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ELECTRIC VEHICLES IN SERBIA: INSTRUMENT FOR THE ENERGY TRANSITION?

Abstract: *The increasing global impact of climate change has not circumvented Serbia. Committed to take measures that will reduce the impact of climate change through numerous international conventions, the Republic of Serbia has started implementing the energy transition as one of the instruments with which it aims to achieve the set goals. Electric and hybrid vehicles represent one of the ways that the energy transition can be accelerated; the initial provisions on them found their place in positive law in April 2021. This paper will discuss whether the adopted regulations in this area represent a good starting point for achieving the goals of the energy transition, as well as what further measures need to be implemented in order to achieve the desired effect.*

Key words: climate change, energy transition, electric vehicles, renewable energy sources, autonomous vehicles.

1. INTRODUCTION

We are witnessing the growth of global demand for electric vehicles, primarily related to environmental protection and climate change reasons. Two agreements related to the decarbonization of the automotive industry were announced during the 2021 United Nations Climate Change Conference in Glasgow. One of them, the Global Memorandum of Understanding for Zero-Emission Medium and Heavy-Duty Vehicles, defined the goal of cooperation between the fifteen governments regarding the sales of new 100% zero-emission trucks and buses by 2040. Another one is the Declaration on accelerating the transition to 100% zero emission cars and vans, signed by various governments, car companies and other organizations. The aim of the Declaration is to implement the transition in leading markets by 2035 and globally by 2040.¹

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1 Wang, Y., Liu, Y., Gu, B., 2022, COP26: Progress, Challenges, and Outlook, *Advances in Atmospheric Sciences*, 39, p. 1212.

Many of the signatories of these two agreements are Member States of the European Union. Even though they do not include the countries that are the biggest car producers in the EU, it is expected that the Union's policy will strongly follow and implement such agreements. This is also because the majority of countries globally and in the EU are parties to the most important convention related to decarbonization – the United Nations Framework Convention on Climate Change (UNFCCC), which has also a great impact on the Energy Community Contracting Parties, including the countries of the Western Balkans.² One of the key documents that the European Union follows on its pathway to decarbonization and environmental protection is European Green Deal. At the Western Balkans Summit in Sofia on 10 November 2020 it was decided to follow the European Green Deal and adopt the Green Agenda for the Western Balkans,³ which also has the great impact on development of charging stations and electric vehicles themselves.

The Western Balkans is a European region that has often been and still remains on the margins when it comes to implementing innovative solutions, including those in the field of green transition. Nevertheless, Serbia, as one of the Western Balkans countries, intends to follow the same pattern and implement such solutions. The Government of the Republic of Serbia has recently adopted a bylaw that grants subsidies to buyers of electric and hybrid vehicles, thus demonstrating interest in creating a greener national vehicle market.⁴ The Republic of Serbia intends to become a European Union Member State and the accession negotiations process on the Green Agenda and the sustainable connectivity cluster was opened in December 2021.⁵ Development of the electric vehicles in Serbia will certainly help the progress related to this cluster, especially regarding

2 For more about how the UNFCCC affects countries see Tompkins, E. L., Amundsen, H., 2008, Perceptions of the Effectiveness of the United Nations Framework Convention on Climate Change in Advancing National Action on Climate Change, *Environmental Science & Policy*, Vol. 11, No. 1, pp. 1–13.

3 For more about the impact of national energy and climate planning in the Western Balkans see Batas-Bjelić, I., Rajaković, N., 2022, National Energy and Climate Planning Approach for the Western Balkans: Between the Carrot and the Stick of the EU Green Agenda, *International Journal of Global Environmental Issues*, Vol. 20, No. 2–4, pp. 123–134.

4 Regulation on the conditions and manner of carrying out subsidized purchase of new vehicles with exclusively electric drive, as well as vehicles powered by an electric drive (hybrid drive) in addition to an internal combustion engine, *Official Gazette of the RS*, No. 18/23.

5 This cluster includes: Chapter 14 on Transport, Chapter 15 on Energy, Chapter 21 on Trans-European networks, and Chapter 27 on Environment and Climate Change.

the chapters on energy, and environment and climate change, and accelerate the Republic of Serbia on the path to European Union membership.⁶

Construction of electric vehicle charging stations, i.e., charging stations for hybrid vehicles, is required in order to enable the charging of electric and hybrid vehicles. The development of the construction of charging stations in Serbia will be of great importance for the entire Western Balkans, as a complete network of charging stations will be established. The absence of regulations in this field in the Republic of Serbia did not prevent certain oil and gas companies from building charging stations for electric vehicles and becoming the pioneers in this field.⁷ However, some legal and other issues regarding the construction and operation of charging stations remain open, which requires specific regulation of this field. The first step has already been taken with the amendment of the Law on Energy of the Republic of Serbia (“Energy Law”), which set the ground rules regarding the institute of charging stations for the electric and hybrid vehicles (“charging stations”).⁸

The following phases in the regulations process should establish the entire regulatory playing field for electric and hybrid vehicles (“electric vehicles”). They will predominantly cover technical requirements for the charging stations and electric vehicles, but the crucial ones should regulate which type of energy will be used for the charging of the electric vehicles. In addition, equal distribution of charging stations in Serbia should be provided, either by existing or new legal acts. One of the issues that should also be covered is the demarcation between what should be regulated by the state and what should be regulated by the market, in accordance with the applicable international and national rules.

In this paper, the focus will be on the open issues regarding electric vehicles, in relation to the energy transition in the Republic of Serbia. One of the key questions is whether we can claim that the electric vehicles are an energy transition tool if they are charged from non-renewable energy sources. Another one is whether the electric vehicles can be used as a tool

6 For more on the role of environmental protection in EU enlargement history see Bogojević, S., Drenovak-Ivanović, M., 2019, Environmental Protection through the Prism of Enlargement: Time for Reflection, *Common Market Law Review*, Vol. 56, No. 4, pp. 949–977.

7 This is despite the fact that the first charging station for electric vehicles in Serbia was installed in the town of Leskovac, by the TotalEnergies company back in 2021. TotalEnergies, 2021, *Kompanija TotalEnergies je instalirala prvi punjač za električna vozila u Srbiji* (<https://totalenergies.rs/sr/totalenergies-u-srbiji/vesti/kompanija-totalenergies-je-instalirala-prvi-punjac-za-elektricna-vozila>, 11. 8. 2023).

8 Energy Law, Art. 210v, *Official Gazette of the RS*, Nos. 145/14, 95/18 – other law, 40/21 and 35/23 – other law.

for electricity storage and how this might contribute to the energy transition. It will also be discussed how the regulations on the production of the electric vehicles and the waste generated from them can be improved. One part of this article will address the concerns related to the charging infrastructure, while certain legal issues of importance to electric vehicles will also be analyzed. The aim of the paper is to generally present the legal dilemmas related to electric vehicles, while further development of regulation in this area will enable deeper research into certain legal issues.

2. WHAT HAS BEEN REGULATED SO FAR

The Energy Law⁹ provides the definitions for the main participants and institutes related to electric and hybrid vehicles. According to the Energy Law, the provider of charging services for electric and hybrid vehicles can be a company or an entrepreneur who provides a public charging service for electric vehicles and at the same time represents the end customer in the electricity market. A charging station is defined as a public place where the electric vehicle charging service is provided or where electric vehicles for public transportation of passengers are charged.

The Law further stipulates that the electricity distribution system operator (DSO) is required to cooperate on a non-discriminatory basis with any natural or legal person who owns, develops or operates charging stations. As a rule, the DSO cannot own, develop or operate charging stations, with the exception of charging stations solely for its use.¹⁰

The amendments to the Law on Planning and Construction,¹¹ which entered into force in August 2023, provide definitions of electro mobility, charging points for electric vehicles, and chargers. Electro mobility is defined as a special form of environmental transport, using electric vehicles that mainly utilize electricity for propulsion. For the first time in Serbian legislation, this law defines a charging station as the place where it is possible to replace the battery on one or more electric vehicles. A charger is

9 *Ibid.*

10 For more about regulations related to charging stations see Kuzman, M., Grujić, D., 2022, Charging stations for electric vehicles on the market of the Republic of Serbia, *Proceedings of 13th Conference on Electricity Distribution with Regional Participation*, Kopaonik, Serbia, (http://ciredserbia.org.rs/Radovi/KO2022/STK%204/R-4.06%20109_Milos%20Kuzman_Dunja%20Grujic_PUNIONICE%20ELEKTRICNIH%20VOZILA%20NA%20TRZISTU%20REPUBLIKE%20SRBIJE.pdf, 11. 8. 2023).

11 Law on Planning and Construction, *Official Gazette of the RS*, Nos. 72/09, 81/09 – correction, 64/10 – CC decision, 24/11, 121/12, 42/13 – CC decision, 50/13 – CC decision, 98/13 – CC decision, 132/14, 145/14, 83/18, 31/19, 37/19 – other law, 9/20, 52/21 and 62/23.

defined as a device, installed on land or in a facility used for public or private purposes. The law also stipulates that the Energy Agency of the Republic of Serbia is responsible for more closely regulating the method of supply and billing of the delivered electricity required for electric vehicle chargers.¹² By comparing legal solutions from the Law on Energy and the Law on Planning and Construction, it can be seen that the terms related to electric vehicles are not regulated in the same way, and it is necessary to harmonize the legal terminology in order to avoid causing any doubts in their application.

To improve the regulatory framework related to electric vehicles, in addition to the abovementioned bylaw, which is to be adopted by the Energy Agency of the Republic of Serbia, the Government of the Republic of Serbia is required to stipulate the technical specifications for the charging stations, the capability, manner and place of measurement of electricity consumed, the obligations of the DSO to the end customer, and other related rules.¹³ Furthermore, specific electric vehicle charging services for electric and hybrid vehicles, as well as the obligations of the electric and hybrid vehicle charging service provider should be regulated. The implementation of these rules is expected to take place following the enactment of the bylaws that will regulate the subject area, which are still in the drafting stage. One of the very first versions of the amendments to the Energy Law stated that electric vehicle charging services for electric and hybrid vehicles are special energy activities, which requires a license. This view was not applied in the final version of the amendments, and the possible licensing of charging stations is no longer an issue.¹⁴

Hence, bearing in mind the existing legal framework, the role of electric vehicles in the energy transition can hardly be presented through legal analysis and conclusions, but rather through practical questions and issues related to the charging station operators and infrastructure. Some of the conclusions and suggestions from this article can be used as guidelines the legislator, and hence contribute to the energy transition.

12 Art. 2, paras. 18, 38 and 59 and Art. 85(s9) of Law on Planning and Construction.

13 Moreover, the following DSO bylaws must be amended in order to make the electric vehicle operators and infrastructure operable: a) Distribution Grid Code, *Official Gazette of the RS*, Nos. 71/17 and 14/19, and b) Electricity Market Code, *Official Gazette of the RS*, No. 135/22.

14 Most countries do not require licensing of charging stations. It seems that, as claimed in one article, the Government is supporting the establishment of charging stations infrastructure by exempting the providers from licensing. See Meszaros, F., Shatanawi, M., Ogunkunbi, G. A., 2020, Challenges of the Electric Vehicle Markets in Emerging Economies, *Periodica Polytechnica Transportation Engineering*, Vol. 49, No. 1, p. 3.

3. CHARGING ELECTRIC AND HYBRID VEHICLES IN SERBIA WITH THE ELECTRICITY GENERATED FROM RENEWABLE ENERGY SOURCES

An important issue that has great impact on the energy transition is the existence of charging stations, representing a positive example in the fight against climate change while the same time contributing to environmental protection. To provide an answer to this question requires an analysis of whether the electric energy that powers charging stations comes from the renewable energy sources. If such electricity does come from the renewable sources, the answer needs to be a positive one. It would be controversial to present the construction of the charging stations as a per se response to the global climate and environmental problems, without further analysis.

In Serbia, the electricity that is distributed to the end customers through the distribution network – including end customers who charge their vehicles from the charging stations – is generated both from non-renewable and renewable sources. The energy mix in 2022 consisted of around 30% of the energy coming from renewable and 70% from nonrenewable sources,¹⁵ with the government plans for 40% of the Serbian residual energy mix will consist of renewable sources by 2024.¹⁶ Most of the energy from renewable sources comes from hydropower, while a smaller percentage comes from the wind, sun and biomass.

Although it has been in existence for several years, the Guarantee of Origin market is not properly developed in the Serbian electricity market.¹⁷ The majority of users are companies that follow a green agenda and want to present that they only purchase electricity from renewable sources. These guarantees are still not used for charging stations and electric vehicles drivers cannot be certain that they are buying electricity only from renewable sources. Even if that were the case, the system could not physically

15 Elektromreža Srbije j.s.c., 2023, *Annual Report on the National residual mix for Serbia for 2022*, p. 4, (<https://ems.rs/wp-content/uploads/2023/06/Godisnji-izvestaj-o-nationalnom-rezidualnom-miksu-2022.pdf>, 11. 8. 2023).

16 eKapija, 2021, Cilj Srbije 40% zelene energije do 2040. godine, *eKapija*, 21 April, (<https://oie.rs/cilj-srbije-40-zelene-energije-do-2040-godine-potpisan-sporazum-ministarstva-i-udruzenja-obnovljivi-izvori-energije/>, 11. 8. 2023).

17 The Guarantee of Origin is an electronic document that has the sole function of proving to the final customer that a certain amount of energy is produced from renewable energy sources and is regulated by Art. 47 of the Law on Use of Renewable Energy Sources, *Official Gazette of the RS*, Nos. 40/21 and 35/23.

separate the electricity coming from renewable and nonrenewable sources, so it is questionable whether such certificates would have a practical impact on what is the core of their purpose – to slow down climate change and its consequences.¹⁸

Charging stations could have their own energy plants powered by renewable energy sources, which is a solution already used in practice worldwide.¹⁹ In recent years, this solution has become a trend in Serbia and the major filling stations, which are at the same time charging stations, have installed photovoltaic capacities sufficient for their own consumption. Again, this solution is only of a local character and does not have a large impact on the residual energy mix in Serbia.

Could there be a rule that would simply specify that all electric and hybrid vehicles must use the power coming from renewables? Such a rule could exist, but it would be difficult to implement in practice. Charging stations could provide a Certificates of Origin and we could formally tick the box. Alternatively, charging stations could have their own sources of renewable energy, most commonly solar panels. This could be achieved in the coming years, since the percentage of electric and hybrid vehicles on the roads is not high, and we have enough renewable power to serve the market. But would that mean that the goal has been met?

In its essence, the energy transition is a complex mechanism that will reach common global goals in the long run. If we make the green-only electricity for charging stations, the goal of energy transition will not be reached and the box we ticked will not be of great importance. Without increasing the percentage of renewables in the energy mix, it will be difficult to make improvements in this field and the stakeholders will still face the same big picture.²⁰

18 Many authors doubt that the Guarantee of Origin is an efficient tool for energy transition. See Hamburger, A., 2019, Is Guarantee of Origin Really an Effective Energy Policy Tool in Europe? A Critical Approach, *Society and Economy*, Vol. 41, No. 4, pp. 487–507.

19 For more about the positive aspects of photovoltaic power station installation on charging stations see Brenna, M. *et al.*, 2014, Urban Scale Photovoltaic Charging Stations for Electric Vehicles, *IEEE Transactions on Sustainable Energy*, Vol. 5, No. 4, pp. 1234–1241.

20 For a study in Germany on the present future impact of electric vehicle development on the power system see Schill, W-P., Gerbaulet, C., 2015, Power system impacts of electric vehicles in Germany: Charging with Coal or Renewables?, *Applied Energy*, 156, pp. 185–196. Similar studies will be useful to show how recent electric or hybrid vehicles in Serbia can only be charged from renewable energy sources *i.e.* when the power system is prepared for that.

4. ELECTRIC AND HYBRID VEHICLES AS ELECTRICITY STORAGE

Storage of electric energy in one of the tools for energy transition. The 2021 Amendments to the Energy Law introduced the storage operator as a new participant in the energy market, which clearly shows the intention of the lawmaker to develop electric energy storage operations.²¹ By saving the electric energy in storage, a storage operator could save the surplus of the produced electric energy for the periods when there is not enough electric energy to meet the needs of all consumers. On a daily basis, it could be a situation when electric energy produced from the sun during the day ends up being used at night.²²

The electric energy storage industry is still in the development phase, since the production and installation of storage requires significant funds. As the technology develops, they it become more affordable and we can expect its growth in the future.²³ This will also enable the more precise planning of electric energy production and consumption, as well as a more efficient usage of electrical energy.

Considering electric and hybrid vehicles, the law does not provide any obstacles to their use as electric energy storage. This means that the owner of an electric or hybrid vehicle, or its user as the case may be, could store energy in the vehicle during periods of lower electric energy tariffs and use it in periods when the tariffs are higher. They could use it not only for driving the vehicle but also for the everyday household purposes by simply connecting such a storage to a household installation.

Even if a law or bylaw does not expressly forbid this, it is advisable to stipulate in the regulation that such a possibility is permitted. If not, based on similar experiences, some institutions may conclude that using your own energy, stored in electric or hybrid vehicles, for your own purposes is not allowed and thus instruct consumers to use only the energy from the public distribution network and/or their own energy, in the event that they are certified prosumers.

21 Energy Law, Art. 2, para. 52.

22 There are many studies that show how electric and hybrid vehicles storage can contribute to households and together with installed renewable capacity create less dependence on the grid. See Mesarić, P., Krajcar, S., 2015, Home Demand Side Management Integrated with Electric Vehicles and Renewable Energy Sources, *Energy and Buildings*, 108, pp. 1–9.

23 For one of the pioneering articles in this field see Karden, E. *et al.*, 2007, Energy Storage Devices for Future Hybrid Electric Vehicles, *Journal of Power Sources*, Vol. 168, No. 1, pp. 2–11.

The role of electric and hybrid vehicles as electric energy storages shows that their role in the energy transition may be more significant than previously thought. Prerequisites for this are: a) that the law and (sometimes more importantly) the interpretation of the law allows this, b) that a representative number of electric and hybrid vehicles is present on the roads, and c) that the electric energy from vehicles can be connected to household installation without high expenses. It seems that in the near future this will become achievable, bearing in mind both the sustainable and economic interests of all the stakeholders.

5. PRODUCTION OF ELECTRIC AND HYBRID VEHICLES

The claim cannot be made that electric or hybrid vehicles fully promote the energy transition if their production is not sustainable and environmentally friendly. As stipulated earlier at the United Nations Climate Change Conference in Glasgow, some governments and other stakeholders opened this topic and set the goals to enable the production of electric vehicles with zero emissions. The problem is that this is not a global commitment, due to different interests of certain states and the slow development of the energy transition process.

The Republic of Serbia does not have a set of rules that regulates this field. There are no parameters that determine whether the production of electric vehicles is environmentally friendly or not.²⁴ In the early phases of the energy transition, less environmentally friendly production of electric vehicles could be partially compensated by the benefits that the use of electric vehicles might have on the energy transition. Again, such conclusions require further analysis, and certain parameters for that analysis should be defined by the relevant regulations.

The impact of electric or hybrid vehicles the environment should not be excluded when talking about the energy transition, having in mind the strong interdependence between these two concepts and their impact on climate change. Hence it is advisable for the Serbian Government and other institutions to set rules that will help and enable the more environmentally friendly production of electric vehicles, with due respect to competition rules, including those related to state aid.

Another important aspect that must be considered is the sustainable consumption of electric vehicles. In the United Nations 2030 Sustainable

24 In the past decade, many scholars have addressed the topic of sustainable production of electric vehicles, e.g. Günther, H.-O., Kannegiesser, M., Autenrieb, N., 2015, The Role of Electric Vehicles for Supply Chain Sustainability in the Automotive Industry, *Journal of Cleaner Production*, 90, pp. 220–233.

Development Agenda, ensuring sustainable consumption and production are together provided in Goal 12.²⁵ The concept of sustainable consumption, among others, implies that the consumption of products takes place in accordance with good environmental and energy practices, but it also deals with consumer awareness of product sustainability as well as consumer habits in this regard. This concept, as well as the concept of sustainable production, deals with the topic of waste generation, which is discussed in the next chapter.

6. WASTE GENERATED FROM ELECTRIC VEHICLE PRODUCTION AND/OR CONSUMPTION

Production of electric and hybrid vehicles involves different industries, including steel and machine industries, which generate different types of waste. After its lifetime, the vehicles end up as waste, which can be treated in different ways depending on their type. It is important that such waste does not harm the environment and does not have a negative impact on climate change, otherwise regarding energy vehicles as a tool for energy transition will remain questionable.

There are several laws in the Republic of Serbia that apply to different types of waste and procedures for their storage and disposal.²⁶ On the other hand, there are no laws or bylaws, or any regulations that specifically stipulate rules regarding waste generated by electric vehicles and consumption, including batteries. Treatment of such waste is primarily up to its holder – the producer or owner of the electric or hybrid vehicle, as the case may be, or a waste management entity, if the waste is classified as the type of waste that can only be treated by a specialized entity.²⁷

Producers or owners are therefore tasked with ensuring that the waste generated in the of production and consumption of electric vehicles is properly treated. When buying a vehicle, the owner needs to be presented with the facts on what type of waste could be generated from it. Furthermore, the Republic of Serbia will present this fact in relevant reports and try to minimize the waste coming from the electric vehicles industry in

25 United Nations, 2015, *2030 Agenda for Sustainable Development*, Goal 12.

26 The general set of rules regarding waste removal is defined in the Waste Management Law, *Official Gazette of the RS*, Nos. 6/09, 88/10, 14/16, 95/18 – other law and 35/23.

27 It is important that each type of waste coming from electric and hybrid vehicles is treated properly under the general rules. Some waste can be recycled and reused, and in recent years scholars have been paying attention to different types of waste treatment. See Bulach, W. *et al.*, 2018, *Electric Vehicle Recycling 2020: Key Component Power Electronic*, *Waste Management & Research*, Vol. 36, No. 4, pp. 1–10.

general, especially hazardous and non-recyclable waste. Only then it can be claimed that the production and/or consumption of the electric vehicles is moving in the right direction for achieving the energy transition goals.

7. CHARGING INFRASTRUCTURE

A well-established charging infrastructure is a prerequisite for the development of electric vehicles and their presence on the roads. Many Member States of the European Union have established plans for the development of the charging infrastructure areas, as there is a lack of such infrastructure.²⁸ In the Serbia, most charging stations are built at filling stations and are operated by the filling station operators. They are predominantly located in major metropolitan areas or in their vicinity, but even in those areas their number is not significant.

Another issue related to the charging stations infrastructure is the high cost of its development. This is why the government needs to provide grants for its development in areas where it is not commercially viable. In areas where there is commercial interest, stakeholders will find a way to establish a network of charging stations, and one of the motives will certainly be the promotion of policies for the sustainability of such stakeholders.

One more issue related to charging stations is the slow development of the technology. At the moment, charging electric vehicles is not as fast as filling vehicles that run on fossil fuels. This will change with the development of technology, and less infrastructure will be required. Smart planning of infrastructure is therefore crucial, as a surplus of charging stations could become a reality.

Relevant international practices related to the designing and planning charging infrastructure areas, with a special focus on the best European practices, can help the relevant stakeholders in Serbia to establish a sustainable and efficient network of charging stations. The government should support the building of infrastructure in remote areas through its policies, so that every electric vehicle can be charged anywhere in the country. Without the developed infrastructure of charging stations, electric vehicles will not be fully deployed in Serbia and hence the energy transition will not be as effective.²⁹

28 In existing charging infrastructure development plans, great attention is paid to specific aspects of such planning, e.g. planning of charging stations on highways. See Szumska, E., 2023, *Electric Vehicle Charging Infrastructure along Highways in the EU*, *Energies*, Vol. 16, No. 2, p. 895.

29 The development of the charging infrastructure should always be carefully planned, taking also into account the future developments in the energy sector. See Funke, S. Á. *et al.*, 2019, *How Much Charging Infrastructure Do Electric Vehicles Need? A*

The charging infrastructure for electric and hybrid vehicles is an important tool for increasing the number of electric and hybrid vehicles on the roads. Hence, the construction of charging stations must follow the transition from fossil fuel to electric and hybrid vehicles, and therefore needs to be carefully planned.³⁰ Well-drafted regulations represent the basic precondition for a smooth transition.

The network of charging stations in Serbia, whether public or private, is in an early stage of development.³¹ Therefore, the set of rules for the construction and operation of charging stations needs to be smoothly drafted to facilitate easy implementation. The experiences of other countries regarding the charging stations legislative framework should be considered, to assist decision makers in using the best standards and practices, in order to create a productive legal environment for the increase of the usage of electric and hybrid vehicles in the Western Balkans.

8. OPEN LEGAL ISSUES

The proper functioning of any legal instrument is only possible if there are no open legal issues and the instrument can perform its role. To claim that electric vehicles can contribute to the energy transition, all legal issues need to be discussed with the hope that they will be resolved in the future and that such an instrument can be used widely. Regarding electric vehicles, three open legal questions will be considered: a) ownership of electric meters at charging stations, b) electric vehicle licensing, and c) responsibility of autonomous electric vehicles.

8.1. OWNERSHIP OF ELECTRIC METERS AT CHARGING STATIONS

One of the open issues expected to be resolved in the by-laws is the ownership of the electric meter at the charging station, i.e., whether it is

Review of the Evidence and International Comparison, *Transportation Research Part D: Transport and Environment*, 77, pp. 224–242.

30 There are already studies that propose criteria for charging stations infrastructure planning in Serbia, such as Janjić, A. *et al.*, 2021, Estimating the Optimal Number and Locations of Electric Vehicle Charging Stations: The Application of Multi-criteria p-median Methodology, *Transportation Planning and Technology*, Vol. 44, No. 8, pp. 827–842.

31 Electromaps, a useful platform for finding the nearest charging station, was established in Barcelona in 2009. This platform can also be used to search charging stations in Serbia. It is available at <https://www.electromaps.com/en/charging-stations/serbia> (11. 8. 2023). According to data from the platform, in the mid-August 2023, there were 117 charging stations in Serbia, of which 48 were in Belgrade. It can be noted that in most districts in Serbia there are only one or two charging stations.

the DSO or the charging station operator. The Energy Law stipulates that the electric meter will be financed by the charging station operator, while the owner will be the DSO.³² This solution is stipulated, given the fact that the DSO shall have access to electric meters at any time in order to ensure their operation, and only ownership of them grants such rights. As the public charging stations are built under current legislation, this principle is followed and will be followed in the future.

Generally, households and prosumers in Serbia are required to invest and provide electric meters for themselves, and the DSO remains the owner of these electric meters.³³ The problem lies in the acquisition of these meters by the DSO, as the private owners do not want to simply hand over their property to the DSO, claiming the general principle of law protecting their private property. One of the solutions mentioned by experts is to simply make a provision in the law stating that as of a certain date all electric meters in Serbia will be the property of the DSO. The problem with this solution is that some could appeal to the Constitutional Court and claim that the protection of private property has supremacy over the public interest in giving ownership of electric meters over to the DSO, whatever the reason may be.

One of the suggestions for how to resolve this issue is to give the DSO the lease rights over the electric meters so that the DSO can operate them, while the owners would not charge the DSO for such a lease. Whatever the final solution will be, this issue needs to be settled, ensuring the operation of charging stations for the benefit of both the distribution system and the operator of the charging station.

8.2. ELECTRIC VEHICLES LICENSING

The current system of vehicles licensing has been made for conventional vehicles, i.e., those running on fossil fuel. Such a system is based on technical specifications, which are particular to this type of vehicles. The technical characteristics of electric vehicles are different than those of conventional vehicles, and hence their licensing needs to be treated differently.

Firstly, the requirements for licensing electric vehicles need to be different, for example they should not be based on weight requirements, as they are lighter than the conventional ones. Secondly, there are practical issues of how to register a vehicle that has been technically transformed from a conventional vehicle into an electric one by the users themselves. This would not be a problem with vehicles that were initially produced as

32 Energy Law, Art. 141.

33 *Ibid.*

electric vehicles, but in practice, there have been cases of users attempting to register a vehicle as an electrical one, although it had originally been manufactured as a conventional one.³⁴

In many jurisdictions, the licensing fee for electric vehicles is lower than that for the conventional ones.³⁵ The rationale for this is that electric vehicles produce less pollution and noise, they weigh less, have better engine performance, etc. All of these solutions and arguments will need to be considered by lawmakers in the Republic of Serbia. Currently, the requirements for licensing of electric and conventional vehicles are the same, which is expected to change in the future, in accordance with the best European and international standards and practices.

8.3. RESPONSIBILITY OF AUTONOMOUS ELECTRIC VEHICLES

Autonomous vehicles are vehicles that can operate on their own, i.e., without human involvement. Both conventional and electric vehicles could be autonomous, but in this article we will discuss the electric ones, which will represent the majority of vehicles on streets in the future.

The type of automation of such vehicles may vary, from ones where only certain components are automated to ones that can fully perform their function without a driver. In the majority of jurisdictions that have regulated this field, if a driver is present in the vehicle and there is no full level of automation, the driver is held responsible for any damage caused by the vehicle, as it is the driver who has the duty to take reasonable care of the vehicle and prevent accidents. In situations of full automation, some believe that the driver should also be held responsible while others claim that the driver cannot be held responsible if the vehicle is fully automated: any mistake in automation rests with the manufacturer.³⁶

According to the Serbian mandatory general law provisions, the possessor of the vehicle is the one who is responsible for a vehicle in motion that has caused an accident, as they are the user of a dangerous object. In addition, the manufacturer of a defective object is held responsible for

34 013Info, 2022, Pančevac napravio elektroautomobil i već deset godina ne može da ga registruje, *013info*, 27 June, (<https://013info.rs/vesti/drustvo/pancevac-napravio-elektroautomobil-i-10-godina-ne-moze-da-ga-registruje>, 13. 8. 2023).

35 In some countries, such as China, this used to be free of charge for a long time, but presently the price policy is different. See Li, G., Walls, W. D., Zheng, X., 2023, Differential License Plate Pricing and Electric Vehicle Adoption in Shanghai, China, *Transportation Research Part A: Policy and Practice*, 172.

36 Hevelke, A., Nida-Rümelin, J., 2015, Responsibility for Crashes of Autonomous Vehicles: An Ethical Analysis, *Science and Engineering Ethics*, 21, pp. 628–629.

damage if it was caused by such a defect.³⁷ Based on these provisions, it could be claimed that the manufacturer can be held responsible for damages caused by a vehicle in motion, when such damage is caused by an initial defect of the vehicle.

The solutions that presently exist in Serbian law seems clear, rational and applicable to electric cars, but the question remains how they will be interpreted in practice. However, the Serbian criminal law does not seem to recognize the responsibility of the driver or manufacturer of autonomous vehicle in cases of criminal acts against public transport, which law shall be changed. Hence, it is advisable to set the specific provisions concerning the responsibility in connection with autonomous electric vehicles, so that in future there is no uncertainty regarding this issue.³⁸

9. CONCLUSION

We are witnessing a global explosion in the demand for electric and hybrid vehicles, which enables the progress towards climate neutral goals. Many of the strongest world economies are still not fully supporting a fast transition toward a more energy-efficient society. However, the anti-carbon and anti-pollution coalition is increasing with each United Nations Climate Change Conference, which shows that the world is more and more cautious about climate change issues.

The energy transition is one of useful and necessary tools in the fight for a climate neutral world. Without a fast transition to renewable energy sources, climate neutrality will not be reached in the next several decades. The time is running out for the world, and governments need to do whatever is in their power to support a smooth and sustainable transition, leaving conventional energy sources behind. One of the instruments of energy transition can be the switch to electric and hybrid vehicles.

The demand for electric and hybrid vehicles will therefore be used to meet the energy transition goals. The issues raised in this paper should help the Serbian legislator and decision-makers in general to establish regulations and practices that will enable electric and hybrid vehicles to become one of the pillars of the energy transition. Furthermore, a general

37 Law of Contract and Torts, Arts. 178–179, *Official Gazette of the SFRY*, Nos. 29/78, 39/85, 45/89 – decision of CCY and 57/89, *Official Gazette of the FRY*, No. 31/93, *Official Gazette of SCG*, No. 1/03 – Constitutional Charter and *Official Gazette of the RS*, No. 18/20.

38 For more on liability involving autonomous vehicles see Noussia, K., *Autonomous Vehicles: Legal Considerations and Dilemmas*, in: Marano, P., Noussia, K. (eds.), 2020, *InsurTech: A Legal and Regulatory View*, 1, Cham, Springer, pp. 255–258.

regulatory framework should also be designed as an energy transition support mechanism.

The question whether in Serbia electric vehicles are an instrument for the energy transition cannot be answered at the present. Actually, the answer is – it depends. The general public and the experts in this field expect that this answer will change to “yes”, but still need to wait a bit until that moment.

BIBLIOGRAPHY

1. Batas-Bjelić, I., Rajaković N., 2022, National Energy and Climate Planning Approach for the Western Balkans: Between the Carrot and the Stick of the EU Green Agenda, *International Journal of Global Environmental Issues*, Vol. 20, No. 2–4, pp. 123–134.
2. Bogojević, S., Drenovak-Ivanović, M., 2019, Environmental Protection through the Prism of Enlargement: Time for Reflection, *Common Market Law Review*, Vol. 56, No. 4, pp. 949–977.
3. Brenna, M. *et al.*, 2014, Urban Scale Photovoltaic Charging Stations for Electric Vehicles, *IEEE Transactions on Sustainable Energy*, Vol. 5, No. 4, pp. 1234–1241.
4. Bulach, W. *et al.*, 2018, Electric Vehicle Recycling 2020: Key Component Power Electronic, *Waste Management & Research*, Vol. 36, No. 4, pp. 311–320.
5. Funke, S. Á. *et al.*, 2019, How Much Charging Infrastructure Do Electric Vehicles Need? A Review of the Evidence and International Comparison, *Transportation Research Part D: Transport and Environment*, Vol. 77, No. 7, pp. 224–242.
6. Günther, H.-O., Kannegiesser, M., Autenrieb, N., 2015, The Role of Electric Vehicles for Supply Chain Sustainability in the Automotive Industry, *Journal of Cleaner Production*, 90, pp. 220–233.
7. Hamburger, A., 2019, Is Guarantee of Origin Really an Effective Energy Policy Tool in Europe? A Critical Approach, *Society and Economy*, Vol. 41, No. 4, pp. 487–507.
8. Hevelke, A., Nida-Rümelin, J., 2015, Responsibility for Crashes of Autonomous Vehicles: An Ethical Analysis, *Science and Engineering Ethics*, 21, pp. 619–630.
9. Janjić, A. *et al.*, 2021, Estimating the Optimal Number and Locations of Electric Vehicle Charging Stations: The Application of Multi-criteria p-median Methodology, *Transportation Planning and Technology*, Vol. 44, No. 8, pp. 827–842.
10. Karden, E. *et al.*, 2007, Energy Storage Devices for Future Hybrid Electric Vehicles, *Journal of Power Sources*, Vol. 168, No. 1, pp. 2–11.
11. Li, G., Walls, W. D., Zheng, X., 2023, Differential License Plate Pricing and Electric Vehicle Adoption in Shanghai, China, *Transportation Research Part A: Policy and Practice*, 172.
12. Mesarić, P., Krajcar, S., 2015, Home Demand Side Management Integrated with Electric Vehicles and Renewable Energy Sources, *Energy and Buildings*, 108, pp. 1–9.

13. Meszaros, F., Shatanawi, M., Ogunkunbi, G. A., 2020, Challenges of the Electric Vehicle Markets in Emerging Economies, *Periodica Polytechnica Transportation Engineering*, Vol. 49, No. 1, pp. 93–101.
14. Noussia, K., Autonomous Vehicles: Legal Considerations and Dilemmas, in: Marano, P., Noussia, K. (eds.), 2020, *InsurTech: A Legal and Regulatory View*, 1, Cham, Springer, pp. 253–270.
15. Schill, W-P., Gerbaulet, C., 2015, Power System Impacts of Electric Vehicles in Germany: Charging with Coal or Renewables?, *Applied Energy*, 156, pp. 185–196.
16. Szumska, E., 2023, Electric Vehicle Charging Infrastructure along Highways in the EU, *Energies*, Vol. 16, No. 2.
17. Tompkins, E. L., Amundsen, H., 2008, Perceptions of the Effectiveness of the United Nations Framework Convention on Climate Change in Advancing National Action on Climate Change, *Environmental Science & Policy*, Vol. 11, No. 1, pp. 1–13.
18. Wang, Y., Liu, Y., Gu, B., 2022, COP26: Progress, Challenges, and Outlook, *Advances in Atmospheric Sciences*, 39, pp. 1209–1216.

LEGISLATIVE SOURCES

1. Distribution Grid Code, *Official Gazette of the RS*, Nos. 71/17 and 14/19.
2. Electricity Market Code, *Official Gazette of the RS*, No. 135/22.
3. Energy Law, *Official Gazette of the RS*, Nos. 145/14, 95/18 – other law, 40/21 and 35/23 – other law.
4. Law of Contract and Torts, *Official Gazette of the SFRY*, Nos. 29/78, 39/85, 45/89 – decision of CCY and 57/89, *Official Gazette of the FRY*, No. 31/93, *Official Gazette of SCG*, No. 1/03 – Constitutional Charter and *Official Gazette of the RS*, No. 18/20.
5. Law on Use of Renewable Energy Sources, *Official Gazette of the RS*, Nos. 40/21 and 35/23.
6. Law on Planning and Construction, *Official Gazette of the RS*, Nos. 72/09, 81/09 – correction, 64/10 – CC decision, 24/11, 121/12, 42/13 – CC decision, 50/13 – CC decision, 98/13 – CC decision, 132/14, 145/14, 83/18, 31/19, 37/19 – other law, 9/20, 52/21 and 62/23.
7. Regulation on the conditions and manner of carrying out subsidized purchase of new vehicles with exclusively electric drive, as well as vehicles powered by an electric drive (hybrid drive) in addition to an internal combustion engine, *Official Gazette of the RS*, No. 18/23.
8. United Nations, *The 2030 Agenda for Sustainable Development*, 2015, Goal No. 12.
9. Waste Management Law, *Official Gazette of the RS*, Nos. 6/09, 88/10, 14/16, 95/18 – other law and 35/23.

INTERNET SOURCES

1. eKapija, 2021, Cilj Srbije 40% zelene energije do 2040. godine, *eKapija*, 21 April, (<https://oie.rs/cilj-srbije-40-zelene-energije-do-2040-godine-potpisan-sporazum-ministarstva-i-udruzenja-obnovljivi-izvori-energije/>, 11. 8. 2023).
2. Electromaps, 2023, List of charging stations for electric vehicles in Serbia, (<https://www.electromaps.com/en/charging-stations/serbia>, 11. 8. 2023).
3. Elektromreža Srbije jsc, 2023, Annual Report on the National residual mix for Serbia for 2022, (<https://ems.rs/wp-content/uploads/2023/06/Godisnji-izvestaj-o-nacionalnom-rezidualnom-miksu-2022.pdf>, 11. 8. 2023).
4. TotalEnergies, 2021, *Kompanija TotalEnergies je instalirala prvi punjač za električna vozila u Srbiji*, 11 April (<https://totalenergies.rs/sr/totalenergies-u-srbiji/vesti/kompanija-totalenergies-je-instalirala-prvi-punjac-za-elektricna-vozila>, 11. 8. 2023).
5. Kuzman, M., Grujić, D., 2022, Charging stations for electric vehicles on the market of the Republic of Serbia, *Proceedings of 13th Conference on Electricity Distribution with Regional Participation*, Kopaonik, Serbia, (http://ciredserbia.org.rs/Radovi/KO2022/STK%204/R-4.06%20109_Milos%20Kuzman_Dunja%20Grujic_PUNIONICE%20ELEKTRICNIH%20VOZILA%20NA%20TRZISTU%20REPUBLIKE%20SRBIJE.pdf, 11. 8. 2023).
6. 013Info, 2022, Pančevac napravio elektroautomobil i već deset godina ne može da ga registruje, *013info*, 27 June, (<https://013info.rs/vesti/drustvo/pancevac-napravio-elektroautomobil-i-10-godina-ne-moze-da-ga-registruje>, 13. 8. 2023).

ELEKTRIČNA VOZILA U REPUBLICI SRBIJI: INSTRUMENT ENERGETSKE TRANZICIJE?

Miloš Kuzman

APSTRAKT

Sve učestalije globalne posledice klimatskih promena nisu zaobišle ni Republiku Srbiju. Kako se brojnim međunarodnim konvencijama obavezala da preduzme mere koje će smanjiti uticaj klimatskih promena, Republika Srbija je započela sprovođenje energetske tranzicije kao jednog od instrumenata uz pomoć koga će postići preuzete ciljeve. Vozila na električni pogon, odnosno hibridna vozila predstavljaju način uz pomoć koga se energetska tranzicija može ubrzati i u aprilu 2021. godine osnovne odredbe o njima su našle mesto u pozitivnom zakonodavstvu. U ovom radu se razmatra da li doneti propisi u ovoj oblasti predstavljaju dobru polaznu osnovu za dostizanje ciljeva energetske tranzicije kao i šta je potrebno dodatno učiniti da bi se njihovom primenom postigao željeni efekat.

Ključne reči: klimatske promene, energetska tranzicija, električna vozila, obnovljivi izvori energije, autonomna vozila.

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