmental and economic impacts of the regulations are focussed on. The basic criteria for these comparisons are tax burden, incentives, and emission reduction strategies. This methodology has enabled to evaluate the effects of Türkiye's current tax policies on the

demand for electric and light commercial vehicles from both local and global perspectives. The study also aims to develop recommendations for policy makers in the light of the findings.

3. EVs IN COMBATING CLIMATE CHANGE AND ENSURING SDG

Adoption of EVs is driven by government incentives and strategies aimed at achieving the SDGs (Tilly et al., 2025: 239). EVs are particularly relevant to SDG 7, which focuses on ensuring "access to affordable, reliable, sustainable, and modern energy for all" (United Nations, 2015). Alternative fuel vehicles contribute to this goal by reducing dependence on non-renewable energy sources and enhancing the sustainability of energy consumption.

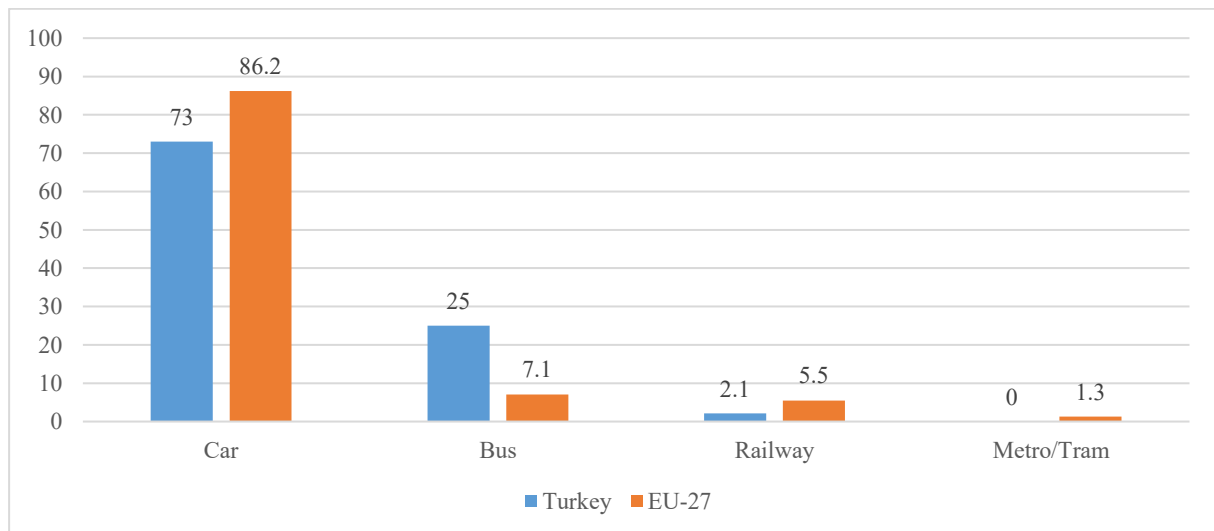
SDG 13, on the other hand, calls for "urgent action to combat climate change and its impacts" (United Nations, 2015). Conventional fuel vehicles emit significant amounts of greenhouse gases, while EVs have emerged as a strategic solution to achieve decarbonization, ecological balance, commercialization, and technological innovation in the transportation sector (Cao et al., 2021, p. 1). Carbon emissions have become a critical area of research in sustainable development (Lu et al., 2024, p. 2).

Human activities, particularly greenhouse gas emissions, contribute to global warming, with global surface temperatures continuing to rise. The primary causes include unsustainable energy and land use, as well as consumption and production patterns (IPCC, 2023, p. 42). In 2022, energy-related emissions worldwide increased by 0.8% compared to 2021, reaching their highest recorded level. Emissions from energy consumption accounted for 87% of total global emissions (Energy Institute, 2023, p. 4).

In Türkiye, energy-related emissions constituted 71.3% of total greenhouse gas emissions in CO₂ equivalents in 2021, representing a 188.4% increase compared to 1990. CO₂ emissions accounted for the largest share at 80.2% in 2021 (Turkish Statistical Institute, 2023). The share of the transportation sector in Türkiye's total CO₂ emissions was 20.2% in 2020. Additionally, 86.6% of CO₂ emissions from transportation originated from road transport, 9.2% from aviation, 3.4% from maritime transport, 0.3% from rail transport, and 0.4% from other forms of transportation (European Union, 2022, pp. 149, 153).

For instance, reducing air pollution and slowing energy consumption have become China's two most pressing issues in sustainable development. As a result, China promotes the use of EVs (Lu et al., 2024, p. 1). Similarly, the European Union's commitment to reducing greenhouse gas emissions and achieving climate action goals is closely linked to efforts to encourage the adoption of EVs (Fabana, 2025).

Figure 1. Modes of Transportation in Road Passenger Transport in Türkiye and EU-27 Countries (% , 2020)

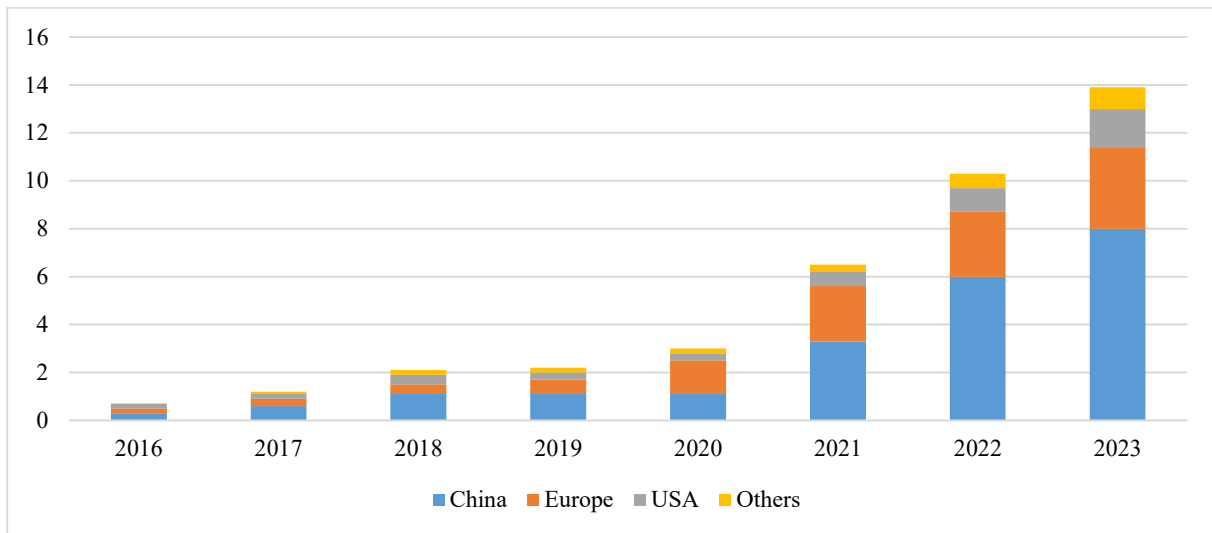


Source: Created from European Union, 2022, p. 49.

Figure 1 shows the percentage of Transportation Modes in Road Passenger Transport in Türkiye and EU-27 Countries in terms of kilometers per person. The share of automobiles is 73% in Türkiye and 86,2% in EU-27. After automobiles, buses take the second place in both Türkiye and EU-27. The share of buses is 25% in Türkiye and 7.1% in the EU-27, which is significantly higher in Türkiye than in the EU-27. While the share of rail transportation is 6,8% in EU-27, it is 2.1% in Türkiye, well behind the EU-27. Therefore, it can be said that a regulation on automobiles has the potential to have an impact on climate change.

However, even though EV is seen as a solution, it is important that the electricity used by the vehicles comes from RE sources. This is because driving your car can result in both GHG emissions from the exhaust of your car and emissions related to the production of the fuel used to power your car (U.S. Department of Energy, 2024). Therefore, although EV is also seen as a tool to combat climate change, it is important to obtain this energy from RE resources, especially electricity generation. In 2022, the share of RE resources (excluding hydropower) in global electricity generation is 14% (Energy Institute, 2023, p. 7). In Türkiye, this share is approximately 35% in 2021 (Dale, 2022, p. 51). RE-based electricity is more affordable than fossil fuel-based electricity in an increasing number of countries and accounts for more than 50% of electricity generation in around 30% of countries (IEA, 2023a, p. 11). However, another important issue here is the weight of electric fuel vehicles in total vehicles. In other words, how much of the electricity generated from RE is used in the transportation sector.

Figure 2. Electric Cars 2016-2023 (Million)



Source: (IEA 2023c).

According to the findings of a specific study conducted in China, the success of alternative fuel vehicles cannot be measured solely by their prevalence. Achieving the goal of reducing carbon emissions requires making the production of these vehicles less carbon-intensive (Lu et al., 2024, p. 13). Thus, EVs are only one part of this broader process. Transitioning to RE and promoting the widespread use of alternative fuel vehicles, alongside enhancing efficiency in production and consumption processes—particularly in the energy used by these vehicles—and ensuring the use of clean energy contribute significantly to the success of these policies.

EVs are considered one of the key technologies for decarbonizing road transport, which accounts for 15% (approximately one-sixth) of global emissions (IEA, 2023c). Increasing the share of renewable energy in total energy production, both globally and in Türkiye, stands out as a critical measure in addressing numerous challenges, particularly environmental issues. Alternative fuel vehicles are supported by public policies in many countries to reduce the transport sector's reliance on fossil fuels.

In 2022, the EVs market exceeded 10 million units. That year, 14% of all new cars sold globally were electric. China leads the market, accounting for approximately 60% of global EVs sales and owning more than half of all EVs. In Europe, the second-largest market, EVs sales grew by more than 15% in 2022, with one in five cars sold

being electric. In the United States, the third-largest market, sales increased by 55% in 2022, reaching an 8% market share (IEA, 2023b, p. 8).

While global demand for these vehicles continues to grow, Türkiye has lagged in the transition to EVs. This delay is primarily attributed to limited charging infrastructure and high import taxes (Statista, 2023).

Table 1. Motorized Land Vehicles in Türkiye

Year	Gasoline	(%)	Diesel	(%)	LPG	(%)	Hybrid ⁽²⁾	(%)	Electricity	(%)	Unknown ⁽³⁾	(%)
2010	3,191,964	42.3	1,381,631	18.3	2,900,034	38.4	-	-	-	-	71,233	0.9
2012	2,929,216	33.9	2,101,206	24.3	3,569,143	41.3	53	0.0	175	0.0	49,082	0.6
2014	2,855,078	29.0	2,882,885	29.2	4,076,730	41.4	113	0.0	412	0.0	42,697	0.4
2016	3,031,744	26.8	3,803,772	33.6	4,439,631	39.2	517	0.0	643	0.0	41,691	0.4
2018	3,089,626	24.9	4,568,665	36.8	4,695,717	37.9	4,415	0.0	952	0.0	38,815	0.3
2020	3,201,894	24.4	5,014,356	38.3	4,810,018	36.7	33,690	0.3	2,797	0.0	36,286	0.3
2022	3,817,104	26.8	5,261,876	36.9	5,005,563	35.1	134,662	0.9	14,552	0.1	35,595	0.2
2024 ¹	4,479,084	29.1	5,449,827	35.4	5,106,861	33.1	246,168	1.6	92,989	0.6	35,353	0.2

Source: Turkish Statistical Institute (2024), Distribution of Automobiles Registered in Traffic by Fuel Type.

Figures in the table may not add up to the total due to rounding. (1)Data are as of the end of February. (2)Includes hybrid, gasoline-electric and diesel-electric cars. (3) Unknown fuel type includes cars for which the fuel type was left blank or incorrect data was entered by mistake in the registration process.

According to Table 1, as of February 2024, 29.1% of registered motor vehicles in Türkiye are gasoline, 35.4% diesel, 33.1% LPG, 1.6% hybrid, 0.6% electric and 0.2% unknown. In Türkiye, while the share of the transportation sector in Final Energy Consumption in 2020 was 25.5%, this share is targeted to be 24.5% in 2035 and electrification is seen as a tool in the transportation sector (Republic of Türkiye Ministry of Energy and Natural Resources, 2022, p. 21, 22, 29).

4. EVs AND TAX POLICIES

Taxes on road vehicles are being progressively adjusted and implemented by many countries to influence consumer behavior and reduce transport externalities, in particular environmental and climate externalities. Energy and environmental considerations have led to a gradual adjustment of taxes on the purchase and registration of road vehicles, taking into account fuel efficiency or emissions of CO₂ and other pollutants. Taxes on road use were initially applied to finance infrastructure and later to manage externalities of road transport, including pollutant emissions (OECD, 2022). On the demand side, markets can be created through fiscal and non-fiscal incentives (Subekti et al., 2021, p. 21). Governments around the world intervene in this process through various instruments and taxes on fossil fuel vehicles are increased, taxes on alternative fuel vehicles are reduced and incentives are offered (Ustabaş, 2014, p. 289). These fiscal incentives aim to reduce the costs of purchasing and owning EVs (Yang et al. 2016, p. 9) and price differentials are reduced (Zarazua de Rubens et al. 2018, p. 505). Incentive policies are more likely to determine consumer acceptance of EVs than other factors (Li et al., 2020, p. 2, 3). Fiscal incentives for zero- and low-emission vehicles, combined with increased taxes on vehicles with higher CO₂ levels, have a noticeable effect on the emissions of new car fleets (Şenzybek and Mock, 2019b, p. 6).

Diamond (2006, p. 16) finds that effective tax incentives have positive effects on the purchase of HA in the US. Yuan et al. (2015, p. 303) argue that vehicle purchase tax incentives in China will directly contribute to the increase in alternative fuel vehicle sales. Bjerkan et al. (2016, p. 174, 175, 179) find that in Norway, the most prominent determinants of EV purchase are purchase taxes and VAT, and that these incentives are determinants for more than 80% of respondents. This is in line with previous research, which found that the strongest incentive to encourage the adoption of HAs is the upfront price discount. An adjustment in taxes to reduce purchasing costs appears to be the strongest incentive tool. Cengiz and Yavuz (2020, p. 103) conclude that the market for EVs is higher in countries where these vehicles are supported by the public at the purchase stage and at the same time driving costs are kept low.

The most prominent policies to increase the sale of EVs are subsidies, fiscal incentives and fuel cost savings. Direct subsidies are usually a one-time support for the purchase of EVs, while fiscal incentives take the form of discounts on purchase and/or annual tax. Fuel cost savings are also achieved through low levels of taxation. Among

fiscal incentives, there are four main categories of tax relief. These can be classified as VAT, one-time purchase and registration tax, annual circulation tax and company car tax (Mock and Yang, 2014, p. 6-9). Yang et al. (2016, p. 9) divide incentives for EVs into two broad categories: subsidies and rebates for vehicle tax. Subsidies tend to be more transparent and direct, while others can be much more variable and ambiguous, depending on both the tax system and vehicle characteristics. Hasan et al. (2020) list some of the policies that can be implemented to transition to low- or zero-emission vehicles as exemption of EVs from road user fees, income tax credit (ICT) rebates for vehicle purchase and registration tax.

Many European countries use various tax incentives to support fuel-efficient/low-emission vehicles such as EVs as part of the climate change mitigation goal (Yan, 2018, p. 61). European countries have taxed the purchase or ownership of passenger cars more comprehensively than most countries. Since 2006, they have changed their tax systems to more directly target CO₂ emission rates. These reforms were widely seen as complementary to CO₂ emission rate standards and aimed to encourage consumers to purchase vehicles that emit less CO₂ (Klier & Linn, 2015, p. 218). However, the financial incentives offered in Europe to encourage the market entry of EVs, including tax benefits and purchase incentives, vary from country to country. As of 2023, 20 EU member states offer incentives for the purchase of EVs. Belgium, Bulgaria, Denmark, Finland, Latvia, Slovakia and Sweden do not offer any purchase incentives, but they do offer tax reductions or exemptions. Estonia has introduced purchase incentives for battery-powered EVs, Denmark offers minimum-rate taxes on purchase and ownership, Bulgaria and Romania exempt EVs from ownership-related taxes. Austria offers VAT reduction and tax exemption for zero-emission cars used for commercial purposes, while in Croatia no SCT is applied to EVs. In Finland, zero-emission passenger cars are exempt from registration tax from October 1, 2021. Lithuania offers registration tax exemption for EVs at first registration, Denmark offers reduced rates (ACEA, 2023). In Italy, EVs are exempt from vehicle tax for five years from the date of first registration. Afterwards, they are taxed at an amount equal to one-quarter of gasoline vehicles (Hauff et al., 2018, p. 5). In 2021, when looking at the fuel and technology shares of newly sold passenger cars, the share of EVs in Norway is 64,5%, while the share of HEVs is 28.2%. In Iceland, the share of EVs is 26,9%, while the share of diesel vehicles is 15% and the share of gasoline vehicles is 18%. HEV accounts for the other market share. The market share of EVs is 19,8% in the Netherlands and 19% in Sweden (Tietge et al., 2022, p. 5). Moreover, following the Dieselgate scandal, most EU member states have been using vehicle tax systems to reduce NO_x emissions and imposing extra taxes on diesel vehicles, which emit an average of six times more NO_x emissions than gasoline vehicles (Şenzeybek & Mock, 2019a, 23). The majority of new vehicles registered in Sweden are company cars and can be used privately by the employees who drive them. The benefit of using a vehicle provided by the employer for private travel is, as a rule, taxable. The taxable value of environmentally friendly cars is set at a lower level, equal to the price of the nearest comparable car without environmental technology (Sweden Ministry of the Environment, 2020, p. 50). To subsidize vehicle purchases, China, Canada, France, Japan, Korea, Sweden, many US states and the UK provide rebates that effectively lower the purchase price of EVs. The US has implemented the ICT, which incentivizes the purchase of EVs by reducing the amount of tax owed. Vehicle tax rebates are also widely applied at the national level and can be either one-off at the time of purchase or as annual taxes paid by consumers (Yang et al. 2016, p. 9). The Thai government also appears to offer various fiscal incentives for EVs, including subsidies, SCT exemptions and import duty reductions. Governments in EMEs see EVs as an opportunity to reduce air pollution, mitigate climate impacts and reduce dependence on energy imports. The policies are usually in the form of tax exemptions for EVs, equipment and parts, as well as purchase incentives, mandates and deployment targets (IEA, 2023b, p. 31, 76, 94). In addition, not only central governments but also local governments and local incentives play an important role in achieving these goals. Therefore, coordination between central and local government policies is important. Incentives offered for renewable energy production, infrastructure, charging stations, and other issues, taking into account local needs, affect the success of the policies implemented (Lu et al., 202, p. 14).

It is clear that some supply-side factors for EVs will also affect market demand. Therefore, subsidy policies targeting the supply side for these instruments also have the potential to stimulate market demand for these products in the short run. While the literature indicates that demand-side fiscal subsidies play an important role in stimulating and steering the EV market (Gong et al., 2020, p. 1716, 1728; Subekti et al., 2021, p. 21), supply-side policies also have an impact on demand-side policies. Similar results are shown in the study by Javazi et al. (2025), which examines the effects of consumer-oriented intervention policies, production-oriented intervention policies, and charging service-oriented intervention policies on the demand for BEVs in terms of economic-environmental and socio-economic sustainability goals. This study shows that all three intervention policies benefit demand for

BEVs. Therefore, it is recommended that the government implement appropriate policies to promote the growth of sustainable transportation, taking into account current market conditions and budget constraints (Javazi et al., 2025, p. 1). Tilly et al. (2025) note that the electrification of transportation can make a meaningful contribution to climate action, infrastructure development, and the creation of sustainable cities and communities through integrated efforts. They emphasize the importance of a comprehensive process involving public, private, and civil society actors (Tilly et al., 2025, p. 250).

5. TAX POLICIES FOR EVS IN TÜRKİYE

5.1. MVT for EVs in Türkiye

In Türkiye, automobiles are taxed according to the “MVT Law No. 197” published in the Official Gazette dated 23.02.1963 and numbered 11342. In 2004, the net weight for automobiles was abandoned and MVT tariffs were determined according to the cylinder volume (Kabakçı Karadeniz, 2018, p. 195). “Law No. 7061” published in O.G. dated 05.12.2017 and numbered 30261, as of 01.01.2018, the value of the vehicle has started to be applied as a third criterion in addition to the engine cylinder volume and vehicle age in the calculation of the MVT of registered and registered passenger cars (Somuncu, 2022, p. 39). Article 5 of the MVT Law No. 197 stipulates that “Automobiles, cap and trucks, off-road vehicles and similar vehicles and motorcycles are taxed according to the tariff numbered (I)”.

Table 2. Tariff No. (I) as of 1/1/2024

Engine Cylinder Volume (cm³)	Vehicle Value (TL)	Line Number	Age of Vehicles and Annual Tax Amount to be Paid (TL)				
			1 - 3 years	4 - 6 years	7 - 11 years	12 - 15 years	Age 16 and over
1- Automobiles, capicabs, off-road vehicles and similar vehicles							
1300 cm³ and below	Not exceeding 180,600	1	3,359	2,343	1,308	987	347
	Exceeding 180,600 but not exceeding 316,400	2	3,692	2,576	1,437	1,088	383
	Exceeding 316,400	3	4,032	2,809	1,573	1,188	413
1301 - up to 1600 cm³	Not exceeding 180,600	4	5,851	4,387	2,544	1,798	690
	Exceeding 180,600 but not exceeding 316,400	5	6,439	4,828	2,801	1,972	754
	Exceeding 316,400	6	7,026	5,265	3,050	2,153	823
1601 - up to 1800 cm³	Not exceeding 452,800	7	11,374	8,894	5,227	3,189	1,235
	Exceeding 452,800	8	12,413	9,697	5,710	3,484	1,348
1801 – up to 2000 cm³	Not exceeding 452,800	9	17,920	13,800	8,111	4,828	1,898
	Exceeding 452,800	10	19,553	15,061	8,848	5,265	2,072
2001 – up to 2500 cm³	Not exceeding 565,500	11	26,885	19,517	12,193	7,282	2,880
	Exceeding 565,500	12	29,332	21,290	13,299	7,948	3,142
2501 – up to 3000 cm³	Not exceeding 1,131,800	13	37,485	32,615	20,373	10,957	4,016
	Exceeding 1,131,800	14	40,898	35,575	22,227	11,955	4,383
3001 – up to 3500 cm³	Not exceeding 1,131,800	15	57,093	51,374	30,944	15,446	5,657
	Exceeding 1,131,800	16	62,289	56,039	33,756	16,845	6,179
3501 – up to 4000 cm³	Not exceeding 1,811,800	17	89,767	77,517	45,649	20,373	8,111
	Exceeding 1,811,800	18	97,937	84,560	49,807	22,227	8,848
4001 cm³ and above	Not exceeding 2,151,400	19	146,932	110,177	65,252	29,326	11,374
	Exceeding 2,151,400	20	160,285	120,196	71,186	31,991	12,413

Source: (Directorate of Revenue Administration, 2024a).

The MVT to be paid by vehicle owners with large engine cylinder volumes is higher than that of smaller vehicles. But the tax rate calculated inversely proportional to the age of the vehicle is among the reasons for higher

emissions. Moreover, while different fuel types emit different levels of environmental pollution, fuel type differences are not taken into account except for EVs (Kabakçı Karadeniz, 2018, p. 199). There is no difference in the annual tax for diesel, gasoline or HA. It is seen that there is no regulation on the calculation of the MVT of HA in the MVT Law No. 197. The first regulation on EVs was made with the “Law No. 7103 on Amendments to Tax Laws and Certain Decree Laws” published in the Official Gazette No. 30373 (2nd Repeated) on 27/3/2018. Additional paragraph added to Article 5 of the MTV Law with this regulation: 21/3/2018-7103/18 Art., the tax rates to be levied on vehicles with electric motors only, which are included in the section titled “1 - Automobiles, coupes, off-road vehicles and the like” of the tariff numbered (I), are shown in Table 3.

Table 3. MVT Table for Automobiles, Land Vehicles, Land Vehicles and Similar Vehicles with Electric Motors Only

Engine power;

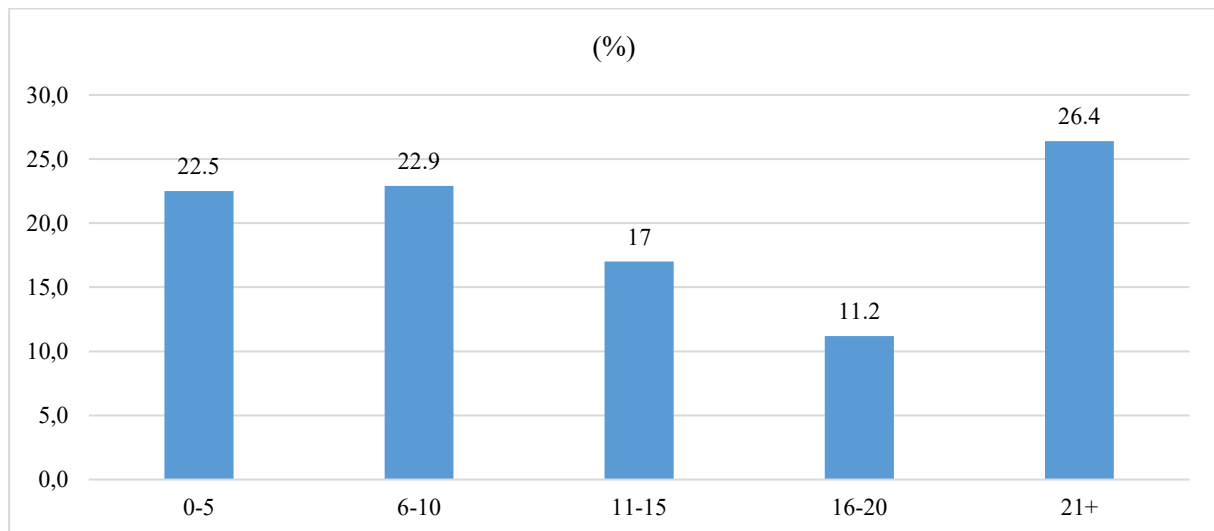
- a) Those not exceeding 70 kW in line numbers 1, 2, 3,
- b) Those exceeding 70 kW but not exceeding 85 kW in line numbers 4, 5, 6,
- c) Those exceeding 85 kW but not exceeding 105 kW in line numbers 7, 8,
- d) Those exceeding 105 kW but not exceeding 120 kW in line numbers 9, 10,
- e) Those exceeding 120 kW but not exceeding 150 kW are in line numbers 11, 12,
- f) Those exceeding 150 kW but not exceeding 180 kW are in line numbers 13, 14,
- g) Those exceeding 180 kW but not exceeding 210 kW are in line numbers 15, 16,
- h) Those exceeding 210 kW but not exceeding 240 kW are in line numbers 17, 18,
- ı) Those exceeding 240 kW are in line numbers 19, 20,

The tax amounts corresponding to the vehicle values and age are taxed at the rate of 25% of the tax amounts.

Source: (Law No. 197, 1963, Article 5, Additional paragraph: 21/3/2018-7103/18 Art)

Vehicles with only electric motors will be taxed at 25 percent of the tax amounts corresponding to the vehicle values and age of cars with internal combustion engines in tariff I. Keeping the MTV lower for older cars alleviates the fiscal pressure on second-hand car owners when compared with the new car buyers, does not provide any fiscal incentive for low-emission cars, and encourages car owners to keep their vehicles for a long time, even if they produce high emissions. Passenger cars older than 16 years old, which contribute less than 10% to MVT revenue, are responsible for around 40% of total CO₂ emissions and 67% of total NO_x emissions in Türkiye (Şenzybek & Mock, 2019a, p. 23).

Figure 3. Distribution of Registered Vehicles by Age Group in Türkiye in 2023 (%)



Source: (Automotive Authorised Distributors Association, 2023).

In 2023, 54.6% of registered cars are older than 10 years old, 22.5% are up to 5 years old and 22.9% are between 6 and 10 years old. According to Table 2, an HEV with an engine displacement of 1300 cm³ and below, with a vehicle value exceeding 316,400 and between 1 and 3 years old, pays 4,032 TRY MVT in 2024, while a car with an internal combustion engine with the same engine displacement, with a vehicle value exceeding 316,400 and older than 16 years old, pays 413 TRY MVT, and a car with an internal combustion engine with an engine displacement of 2501 - 3000 cm³, with a vehicle value not exceeding 1,131,800 and older than 16 years old, pays 4,016 TRY MVT.

5.2. SCT for EVs in Türkiye

“SCT Law No. 4760” was published in the O.G. dated 12/06/2002 and entered into force on 01/08/2002, the goods or groups of goods in the lists annexed to the law are subject to SCT for one time only, according to Article 1 (b), “the first acquisition of the goods in the list (II) that are subject to recording and registration” (c), “the goods in the list (II) that are not subject to recording and registration”. Only vehicles with electric motors and vehicles with electric motors are included in the list numbered II. Regulations for vehicles with electric motor (HV):

- With the “Law No. 6745 on Supporting Investments on Project Basis and Amendments to Certain Laws and Decree Laws” published in the Official Gazette No. 29824 dated 07.09.2016, the SCT Law No. 4760 was amended. With this regulation, an arrangement has been made in the list numbered II attached to the SCT Law regarding HEV, and it has been decided to collect SCT at the rate of 90% for those with an electric motor, whose electric motor power exceeds 50 kW and whose engine cylinder volume does not exceed 1800 cm³, 90% for others, 145% for those whose electric motor power exceeds 100 kW and whose engine cylinder volume does not exceed 2500 cm³, and 145% for others.
- With the “Decree of the Council of Ministers No. 2016/9256” published in the Official Gazette on 05.10.2016, the rate of 90% was reduced to 45% for those whose electric motor power exceeds 50 kW and whose engine cylinder volume does not exceed 1800 cm³, and the rate of 145% was reduced to 90% for those whose electric motor power exceeds 100 kW and whose engine cylinder volume does not exceed 2500 cm³.
- The “Decree of the Council of Ministers No. 2016/9542” published in the Official Gazette No. 29899 dated 25.11.2016, the tax-free price of the vehicle is included in the determination of the SCT rate. Electric motor power exceeding 50 KW and engine cylinder volume not exceeding 1800 cm³ is determined as 60%, 45% for those whose tax base does not exceed 50,000 TRY, and 50% for those whose tax base exceeds 50,000 TRY but does not exceed 80,000 TRY. The tax base is determined as 110% for those whose electric motor power exceeds 100 KW and whose engine cylinder volume does not exceed 2500 cm³. For those whose electric motor power exceeds 100 KW and whose engine cylinder volume is between 2000 cm³ and 2500 cm³, the tax base is determined as 100% for those whose tax base does not exceed 100,000 TL and 160% for others.

In 2018, while the rates remained the same in the changes made on 01.01.2018, 27.03.2018, 24.09.2018 for the vehicles in the list numbered II, the bases were increased. With the “Presidential Decree No. 287” published in the repeated R.G. dated October 31, 2018 and numbered 30581, the SCT rate of HAs was reduced. The rate is 30% for those whose electric motor power exceeds 50 kW and whose engine cylinder volume does not exceed 1800 cm³, for those whose tax base does not exceed 85,000 TRY, 35% for those whose tax base exceeds 85,000 TRY but does not exceed 135,000 TRY and 60% for others. For those whose electric motor power exceeds 100 kW and whose engine cylinder volume does not exceed 2500 cm³, the tax base is 100% for those whose tax base does not exceed 170,000 TRY and 110% for others.

- On 01.07.2019, the rates for those whose electric motor power exceeds 50 kW and whose engine cylinder volume does not exceed 1800 cm³ in the list numbered II were increased from 30% to 45% for those whose tax base does not exceed 85,000 TRY, and from 35% to 50% for those whose tax base exceeds 85,000 TRY but does not exceed 135,000 TRY.
- With the “Presidential Decree No. 2912” published in the Official Gazette No. 31229 on 30.08.2020, the rate was increased from 60% to 80% for those whose electric motor power exceeds 50 kW and whose engine cylinder volume does not exceed 1800 cm³ and whose tax base exceeds 135,000 TRY. For those whose electric motor power exceeds 100 kW and whose engine cylinder volume does not exceed 2500 cm³, the rate was increased from 100% to 130% for those whose tax base does not exceed 170,000 TRY and from 110% to 150% for others. For the others, the rate was increased from 160% to 220%.

- With the “Presidential Decree No. 4373” published in the Official Gazette No. 31567 dated 13.08.2021, the “Presidential Decree No. 5096” published in the Official Gazette No. 31718 dated 13.01.2022 and the “Presidential Decree No. 6417” published in the Official Gazette No. 32023 dated 24.10.2022, the tax bases were increased for those whose electric motor power exceeds 50 kW and engine cylinder volume does not exceed 1800 cm³.

The first regulation regarding the SCT on EVs was published in the Official Gazette dated 25.02.2011 and numbered 27857 (2nd Repeated) with the “Decree of the Council of Ministers numbered 2011/1435” and with the addition made in the list numbered II attached to the SCT Law, EVs were included in the scope of SCT.

- With the regulation dated 25.02.2011, only those with electric motors, 3% for those with an engine power not exceeding 85 kW, 7% for those with an engine power exceeding 85 kW but not exceeding 120 kW, and 15% for those with an engine power exceeding 120 kW. With the “Presidential Decree No. 3471” published in the Official Gazette dated 02.02.2021 and numbered 31383, the rate of 3% was increased to 10%, the rate of 7% was increased to 25% and the rate of 15% was increased to 60%.
- With the regulation made in the “Law No. 7417 on the Amendment of the Civil Servants Law No. 7417 and Certain Laws and the Decree Law No. 375” published in the Official Gazette No. 31887 on 05.07.2022, the SCT regulation regarding EAs has been amended in the tax base and engine power. It is stated in the relevant tariff that those whose engine power does not exceed 160 kW and whose tax base does not exceed 700,000 TRY will be taxed at a rate of 10% and the others at a rate of 40%; those whose engine power exceeds 160 kW and whose tax base does not exceed 750,000 TRY will be taxed at a rate of 50% and the others at a rate of 60%.
- In the “Presidential Decree No. 6885” published in the Official Gazette dated 03.03.2023 and numbered 32121, it is 10% for those whose engine power does not exceed 160 kW and whose tax base does not exceed 1,250,000 TRY, and 40% for the others. For those whose engine power exceeds 160 kW, the tax base is 50% for those who do not exceed 1,350,000 TRY and 60% for others. With the “Presidential Decree No. 7803” published in the Official Gazette dated 18.11.2023 and numbered 32373, the tax base of 1,250,000 TRY was updated as 1,450,000 TRY.

Currently, the SCT system for passenger cars is based solely on the engine displacement and pre-tax price of the vehicle. For HEVs and EVs, the power of the electric motor is also taken into account, in some cases associated with reduced SCT rates. For vehicles with 1600 cc or more internal combustion engines, SCT is at least equal to the net price of the vehicle. This creates a strong incentive for consumers to choose vehicles with smaller engine displacement, if not lower engine power (Şenzeybek & Mock, 2019b, p. 3).

Table 4. Turkish Automobile Market Numbers, Shares and Changes by Engine Volume

Engine Volume	Engine Type	January-December 2022 Quantity	January-December 2022 Share	January-December 2023 Quantity	January-December 2023 Share	Change
≤ 1600cc	G/D	515,340	87.0%	781,535	80.8%	51.7%
1601cc - ≤ 2000cc	G/D	3,861	0.7%	6,353	0.7%	64.5%
≥ 2001cc	G/D	1,339	0.2%	2,470	0.3%	84.5%
G/D Subtotal		520,540	87.8%	790,358	81.7%	51.8%
≤ 1600cc	Hybrid	40,760	6.9%	67,928	7.0%	66.7%
1601cc - ≤ 1800cc (≤ 50KW)	Hybrid	0	0.0%	0	0.0%	
1601cc - ≤ 1800cc (> 50KW)	Hybrid	11,131	1.9%	17,850	1.8%	60.4%
1801cc - ≤ 2000cc	Hybrid	11,715	2.0%	17,488	1.8%	49.3%
2001cc - ≤ 2500cc (≤ 100KW)	Hybrid	349	0.1%	271	0.0%	-22.3%
2001cc - ≤ 2500cc (> 100KW)	Hybrid	34	0.0%	436	0.0%	1182.4%
> 2500cc	Hybrid	398	0.1%	831	0.1%	108.8%
Hybrid Subtotal		64,387	10.9%	104,804	10.8%	62.8%
≤ 160 kW	Electricity	2,965	0.5%	52,244	5.4%	1662.0%
> 160 kW	Electricity	4,768	0.8%	19,935	2.1%	318.1%
Electricity Subtotal		7,733	1.3%	72,179	7.5%	833.4%
Total		592,660	100.0%	967,341	100.0%	63.2%

Source: (Erce, 2024, p. 14).

Table 4 shows data for 2022 and 2023 for car sales by engine displacement. In 2023, 81.7% of the cars sold are diesel and gasoline cars, 10.8% are HEV and 7.5% are EV. While the increase in diesel and gasoline car sales compared to 2022 was 51.8%, HEV and EV sales increased by 62.8% and 833.4%, respectively. In terms of engine displacement, the share of vehicles below 1600 cc in total vehicle sales is 87,8% in 2023. Of this share, 80,8% is composed of gasoline and diesel and 7% is HEV. In 2023, the largest share in total vehicle sales will be composed of vehicles below 1600 cc. The share of vehicles above 1600 cc is 1% for gasoline and diesel fueled vehicles, while HEV accounts for 3,8%. In the same period, 5.4% of the total sales of EVs was composed of cars below 160 kW, while 2.1% was composed of cars above 160 kW. Compared to the previous year, the share of EVs in automobile sales in 2023 increased by 1662% for cars below 160 kW and by 318,1% for cars above 160 kW. Ökde (2022, p. 432) states that the number of EVs sold in Türkiye is quite low compared to the EU, and when the ratio of newly registered vehicles to all vehicles is compared, this ratio is approximately 35 times higher in the EU than in Türkiye.

Table 5. Turkish Automobile Market Numbers, Shares and Changes by Emission Values

CO ₂ Average Emission Values (g/km)	January-December 2022		January-December 2023		Change
	Quantity	Share	Quantity	Share	
< 100	31,572	5.3%	100,161	10.4%	217.2%
≥ 100 - < 120	229,587	38.7%	336,933	34.8%	46.8%
≥ 120 - < 140	160,443	27.1%	216,183	22.3%	34.7%
≥ 140 - < 160	145,935	24.6%	217,468	22.5%	49.0%
≥ 160	25,123	4.2%	96,596	10.0%	284.5%
Total	592,660	100.0%	967,341	100.0%	63.2%

Source: (Erce, 2024, p. 15).

Table 5 presents data on automobile sales in 2022 and 2023 according to emission emissions. The share of 100-120 g/km cars in total sales decreased from 38,7% in 2022 to 34.8% in 2023. The share of cars with emissions below 100 g/km increased from 5,3% to 10.4% in 2022, while the share of cars with emissions above 160 g/km increased from 4.2% to 10%. While the share of sales of vehicles with emissions below 100 g/km and above 160 g/km in total vehicle sales increased, the share of vehicles with other emission levels decreased.

Table 6. SCT Regulation for Passenger Cars in Türkiye

Electric Cars	Hybrid Cars	Cars with Internal Combustion Engine
Engine power not exceeding 160 kW -Those whose SCT base does not exceed 1,450,000 TRY 10% - Others 40%	Those with an electric motor, whose electric motor power exceeds 50 kW and whose engine cylinder volume does not exceed 1800 cm ³ - Those whose SCT base does not exceed 228,000 TRY 45% - Those whose SCT base exceeds 228,000 TRY but does not exceed 350,000 TRY 50% - Others 80%	Engine cylinder volume not exceeding 1600 cm ³ -Those whose SCT base does not exceed 184,000 TRY 45% -Those whose excise tax base exceeds 184,000 TRY but does not exceed 220,000 TRY 50% -Those whose excise tax base exceeds 220,000 TRY but does not exceed 250,000 TRY 60% -Those whose excise tax base exceeds 250,000 TRY but does not exceed 280,000 TRY 70% -Others 80%
Engine power exceeding 160 kW -Those whose SCT base does not exceed 1,350,000 TRY 50% -Others 60%	Those with an electric motor, whose electric motor power exceeds 100 kW and whose engine cylinder volume does not exceed 2500 cm ³ -Those whose SCT base does not exceed 170,000 TRY 130% -Others 150% Others 220%	Engine cylinder volume exceeding 1600 cm ³ but not exceeding 2000 cm ³ - Those whose SCT base does not exceed 170,000 TRY 130% - Others 150%
	¹ The vehicle, which also has an electric motor, is an externally rechargeable vehicle with carbon dioxide emissions of less than 25 grams per weighted combined kilometer and an equivalent electric range of 70 kilometers or more. -Engine cylinder volume not exceeding 1600 cm ³ -- Those whose SCT base does not exceed 1,350,000 TRY 30%	Engine cylinder volume exceeding 2000 cm ³ -Others 220%

Electric Cars	Hybrid Cars	Cars with Internal Combustion Engine
	-- Others 60%	
	- Engine cylinder volume exceeding 1600 cm ³ but not exceeding 1800 cm ³	
	--Tax base not exceeding 1,350,000 TRY 80%	

Source: (Directorate of Revenue Administration, 2024b; Legislation, Regulations in List II dated 18.11.2023).

¹ Directorate of Revenue Administration (2024c), Regulation added with the list numbered II dated 26.07.2024.

Table 6 shows the regulations for passenger cars in force as of 18.11.2023. Looking at the regulations for HEVs, it is quite difficult to say that these vehicles have a tax advantage over vehicles with internal combustion engines. Only the tax bases are set higher. When compared to EVs, it is seen that the tax rates for HEVs are high. As of 2023, according to Table 4 and Table 6, 82% of the HEVs sold are subject to an SCT rate ranging between 45%, 50% and 80%. In the same period, 17% of these vehicles sold were taxed at 130% and 150%, while about 1% were taxed at 220%. While 98.9% of the internal combustion vehicles sold were subject to SCT at rates ranging between 45% and 80%, 0.8% of these vehicles were subject to 130% and 150%, and 0.3% were subject to 220%. Therefore, it is very difficult to say that the SCT regulation for HOs also constitutes a tax incentive for these vehicles. With the “Law No. 7521 on the Amendment of Certain Laws and Decree Laws” published in the Official Gazette dated 26.07.2024 and numbered 32613, the SCT base of those that can be charged from outside the vehicle, whose carbon dioxide emission per weighted combined kilometer is less than 25 grams, whose range can be covered with equivalent electrical energy is 70 km or more, and whose engine cylinder volume does not exceed 1600 cm³ is 1.350,000 TRY and 60% for the others, and 70% for those whose engine cylinder volume exceeds 1600 cm³ but does not exceed 1800 cm³ and whose tax base does not exceed 1,350,000 TRY. While it is a positive arrangement that both the emission emissions and the range of these vehicles are taken into consideration, it is still seen that this incentive will only be encouraging for certain model HEVs.

When Table 4 and Table 6 are evaluated, it is seen that 72,4% of EVs sold in 2023 are subject to SCT at a rate of 10% and 40% depending on the matrix, while 27,6% of these vehicles are subject to SCT at a rate of 50% and 60% depending on the matrix. Although these rates are set at a lower level compared to other vehicles, even an EV with an engine power of no more than 160 kW and a tax base of no more than 1,450,000 TRY is subject to a tax burden of approximately one third of the tax-free price of the vehicle with SCT and VAT. Similarly, Şenzybek and Mock (2019a) argue that while the current tax incentives in Türkiye provide a benefit for some specific HEV and EV models, they are not sufficient to encourage significant uptake.

5.3. VAT on EVs in Türkiye

“VAT Law No. 3065” does not have a specific regulation for EVs and HEVs. With the “Presidential Decree No. 7346” published in the Official Gazette dated July 7, 2023 and numbered 32241, the VAT rate was increased from 18% to 20%. The VAT base for EVs and HEVs is the amount calculated by adding the SCT amount to the net price of the vehicle. Therefore, the tax burden on these vehicles has increased with the latest regulation.

Table 7. BMW IX1 E Drive M Sport Sales Price and Minimum Wage in Some Countries

Country	Sale Price(Euro)	Sale Price(TRY)	Minimum Wage(Euro)
Türkiye	78,088	2,728,700	612,58
Luxembourg	48,298	1,687,705	2,570,93
France	50,800	1,775,134	1,766.92
Germany	47,900	1,673,798	2,054

Source: (BMW, 2024a; BMW, 2024b; BMW, 2024c; BMW, 2024d).

Table 7 shows the selling price of BMW IX Drive M Sport model EV in Türkiye and the sample countries on 27.03.2024. The vehicle in question is subject to 40% SCT and 20% VAT. The tax burden of SCT and VAT on the vehicle is 68%. The price difference between Türkiye and other countries is largely due to the tax burden. Moreover, the same vehicle, with an engine power of 150 kW, is subject to 25% of the MVT tax for cars with an engine displacement of 2001 - 2500 cm³. Since the tax-free sale price of the vehicle exceeds 565,500 TRY, the tax amount is 25% of 29,332 TRY as of 2024. This is a higher amount than the MVT on gasoline or diesel fueled 1-3 year old vehicles with engine displacement up to 1601 - 1800 cm³. Moreover, the minimum wage in France in the

first half of 2024 is 1,766.92 Euros, 2,054 Euros in Germany, 2,570.93 Euros in Luxembourg and 612,58 Euros in Türkiye (Eurostat, 2024). The tax burden on alternative fuel vehicles in Türkiye is high compared to other countries and this has an impact on the demand for these vehicles.

6. CONCLUSION

SDGs have become a significant focal point in the design of government policies, particularly in recent years. Incentives and policies introduced by governments are considered key drivers in achieving these goals. Alternative fuel vehicles, in particular, have the potential to contribute significantly to the attainment of SDG 7 and SDG 13. On the one hand, reducing dependence on non-renewable energy sources will enhance the sustainability of energy consumption. On the other hand, decarbonization in the transportation sector will support efforts to combat climate change.

In the fight against climate change, governments offer various incentives to drive consumer demand for alternative fuel vehicles. On the one hand, a taxation system based on CO₂ emissions is designed, on the other hand, discounts and exemptions are offered on vehicle purchases, annual taxes, vehicle registration and ownership taxes as well as import duties. The most commonly used incentives include tax exemptions and reductions on vehicle purchase and vehicle registration, SCT, VAT, ICT, import taxes, and regulations on company car taxation. The literature suggests that demand-side fiscal subsidies play an important role in stimulating and driving the EV market. In 2022, 14% of all new cars sold in the world and one out of every five vehicles sold in EU countries will be electric. In Türkiye, 10.8% and 7.5% of cars sold in 2023 were HEVs and EVs, respectively, and the share of EVs in registered vehicles was 0.6% and HEVs 1.6% as of end-February 2024.

In Türkiye, tax regulations for EVs are seen in VAT and SCT related to the purchase of automobiles and in MTV related to ownership. With Law No. 7061, as of 01.01.2018, the MTV of registered and registered passenger cars is determined based on the value of the vehicle in addition to the engine cylinder volume and vehicle age. While vehicles with higher engine displacement have higher emissions, the lower MTV for older cars in Türkiye encourages long-term retention of vehicles, even if they produce high emissions. In Türkiye, 54.6% of registered vehicles are older than 10 years old. As of 2023, 80.8% of the vehicles sold are diesel and gasoline vehicles with engine displacement below 1600 cc and 54.8% are vehicles with emissions above 120 g/km. There is no incentive for the calculation of the MVT of HEVs in the MTV Law No. 197. The first regulation for EVs was made with the "Law No. 7103 on the Amendment of Tax Laws and Certain Decree Laws" published in the Official Gazette dated 27.3.2018 and numbered 30373 (2nd Repeated). EVs will be taxed at the rate of 25 percent of the tax amounts corresponding to the vehicle values and age of automobiles with internal combustion engines included in the MTV annexed Tariff No. I. It is observed that the MVT has only a partial incentive for EVs.

The first SCT regulation for HEVs in Türkiye was made by Law No. 6745 published in the Official Gazette No. 29824 on 07.09.2016. It is observed that the number of regulations is quite high, the frequent amendments exhibit a complex structure, and it is necessary to ensure the simplicity of the legislation. According to the regulations in List II dated 18.11.2023, the SCT rate applied to HEVs varies between 45% and 220%. As of 2023, 82% of the HEVs sold are subject to SCT at 45%, 50% and 80%. In the same period, 17% of HEVs sold are taxed at 130% and 150%, while around 1% are taxed at 220%. While 98.9% of the internal combustion vehicles sold are subject to SCT at rates ranging between 45% and 80%, 0.8% of these vehicles are subject to SCT at rates of 130% and 150%, and 0.3% of these vehicles are subject to SCT at 220%. When the rates and bases are analyzed, it can be said that there is an attempt to reduce the tax rate by keeping the bases higher for HEVs compared to vehicles with internal combustion engines, but there is not a sufficient regulation in terms of rates to encourage HEVs. With the amendment dated 26.07.2024, SCT incentive for HEVs that can only be charged externally was put into effect. The SCT rate for these vehicles varies between 30% and 80%. While it is a positive regulation to take into account the emission of these vehicles, it is still considered that this incentive will only be encouraging for certain models of HEVs. Moreover, apart from this regulation, there is no emission-based SCT system for both EV and HEV.

With the regulation dated 25.02.2011, only vehicles with electric motors were included in the scope of SCT for the first time. With this regulation, the highest rate to be applied for EVs is 15%. This rate was increased to 60% with the regulation dated 02.02.2021 and the lowest rate was increased from 3% to 10% with the same regulation. The increase in SCT rates for EVs has weakened the incentive for demand for these vehicles. With the base adjustment made on 18.11.2023 for EVs, the base to which the 10% rate will be applied for those with an engine power not exceeding 160 kW was increased to TRY 1,450,000, aiming to allow more vehicles to benefit from this

tax rate. However, for those whose engine power does not exceed 160 kW, the rate is applied as 40% depending on the base, and for those whose engine power exceeds 160 kW, the rate is applied as 50% and 60% depending on the base. In 2024, no changes were made regarding the tax base and rates. While 72,4% of the vehicles sold in 2023 were subject to SCT at the rates of 10% and 40% depending on the base, 27.6% of these vehicles were subject to SCT at the rates of 50% and 60% depending on the base. Although these rates are set at lower levels compared to other vehicles, these rates remain low compared to the incentives in other countries.

According to VAT Law No. 3065, there is no special regulation for EVs and HEVs. With the Presidential Decree No. 7346 published in the Official Gazette No. 32241 dated July 7, 2023, the VAT rate was increased from 18% to 20%. The VAT base for these vehicles is the amount found by adding the SCT amount to the net price of the vehicle, and with this regulation, the tax burden on alternative fuel vehicles has been further increased. In addition, although EVs are seen as a solution to fight against climate change, the total share of vehicles and the use of electricity from RE sources is of great importance. Therefore, there is still a need to regulate these taxes on the basis of taxation based on CO₂ emissions within the framework of limiting climate change.

This study examines the impact of tax policies implemented for EVs and BEVs in Türkiye on vehicle demand and emission reduction targets. The findings indicate that while Türkiye's regulatory framework promotes the adoption of alternative fuel vehicles, its overall effectiveness remains limited. Key factors constraining the success of these policies include high SCT rates, a complex legislative framework, and incentives that are narrowly targeted toward a limited range of vehicle models. The Turkish case provides valuable insights for developing economies in designing policies to facilitate the adoption of alternative fuel vehicles.

In a global context, Türkiye's current incentive system is less comprehensive and effective compared to leading markets such as the European Union and China. Notably, China's emphasis on low-carbon production processes and the European Union's emission-based incentive mechanisms represent successful models that Türkiye could incorporate into its policy-making strategies. As a developing economy, Türkiye offers a unique reference point for balancing economic constraints with environmental objectives in policy design. The long-term policy implications for decarbonizing Türkiye's transportation sector can be outlined as follows:

- Adoption of an Emission-Based Taxation System
- Expansion of Charging Infrastructure
- Promotion of Local Production and Renewable Energy Use
- Streamlining and Stabilizing Legislation
- Implementation of Inclusive Incentive Policies

Türkiye's efforts to decarbonize its transportation sector have the potential to contribute not only to national objectives but also to global emission reduction targets. Thus, it is imperative to develop long-term, holistic policies that align with the principles of sustainable development. Such policies would not only address domestic challenges but also position Türkiye as a model for other developing economies pursuing similar objectives.

This study, which examines the impact of tax policies on the demand for EVs and HEVs in Türkiye, has some limitations in terms of its scope and methodology. First, the data set used is limited to a specific time period. The lack of an econometric model in the study may make it difficult to generalize the results to other situations or regions. The absence of quantitative analyses may prevent the existing data sets from being evaluated comprehensively. Despite these limitations, the study's findings provide important insights for shaping sustainable transportation policies in Türkiye. Future research could develop models that make the findings more useful for policymakers or implementers.

DECLARATION OF THE AUTHOR

Declaration of Contribution Rate: The author contributes the study on her own.

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