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Abstract

The European Union (EU) views the promotion of electric transportation as a strategic objective. This objective is connected to a number of other initiatives, including the Clean Transport Systems Initiative, the Europe 2020 Strategy, and the Horizon 2020 agenda. In the year 2015, the implementation of the Jedlik Ányos Plan (Hereafter referred to as the Plan) in Hungary served to expedite the spread of electric vehicles. Electric cars are substantially quieter than conventional automobiles, which means that they contribute less to the pollution of the environment caused by traffic noise.

Keywords: electric mobility, range extender, electric vehicle, charging station, and rapid charging

1. Introduction

The use of fossil fuels by motor vehicles accounts for two-thirds of the total worldwide consumption. In addition, transportation is the industry that produces the most carbon dioxide emissions, second only to the creation of electric power. Additionally, it is an essential sector for accomplishing the objectives of climate policy in the European Union as well as the goals that were established in the Paris Agreement^{1,2}. As a result of the European Union's transportation policy, the pollution that is created by transportation has decreased over the last several decades, while environmentally friendly transportation technology have evolved. Efforts to reform this sector involve the use of solutions that go beyond the utilization of fossil fuels. E-mobility, also known as electromobility, is the term we use to describe the drive toward replacing motor vehicles that run on fossil fuels with electric ones. Electromobility is a field that is undergoing fast growth and has emerged as a symbol of environmental awareness, climate protection, and sustainable development.⁵ It is also capable of assisting in the accomplishment of the goals that the EU has set for the year 2020 in terms of energy and climate.⁶

Following the climate conference that took place in Paris in 2015, the United Nations Climate Change World Report 2018 provides guidance on how to maintain the increase in temperature below 1.5 degrees Celsius. The use of alternative energy sources and the transition to electric transportation are both included in this. In 2019, Gutassy and Gutassy, pages 9–10.

3) Purely electrically propelled vehicles or combustion motor vehicles that are capable of running 25 or 50 kilometers in pure electric operation are included in the category of "electric" vehicles. Electric vehicles are also included in this category. The green license plate is one that they are permitted to use. (The Government law,

paragraph 60 of 326/2011 (XII.28) for the year 2011).

4 If we want to make the car more friendly to the environment, we need to lower the amount of energy that it consumes.

Objective 7 of the new 2030 Agenda for Sustainable Development is to guarantee that everyone has access to energy that is both sustainable and contemporary. This includes the growth of the infrastructure that is required to meet this objective.

The emergence of the world's first electric vehicle, which was constructed by the Hungarian engineer Jedlik Ányos in the year 1828, might be considered the birth of the concept of electromobility. It was not a single individual who came up with the idea for the electric motor vehicle; rather, it was the result of a number of groundbreaking breakthroughs that came about over time.⁸ When it comes to electric propulsion, manufacturers often mix it with other types of propulsion, such as hybrid cars, plug-in hybrids, range extender electric cars, and fuel cell-based electric cars. Currently, hybrid automobiles are available in the catalogs of every manufacturer; nevertheless, the concept of electromobility encompasses more than just conventional electric motor vehicles.⁹ Its goal is to lessen the amount of pollution that is produced in the location where the vehicle is being used over its entire lifespan.

The United States of America, China, and Europe are the three most important international "actors" in the field of electromobility. The state of California is now in the lead in the United States, where their support is considerable on both the supply and demand sides of the market. There is a company in the United States that is solely dedicated to the production of electric motor cars, and that company is Tesla Motors Inc. Additionally, the number of charging stations is continuously expanding at a fast rate. In the meanwhile, China has the potential to become a world leader in the production and sale of automobiles that are powered by alternative energy sources in the not too distant future. Within such context, the government provides assistance to dissemination by providing support to the demand side.^{ten}

2. Legal background

The European Union (EU) views the promotion of electric transportation as a strategic objective. This objective is connected to a number of policies and initiatives, including the Europe 2020 Strategy, the Clean Transport Systems Initiative, and the Horizon 2020.¹² Automobile manufacturers are coming under increasing pressure to create hybrid, plug-in hybrid, and fully electric vehicles as a result of increasingly stringent environmental regulations and requirements.¹³ The European Union's legislation concerning the reduction of carbon dioxide emissions provides motor vehicle manufacturers with an incentive to promote low-emission automobiles.¹⁴ In addition, in order to encourage the

by the year 2030, with the purpose of ensuring a modern and sustainable energy supply as well as technical progress in emerging nations. Check out Horváth 2017, pages 194–199.

6 Directive 2009/28/EC established mandatory targets for calculating the share of

energy from renewable sources in each Member State. This was done in order to meet the Union's target of the share of energy from renewable energy sources reaching 20% by the year 2020, and the share of energy from renewable sources reaching 10% in the transport sector by the same year. In addition, the Commission suggested in its White Paper that greenhouse gas emissions from transportation should be reduced by sixty percent by the year 2050 in comparison to the levels that existed in 1990.

1994 Wakefield, number seven.

Kampker 2014 and Hawken 2019, both of which are 158.

9 Kovács, 2018, number 15.

Where can I find the 10 Merre tart az elektromos autok? (The year 2020).

11 Europe 2020: A plan for growth that is intelligent, sustainable, and inclusive, Brussels, published in 2010.

12 It is especially designed to offer funds for the development of electric vehicles within the framework of Horizon 2020.

The year 2018 Kovács, number 13 According to the white paper on transportation, the transportation industry as a whole need to increase its CO₂ emissions by sixty percent by the year 2050 in comparison to the levels that existed in 1990. Under the heading "Europe on the move," the European Commission offered three different sets of ideas to the member states. These proposals were provided in accordance with the "European strategy for transport with low emissions." By cutting CO₂ emissions from new automobiles by 35% by the year 2030 and from light commercial vehicles by 20% by the year 2021, the foundation for the market for electromobility has been established by law brought about by the European Union. (A European plan for the promotion of low-emission cars)

the adoption of the 2014/94/EU Directive by the European Parliament and Council was intended to facilitate the spread of alternative fuels.¹⁶ (Directive of the AFI) In light of this, the member states are required to develop national regulations that will serve as the foundation upon which a European infrastructure for alternative fuels (including hydrogen, hydrogen-based fuels, biofuels, compressed natural gas, LNG, and LPG) may be constructed. Additionally, it created consistent regulations at the EU level for charging stations for electric motor vehicles, technical specifications, and information for consumers. At the very least, member states are expected to make certain that public charging stations provide sufficient coverage for the use of electric motor vehicles in urban and suburban agglomerations as well as other highly inhabited regions. Additionally, the charging stations are required to include an intelligent metering system. The provision of electromobility services to customers on an ad hoc basis is a need that cannot be avoided. The provision of this service must be carried out in an open and honest manner, without any discrimination. In order to fulfill this need, the costs of the service must be made accessible to the general public. From the point of view of electric mobility, electric power is the alternative fuel that is the most environmentally friendly. In terms of Hungarian regulations, the 17/2017 is the most recent version. With the passage of the NFM (Nemzeti Fejlesztési Minisztérium –

National Development Ministry) legislation on the quality criteria of engine fuel, the list of fuels that are permitted to be used in transportation was broadened to include gasoline, diesel, biodiesel, E85, CNG, and liquid hydrocarbon gas.

Because of the fast development of electric mobility, there is a growing need for regulation that is more comprehensive. The 6/1990 was the first stage before the Hungarian legislative was established. (IV.12.) The KÖHÉM (Közlekedési, Hírközlési és Építésügyi Minisztérium – Transportation, Communication and Construction Ministry) statute,¹⁸ which established the concept of an ecologically friendly motor vehicle, was enacted. The electric motor vehicle¹⁹ and the zero-emission motor vehicle were both included in this category.²⁰

Communication from the European Commission to the European Parliament, the Council, the European Economic and Social Committee, and the Committee of the Regions, Brussels, 20.7.2016 COM(2016) 501 final, Regulation (EC) No 443/2009 of the European Parliament and of the Council were issued on April 23, 2009, and they established emission performance standards for new passenger cars.

The fifteenth session of Parliament passed Act CXVII of 2010, which was titled "Promotion of the Use of Renewable Energy for Transportation and the Reduction of Greenhouse Gas Emissions with Regard to Transportation." The notion of alternative fuels was established by this legislation. These fuels include electricity, hydrogen, biofuels, synthetic fuels, compressed natural gas (CNG) and liquefied natural gas (LNG), as well as liquid petroleum gas (LPG). These fuels have the potential to at least partly replace oil sources as a source of energy for transportation.

A directive issued by the European Parliament and the Council in 2014/94/EU on the deployment of infrastructure for alternative fuels.

a 17 In November of 2016, the European Commission put up a proposal to overhaul the energy market by introducing a package called the "Clean Energy for all Europeans" package, sometimes known as the "Winter Energy Package." At the level of the European Union, the proportion of renewable energy sources in the production of electricity is already more than ten percent (and might reach fifty percent by the year 2050). Ensuring that all Europeans have access to clean energy (2020).

Clauses (6) and (7) of paragraph 2 of the 6/1990 Constitution. The KÖHÉM act, which pertains to the technical prerequisites of registration and entrance into service of road vehicles, is discussed in Section IV.12.

19 Electric vehicle: (a) a purely electric vehicle, the power train of which comprises at least one electrical energy storage device, an electrical power conversion unit and an electrical machine which converts stored electrical energy to propel the vehicle into mechanical energy and has no other means of propelling the vehicle (i.e. BEV); (b) a plug-in hybrid electric vehicle, which is equipped with a connector and a converter, as factory design, to charge its electrical energy storage device from an external source of electrical power, with an electric range of at least 25

By making revisions to the 2007 that were connected to electromobility, the Hungarian legislative substantially satisfied its commitments under the AFI21. legislation pertaining to electric power (VET) of LXXXVI. This legislation, which was passed in 2016, LXXXI, and went into effect on July 1, 2016, included regulations for the charging of electric motor vehicles, as well as the establishment and operation of charging stations inside the education system. The electric motor vehicle, the process of charging electric motor cars, and the terms governing charging station operators were all specified under these laws. The individual who operated the charging station was considered a system user. In accordance with the provisions of the document, the process of charging electric motor vehicles necessitates the acquisition of a license, which can be obtained by means of the license issued by the MEKH (Magyar Energetikai és Közmű-szabályozási Hivatal – Hungarian Energy- and Utility-regulating Bureau). However, if the charging is carried out by means of the personal measured user equipment of the residential or non-residential consumer, this must not be done for the purpose of generating revenue. A considerable amount of time passed during which the VET did not let the charging operator to transmit electric power to the customer. The aforementioned rules, in addition to providing clarity on fundamental concepts, provide the government the authority to address any lingering concerns with electric motor vehicles via a separate act (in accordance with the Automatic Fuel Injection Directive).

The implementation of the Jedlik Ányos Plan (henceforth referred to as the Plan) in Hungary in 2015²² provided a significant boost to the spread of electric automobiles in the country. Public administration actions that are associated with the creation of a basic charging infrastructure were declared to be high priority processes by the 369/2015. This was done as part of the Plan. (XII.2) A legislation enacted the government. In a manner that is analogous, the government act that was passed on October 10, 2016 (II.9) modified the 253/1997. For the purpose of ensuring that the proliferation of electromobility is taken into consideration in residential surroundings, the government legislation (OTÉK) on national urban design and building regulations was enacted.

A paragraph from the 281/2016 document. In accordance with the Government Act, the 273/2007 was updated. (19) A legislation enacted by the government for the implementation of the VET (VET Vhr.). As a direct consequence of this, comprehensive regulations concerning the licensing of electric motor vehicle charging were developed.

With the passage of the Government Statute 170/2017 (VI.29) on some matters pertaining to electric motor vehicle charging services, the groundwork was laid for the regulation of the charging market.

The statutes not only set the essential standards linked to electric motor vehicle charging service and its price, but they also strengthened and broadened the key definitions associated with the situation. In addition to this, it made it abundantly obvious that charging is not the same thing as trading energy but rather a service, and it also established the idea of electromobility service. An further definition of the phrase "electric motor vehicle" was provided by this act, which states that it is defined as "motor vehicles that run on electricity."

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(c) hybrid electric cars with extended range, which conform with point (b) and have a purity electric drive range of at least 50 kilometers (i.e. EREV); (d) plug-in hybrid electric vehicles (PHEV) with extended range.

20 A automobile is considered to be zero-emission if, when it is driven properly, it does not release any of the air pollutants that are regulated by the legislation.

21 The National Policy Framework Program, which was established by the Deployment of Alternative Fuels Infrastructure Directive in the autumn of 2016, was accepted by the Ministry of National Development. This program outlines the development of electric cars and charging infrastructure by the year 2030.

22. As outlined in the 1487/2015, the key legislative duties are to be completed. On the occasion of the approval of the Jedlik Ányos Action Plan, the government has enacted a legislation.

relying either partly or entirely on an electric motor, which requires the acquisition of electric power from an electric storage system that may be charged from an external source in order to work properly. An electric motor is the only source of power for the fully electric vehicle²³, which stores its energy in a battery that has been charged.

In the process of establishing a framework for electromobility, a new set of laws was enacted on July 9, 2019, which, among other things, included an expansion of the law that was enacted in 1998 regarding public transportation. The functioning of electric vehicle chargers, electromobility services, users of electromobility, and dealers of electric cars were all affected by these expansions.²⁶ The newly enacted regulation makes a distinction between those who operate electric chargers and those who offer services related to electromobility. It is the responsibility of the former to guarantee that the charger is installed and functioning properly, while the latter is accountable for providing service to customers. The same economic actor may, of course, fulfill both of these tasks; but, operators have the ability to transfer the right to service to another party, and they can also let other service providers to run alongside their own at a particular charger that they operate. Those who hold and operate the electric network are referred to as distribution system operators (DSO) in accordance with the current law. Distribution system operators are not permitted to be operators of electric chargers or providers of transportation services for electromobility. For the same reason as previously, operation needs a license from the MEKH that is valid for an extended amount of time. At the same time as the operator of the electric charger is able to obtain electric power from any electric power-trader on a market basis, they are also able to negotiate connection and network-use agreements with the local distribution service provider. A notice to the MEKH is required for any action involving the provision of electromobility services. The service must be accessible to all individuals without any kind of discrimination.

Two words were specified by the government act 243/2019 (X.22) on specific concerns of electromobility service. These terms are the electric charging station²⁷ and the electric charging site.²⁸ An electric charging station operator is required to get a

license from the MEKH in order to operate the station. The operator must submit the request at least seventy-five days prior to the anticipated activation of the station. The operator is liable for any possible losses that may be incurred by the consumer of electromobility services in the context of the provision of electric mobility services. In the event that the activities of the operator cannot be traced back to the cause of the harm, the customer remains entitled to indemnification.

23 The category is taken from the English name Battery Electric Vehicle (BEV), and it receives a grade of 5E for its impact on the environment. Singh 2019.

In the year 2019, the Magyar Közlöny (Hungarian Official Journal) issue number 24 was published. Legislation titled "Act LXVII of 2019" was passed in 2019 with the purpose of promoting long-term shareholder participation and amending several acts in order to achieve legal harmony. With effect from October 1st, 2019.

25 The Act has been amended to include the addition of points (f) and (g) of the first paragraph of Section 2. The provisions of paragraphs 32–34 of Act LXVII of 2019.

26. With regard to this matter, the modified Act will be applicable to the proceedings of the MEKH in line with the requirements of both the MEKH Act and the VET. Paragraphs 45/A to 45/E, which were recently introduced to the Amended Road Transport Act, include modifications that are connected to electromobility. In the new block, point A assures that the regulations apply to service providers that are founded in another country within the Community but are also operating in Hungary. Point B, on the other hand, explains the most significant elements and redefines the wording of 170/2017. The legislation of the government (VI.29).

27, a It is a location that has at least two public chargers that are able to provide energy to the electrical storage of electric vehicles, as well as to the electric mobility user, either on an ad hoc basis or on a permanent basis.

28, a Within the vicinity of a public charger, this location is specifically designed for the use of the electro-mobility service.

does not limit the operator's ability to pursue further claims in accordance with the basic principles of civil law.²⁹ There is a need for the service provider to provide an invoice to the customer. The unit price, the quantity of electric power used for the charge of the vehicle's battery (in kilowatt-hours), and the offset of the service that the consumer of electromobility used are all included on the invoice. The issue of penalties was also taken into consideration by the legislation. For instance, if the operator obtained their license by tricking the authorities, then the imposition of a fee may be regarded appropriate. If the operator violated their responsibilities (based on the license, the law, or an executive statute), the MEKH may inform them and give a deadline for repairs, punish them, or temporarily prevent them from continuing their operations for a period of six to twelve months. As a last option, the MEKH may revoke the license.

The amount of the fine is either one percent of the net income from the previous year or one hundred million HUF each, whichever of the two counts is greater.

It is stated in the 326/2011 that point g) of the second part of paragraph 60 describes the situation. (XII. 28) According to the government legislation (which

addresses the administrative chores associated with public road traffic, the issuance of papers linked to public road traffic, and the revocation of those documents), it is allowed to request special light green number plates³⁰ for cars that are ecologically friendly.³¹ It is possible for this to be accompanied with additional privileges and rights.³² In the Jedlik Ányos 2.0 Plan, the government has recently proposed the idea of tightening the regulation of green number plates. This would allow plug-in hybrid automobiles that have excessive pollutant emissions and excess weight to be removed from the process of receiving a green number plate. Up to this point, there has been no legislation enacted at all.

3. Environmental and economic ramifications, and effects on the electric power system

It is possible to assert that electric automobiles, in general, contribute to an improvement in the quality of life inside major cities by lowering the amount of carbon dioxide emissions and the amount of toxic flue dust. Additionally, in regions with a high population density, they have the potential to minimize the amount of noise that is produced.³³ Not only can electric cars greatly decrease the amount of noise pollution caused by traffic, but they are also much quieter than conventional automobiles.

One of the most significant benefits they provide is a reduction in carbon dioxide emissions. Their impact on the environment is felt both locally and worldwide (indirectly), and it is noticeable everywhere. Direct emissions are those that are created by the exhaust, whereas indirect emissions, also known as well-to-wheel emissions, are produced throughout the whole of their life cycle, beginning with their production (and the manufacturing of their components) and continuing all the way through to their eventual disposal as scrap.

There is a point c) in Section 3 of paragraph 7 of the 243/2019. The legislation of the government (X.22).

³⁰ In accordance with the government statute 326/2011 (XII.28) on the issuance and withdrawal of road transport documents, the color of the license plate that is issued to an environmentally friendly vehicle is a light green color. The characters on the plate and the color of the frame are black, and the plate consists of three letters and three numbers. When it comes to a registration plate that is designated as being uniquely permitted, it must have a minimum of four continuous letters and a maximum of five continuous letters, as well as a minimum of one continuous number and a maximum of two continuous numbers, and the total number of characters must be six.

³¹, a vehicles that are favorable to the environment, as described in Chapter I, point 6 of paragraph 2 of the 6/1990 rule. It is the KÖHÉM legislation, which is ³². The likes of free parking, tax savings, and other incentives are included. Please refer to the following sources for further financial incentives and advantages in relation to certain countries: Polgári and Farkas 2020; 1/1975. (II.5) The KPM-BM joint decree

mandates that green license plates are not permitted to utilize the bus lane.

A total of 33 Szilágyi 2018 was 32–33.

The electric vehicle does not contaminate the area in which it is directly located, and if the electricity that it generates is produced in a manner that is favorable to the environment (which may be accomplished via the use of renewable energy), then it does not pollute farther afield either. In a way that is readily apparent, the benefits of the electric car in terms of air quality present themselves locally. Pollutant emissions in the environment and location where the motor vehicle is used are non-existent if the vehicle is used only for electric purposes. It is possible for pollutant emissions to be manifested in an indirect manner via the power plants that provide the generated electric power, particularly if these power plants utilize fossil fuels. The global benefits are mostly manifested via its impact on CO₂ emissions,³⁵ and more especially in areas where electric power is produced by renewable and clean energy sources (such as wind energy, nuclear energy, and hydro-energy). The term "zero emission vehicle" (ZEV) is often used incorrectly to refer to electric automobiles, despite the fact that this designation does not apply to all situations.

It is not enough to just modify the way that cars are propelled and to create new motors; in order to have a positive impact on the environment, it is necessary to cut energy usage as well. In terms of the economic repercussions, it is necessary to emphasize the decrease in the amount of income that the government receives from taxes and levies imposed on gasoline and petrol as a consequence of the decrease in the use of fuel. In addition, the promotion of electromobility necessitates the provision of financial incentives, and the establishment of new investments is necessary in order to further develop the infrastructure of charging stations. The European Union (EU) is also responsible for covering the expenses of these.

It is also possible to lower the external expenses of public transportation, which refers to the expenditures that are incurred as a consequence of transportation but are not paid for by the individuals who participate in it. By way of illustration, the polluter pays concept allows for the ability to include the external costs of air pollution on Europe's roadways into the road taxes (smart road fees), with zero-emission cars being accorded a more favorable treatment.

The significant benefit that these automobiles provide is that they compensate for the strain that is placed on the electric power infrastructure. During the process of charging electric motor cars, the battery stores energy in addition to the energy that is received from the electric power system from the vehicle itself. Therefore, the development of additional energy production capacity is not required for the use of electric power by these motor vehicles in and of themselves. This is because the rise in the demand for electric power that results from charging is not large.³⁶ When assessing the strain that is placed on the system during the process of charging the battery, it is necessary to take into consideration the time of day and the length of time that the charging takes place inside the system. The kind of charging station (commercial, public, particularly in close proximity to shopping centers or highways, fast-charging stations, or home charging) which is being used.

There are 34 Gács for the years 2019–25–27.

464 in the year 35 Bándi. As far as fuels are concerned, the directive 94/63 was approved in 1994 by the Parliament and the Council with the intention of lowering volatile organic compound (VOC) emissions from the storage and distribution of petroleum derivatives. This was done in response to particular pollution. Certain gasoline-powered cars are required to comply with mandatory technical criteria for carbon monoxide, unburnt hydrocarbons, oxides of nitrogen, and particulate matter (Directive 70/220) and Regulation (EC) No 443/2009.

36 Please refer to the adjacent study titled "MAVIR: Medium and long term source-side capacity development of the Hungarian Electricity System," which was published in Budapest in 2013.

Last but not least, while calculating the pressure on the system, they also take into consideration reverse charging. This is because electric motor cars are not only able to receive electric power, but they are also able to send the energy that they have stored back into the network. In order to maintain equilibrium within the system and the market, vehicles that have capacity that is not being used are able to reverse charge into the network.³⁷

4. Limitations

The acquisition prices, the effective range, the existing charging infrastructure, environmental protection, security, and dependability are some of the factors that are limiting the acceptability and proliferation of electromobility.³⁸ On the one hand, the problem of effective range is a factor that reduces the rate at which electric vehicles are popular. From the point of view of the customer, the real range is an issue that is of great importance. Batteries were initially developed in such a way that a single charge could carry the vehicle for a distance of 150 kilometers. On the other hand, a plug-in hybrid, which can be charged from the system, can go for a distance of 80 kilometers only on electric power.³⁹ a. It is via the development of batteries and the network of charging stations that this problem will be ultimately resolved. When it comes to the manufacture of batteries in big quantities at an affordable price, there has not been any substantial breakthrough so far.⁴⁰ Furthermore, they continue to constitute a substantial expense. On the other hand, the purchase price of these automobiles is much higher when compared to the cost of conventional automobiles powered by internal combustion engines. There is a correlation between the presence of in-built batteries and a rise in the cost of plug-in hybrids and totally electric motor cars. Subsidies could be of assistance while making purchases. As a result, a system that encourages the purchase of electric vehicles is a component that should be highlighted as a priority for the government. In addition, the current state of the charging infrastructure is a factor that slows down the propagation process. The charging network is continuously growing, and public chargers, fast-charging stations, and commercial chargers are improving in terms of their level of innovation and technological advancement.⁴¹ It will also be crucial for home charging to become more widespread. Every nation views the construction of the charging infrastructure as a strategically vital program, with the goal of providing permeability and security to electric vehicle owners. A greater number of electric vehicles will be produced as a result of the increasing infrastructure.

An additional essential component of the spread of electromobility is a security concern that is associated with the disposal of spent batteries. Due to the fact that they are

classified hazardous trash, producers are now working on finding solutions that will allow them to be reused and repurposed.

37 Is it possible to turn the electric car into a piaca? (The year 2020).

These elements are also supported by the findings of a study that was carried out by Automotive World in the year 2013. a report that conducted interviews with major automotive companies was published in 2013 under the title "Automotive World: Technology Roadmap - Battery Electric Vehicles." In addition to other questions, they were asked what they believed to be the single most important element that would lead to an increase in the number of sales of electric cars. When asked about the price, over half of the people who responded noted that it was somewhat cheaper.

39 Benoit in the year 2017.

Forty Mercedes-Benz, for instance, is increasing the capacity of its battery assembly operations and constructing additional plants in preparation for the market for electric vehicles. In addition, chemical corporations like as BASF are doing research into the production of better batteries. 31 Zsebik and Novák (2018), pages 48–55; Kovács (2018), page 15.

5. Summary

In conclusion, the modifications to the VET and the VET Vhr. that provided the fundamental framework for the installation of electric charging stations were the first step in the legislative process in Hungary that was relevant to e-mobility. Due to the fact that this procedure is still in its early stages, it would be prudent to wait for more comprehensive regulations concerning investments in electric transportation technology. A legislation pertaining to electromobility has been developed over the course of many years, but the Hungarian Parliament has not yet been presented with a definite proposal concerning this matter. The organization known as e-Mobi Elektromobilitás Nonprofit LLC is responsible for carrying out a number of public responsibilities that are associated with the dissemination of electromobility in Hungary.⁴²

The market for electric cars is seeing growth all around the globe. The expansion of electric travel and e-mobility is possible via the formation of a support system, which in turn enhances the population's receptivity to new advances. The backing of the government is a crucial factor that contributes to the acceleration of this process. In this context, the government is tasked with a number of key responsibilities, including the installation of charging stations, the promotion of the purchase of electric vehicles via a variety of mechanisms, and the promotion of technologies connected to charging stations (from the point of view of industrial growth). Many aspects of the electromobility industry, which has shown significant growth and innovation over the course of the last few years, have the potential to be controlled not just by the government but also by the market. Additionally, Hungary aids in the development of charging infrastructure and gives financial assistance for the purchase of electric cars.

When it comes to both public transit and private automobiles, electromobility will play an important part in the development of big cities that are both livable and "smart" in the years to come. The dissemination of solutions that integrate smart cities and smart energy

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is something that Hungary would also want to see happen, and these solutions will also offer charging services. In order to provide support for electric transportation over the long term, intelligent measurement will be absolutely necessary.

Both the development and priority of technology for decarbonization⁴³ and the dissemination of technologies for zero emission transportation are essential measures that must be taken.

The year is 42 443/2017. In Hungary, the government has enacted a legislation that addresses specific public responsibilities that are associated with the proliferation of electromobility.

A number of incentives were implemented by Directive 2009/33/EC in order to encourage the use of electric cars and other low-emission vehicles. An approach to low-emission transportation that is European in nature. Communication between the European Commission and the European Parliament, the Council, the European Economic and Social Committee, and the Committee of the Regions among other European institutions. COM(2016) 501 final adopted by the European Commission on July 7, 2016, in Brussels.

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