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# Legal Regulation of the Construction and Operation of Electric Vehicle Charging Infrastructure in the Russian Federation and Foreign Countries

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#### Аннотация

At the moment, the use of electric vehicles (EV) is not stable both on a global scale and within a single state. Nevertheless, the electric vehicle industry, as a key technology to decarbonize road transport, is somehow becoming an integral part of the transport and energy complex. However, the full-fledged development of this industry faces a number of issues that can directly affect the state of demand and promote the interests and rights of end consumers. One of these issues is the construction and operation of the electric vehicle charging infrastructure. This is due not only to special technological standards for the construction, operation and decommissioning of such energy facilities, but also to the allocation of additional capacities in the energy system of inhabited areas and highways. Besides, the Russian legal and regulatory framework regulating public relations in the electric vehicles and their charging infrastructure is at the nascent stage, therefore, it is relevant to study and compare the current legal regulation of electric vehicle charging infrastructure in the Russian Federation and foreign countries. This article examines the legal experience of regulating public relations related to electric vehicle charging infrastructure, Germany and Italy (as member states of the European Union), as well as Great Britain and China. Each of the above states offers an independent scheme of legal regulation of one or another aspect of activities related to electric vehicles and their charging infrastructure. The research performed allows us to study foreign experience in order to update the current Russian laws and form a model of legal regulation.

Ключевые слова: energy law, energy law of foreign countries, electric vehicle, electric vehicle charging infrastructure, construction and operation of electric vehicle charging infrastructure

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### Introduction

- In recent years, there has been a significant upswing in the electric vehicle market, which can completely transform the automotive industry and related industries, including energy industry. Thus, according to the statistics of the International Energy Agency, about 6.75 million EVs were sold in the world in 2021, which is by 120% more than in 2020. [1]
- Of course, EVs are a key technology for decarbonizing road transport (it accounts for about 16% of global emissions). Meanwhile, it should be noted that the EV manufacturing and operation sphere, as well as their components and chargers, is a complex area of industry, characterized by engineering, energy, technical and other difficulties.
- Despite technological difficulties, this technological area is recognized as one of the most profitable investment areas, for example, the world's leading automakers plan to invest about \$515 billion by 2030 [2] in EVs and batteries to achieve increasingly stringent decarbonization goals set in certain states.
- At the same time, if there is a sufficiently promising forecast of further development of the electric vehicle industry, a number of issues that can affect the level of demand and meet the needs of the end user, remain unresolved.
- One of such issues (along with the study of the qualitative characteristics of batteries, including the transition to hydrogen technologies) is the construction and operation of the infrastructure of electric car chargers. This is due not only to special technological standards for the construction, operation and decommissioning of such energy facilities, but also to the allocation of additional capacities in the energy system of inhabited areas.
- Additionally, it should be taken into account that the regulatory framework governing public relations in electric vehicle industry, as well as their charging infrastructure, is at the nascent stage.
- In this regard, it will be relevant to conduct a comparative legal study of Russian laws and the legal experience of foreign countries regarding the regulation of the construction and operation of electric vehicle charging infrastructure.

### 9 I.The Russian Federation

- According to statistics from Autostat Analytic Agency, 2,998 new EVs were purchased in Russia in 2022. This figure is 33% more than in 2021, and is a record for the entire period of the existence of the domestic car market. [3] Despite the significant growth of the EV fleet in the Russian Federation, the patterns and main trends of its functioning have not yet developed, which makes it difficult to predict development and management.
- This circumstance may be due to the fragmentation of governmental and legal regulation, especially in terms of determining the legal features of the electric vehicle charging infrastructure.
- According to the Concept for the Development of Electric Vehicles Manufacture in the Russian Federation for the period up to 2030, approved by the Government of the Russian Federation, a balanced scenario for the development of the EV charging stations infrastructure by 2030 will require the presence of 144 thousand charging stations (ports).
- At the same time, the framework document defines measures to promote the charging infrastructure, it is noted that the state policy of regulating the charging infrastructure should be more flexible and include, in addition to directly financing projects for the creation of charging stations, a number of incentive measures for private businesses.
- Additionally, the Guidelines for Promoting the Use of Electric Vehicles and Hybrid Vehicles in Constituent Entities of the Russian Federation approved by Order of the Ministry of Transport of Russia No. AK-131-p dated May 25, 2022, as one of the key factors in increasing demand for electric vehicles, the development of parking space and charging infrastructure, including amendments to urban planning regulations, transport infrastructure, the creation of arrangements for obtaining and taking into account the proposals of owners of electric vehicles for the placement of private charging stations, etc., is emphasized.
- In accordance with the provisions of Federal Law No. 466- $\Phi$ 3 dated December 5, 2022, on the Federal Budget for 2023 and 2024–2025 Planning Period, RUB 2,406,720.00 are allocated for the

implementation of measures to develop electric vehicle charging infrastructure (inter-budget transfers) in 2023.

- Order of the Ministry of Industry and Trade of the Russian Federation No. 1776 dated April 29, 2022, on Approval of the Specifications of the Equipment of a Stationary Public Charging Station that Provides the Possibility of Fast Charging of Electric Vehicles establishes the technological requirements of such energy facilities, namely:
  - (1)Connected power of the charging station shall be at least 149 kW;
- (2) The minimum configuration of the charging station shall include:
- a) At least three DC connectors of EVs, where the established characteristics of GB/T and CCS2 plugs are mandatory;
- b) Charging cables of the charging station with a length of at least 4 meters each;
- c) Simultaneous charging of at least two EV units with dynamic balancing of the output power between DC connectors in all modes of operation of the charging station.
- With regard to determining the legal status of an EV and its charging infrastructure, a number of GOST standards have been adopted in the current national laws defining certain characteristics of such energy facilities, namely:
- -GOST R 59127-2020. National Standard of the Russian Federation. Electric Vehicles and Automobile Vehicles with Combined Power Plants. Identification;
- -GOST R 50571.7.722-2017/IEC 60364-7-722:2015. National Standard of the Russian Federation. Low-Voltage Electrical Installations. Part 7-722. Requirements for Special Installations or Locations. Supplies for Electric Vehicles;
- -GOST IEC 62752-2021. Interstate Standard. In-cable Control and Protection Device for Mode 2 Charging of Electric Road Vehicles (IC-CPD), etc.
- For electric vehicle parking equipment, please refer to SP 113.13330.2016. Handbook of Instructions. Parking Lots. Updated Version of SNiP 21-02-99\*, whereby "chargers (stations, EVSEs) for vehicles with electric engines" are equipment of a mains power source that performs the necessary functions for charging an EV battery. Besides, the charging output for electric vehicles is determined.

## 27 II.Member States of the European Union

- Electric vehicle market technologies are viewed by the European Union as a way to decarbonize the economy as part of the implementation of European Union Regulation No. 443/2009, [4] which sets emission performance standards for new passenger cars as part of a comprehensive community approach to reducing CO<sub>2</sub> emissions of passenger cars.
- Thus, according to the International Energy Agency, at the end of 2021, there were about 5.6 million EVs and light commercial vehicles connected to the grid in the European Union. [5]
- The basis for the development of electric vehicle infrastructure in the European Union was established by Directive 2014/94/EC on the deployment of alternative fuels infrastructure, [6] introducing new EU rules to ensure the creation of charging points for alternative fuel vehicles throughout Europe with uniform standards for their design and use. Member States should establish and publish their objectives and present the basis of their national policies.
- In addition, in 2022 MEPs adopted the Alternative Fuels Infrastructure Regulation, AFIR, [7] according to which by 2026 there should be at least one electric charging point for EVs every 60 km of the main EU roads.
- 32 Germany
- According to official statistics, the number of EVs in 2022 increased almost by 1.5 times (840,645 units in October) compared to 2021 (309,083 units). [8] This aspect can be directly related to high-quality and effective governmental and legal regulation.

- In 2015, a special law on the priority of EV use (Elektromobilitätsgesetz, EmoG) [9] was adopted, the subject of regulation of which includes the main aspects of this sphere, namely: the establishment of terms and definitions, including the establishment of types of electric vehicles (classes M1 and N1, etc.) and their labeling, the definition of the right of municipalities to create preferential parking options, fixing new road signs, etc.
- In relation to the charging infrastructure in Germany, a whole set of laws and regulations of various levels and content has been created.
- Thus, the basic regulation is the Resolution on the Minimum Technical Requirements for the Safe and Functional Design and Operation of Electric Vehicle Charging Stations Accessible to the Public (Ladesäulenverordnung, LSV) [10] from 2016, regulating the minimum technical requirements for the safe and functional design and operation of class N and class M electric vehicle charging stations accessible to the public.
- According to clause 2, § 2, a charging point is a facility on which only one electrically driven vehicle can be charged or discharged at the same time, and which is suitable and intended for charging electrically driven vehicles or charging and discharging EVs. The classification of charging points is legally defined:
- 38 (1)Depending on the charging speed:
- -a typical charging point where electricity with a maximum charging capacity of 22 kW can be transferred to an electrically driven vehicle;
- -a rapid charging point where electricity with a charging capacity of more than 22 kW can be transferred to an electrically driven vehicle.
- (2) Depending on access to a charging point:
- -a public point, if an indefinite group of persons or a group of persons that can be determined only on the basis of general characteristics can actually enter the parking space belonging to the charging point;
- -a charging point for a certain group of persons, if the operator has a clearly visible identification or a sign "The Use is Limited to an Individually Defined Group of Persons."
- The Resolution also defines the standards of technical safety and functional compatibility (§ 3), including the types of sockets, their connectors, etc.
- 45 The main parties to the legal relations under consideration are the charging point operator (CPO) (such company, for example, is Ionity [11]), which should allow EV users to charge their vehicles at certain points (§ 4). Besides, the CPOs are required to notify the Federal Network Agency for Electricity, Telecommunications, Post and Railway (Bundesnetzagentur für Elektrizität, Gas, Telekommunikation, Post und Eisenbahnen) about the commissioning and decommissioning of charging points, as well as provide evidence of their compliance with technical requirements of § 3. In turn, the Federal Agency may require that a charging point be upgraded, prohibit the operation of a charging point if a technical requirement is not met.
- Moreover, the legal status of CPOs as end consumers is determined in accordance with the provisions of the Act on the Further Development of the Electricity Market (Gesetz zur Weiterentwicklung des Strommarktes) of 2016. [12]
- The further development of the use of EVs in Germany was facilitated by the Act adopted in 2020 on the Promotion of Electric Mobility and Modernization of the Homeownership Act, as well as on Amending the Rules of Value and Land Registry (Wohnungseigentumsmodernisierungsgesetz, WEMoG), [13] which defines the procedure for installing and using private charging stations with notification of the network operator and several consultations of electrical engineering companies.
- 48 Italy
- Despite the increase in the number of models on the European market, 49,058 EVs were registered in Italy in 2022, which is by 27.1% less than in 2021 (when 67,264 EVs were registered). Many

researchers explain this by the lack of an accessible charging infrastructure, while others, in turn, point to the imperfection of the legal framework.

- The basis for the development of EVs in Italy is established by Legislative Decree No. 257 dated December 16, 2016, on Alternative Fuels (Direttiva Iniziativa sui combustibili alternativi, DAFI), [14] according to Chapter III of which measures are defined for the distribution of vehicles running on alternative fuels. So, in addition to the general statistical goals and objectives of the further transition to EVs (for example, reaching the level of 25% of the total number of vehicles in the following five years), the need for an "affordable number of charging points", updating of construction norms and regulations, as well as requirements for the repair of buildings for the possibility of establishing and using a connection point for electric vehicle charging is determined.
- In order to define guidelines guaranteeing the uniform development of electric vehicle charging services, the National Infrastructure Plan for Recharging of Electric Vehicles (Piano nazionale delle infrastrutture di ricarica elettrica, Pnire) [15] was adopted in Italy.
- The Plan provides for the creation of a vehicle charging service, the introduction of charging service management procedures, the introduction of subsidies for the modernization of systems, the creation of technological modernization programs for existing buildings, the promotion of technological research aimed at creating infrastructure networks for recharging.
- The most important subjects in operation of electric vehicle charging infrastructure in Italy are the following.
- Firstly, ARERA, [16] an administrative authority for energy, networks and the environment, which regulates and encourages the development of electric vehicle charging infrastructure, sets a network tariff for private and public charging, the cost and methods of connecting charging points, etc.
- Secondly, the charging station developers, in particular Enel, which manages almost half of charging points nationwide.
- In 2023, the Ministry of Environment and Energy Security adopted a Resolution on Determining the Criteria and Conditions for Granting Gratuitous Benefits in Favor of a New Infrastructure for EV Fast and Ultrafast Charging to be Built on Motorways [17], establishing procedural aspects and the procedure for granting gratuitous benefits in order to encourage the construction of at least 7,500 ultrafast electric vehicle charging infrastructures on motorways.
- In general, the construction of the charging infrastructure in Italy is more subject to pan-European standards and building regulation, for example, standards for sockets and plugs (CEI 23-50, CEI EN 60309), other international IEC standards.

## III. Non-Member States of the European Union

- 59 The UK
- In 2022, more than 265,000 battery electric vehicles (BEV) were registered in the UK, which is by 40% more than in 2021. [18] Such material increase in the EV fleet requires an accessible and high-quality charging infrastructure.
- The UK government is investing in the promotion of EVs and the infrastructure that ensures their use. Thus, the Department for Transport, together with the Department for Business, Energy and Industrial Strategy, created the Office for Zero Emission Vehicles (OLEV), [19] which was given a mandate for investments of £ 900 million, as well as the possibility of providing additional investments of £ 20 million in V2G infrastructure (as part of the Government's Smart Systems and Flexibility Plan [20] of 2021).
- Additionally, the OLEV provides grants for charging stations for the installation of a home charging station. Local government agencies can apply to the OLEV for financing up to 75% of the cost of installing a street charging station in areas where there are no parking spaces in the courtyards.
- The basic regulation in relation to the use of EVs and their charging infrastructure is the Automated and Electric Vehicles Act [21] of 2018, the scope of regulation of which includes the specifics of manufacturing and operating public charging points.

- Thus, according to Article 9 of Part 2 of the said Act, a definition of a "charging point" is established as a device intended for charging a vehicle that is capable of being driven by electrical power derived from a battery (or for discharging electricity stored in such a vehicle). Additionally, the "hydrogen refueling point" means a device intended for refueling a vehicle that is capable of being driven by electrical power derived from hydrogen. It should be borne in mind that the above points are a "public charging or refueling point" if it is provided for use by members of the general public.
- The Act also defines the following integral aspects of the functioning of the charging infrastructure, namely: access requirements, standards for connecting public charging points (Article 10), specifics of information for users of public charging points (Article 13), some aspects of the legal status of large fuel retailers supplying the same to public charging or refueling points (Article 11), etc.
- In addition, the Electric Vehicles (Smart Charge Points) Regulations of 2021 were adopted, [22] which determine the manufacturing and operation of private electric vehicle charging points that are used at home or at the workplace, as well as smart cables, defined as an electric cable being a charging point (which can also transmit and receive information).
- From 2022, new Building Regulation for the Installation of Electric Vehicle Charging points or Cable Routes (Infrastructure for Charging Electric Vehicles) [23] will come into force, which contain technical guidance on the requirements for installation and charging points. The said regulation applies to new residential and non-residential buildings; buildings the purpose of which is significantly changed to residential; residential and non-residential buildings undergoing major repairs; and mixed-use buildings that are either new or undergoing major repairs.

## 68 China

- According to statistics published by the China Electric Vehicle Charging Infrastructure Promotion Alliance on January 12, 2023, from January to December 2022, the volume of sales of cars using new energy sources will amount to 6.887 million units, and the increase in the number of chargers will amount to 2.593 million units [24].
- In 2020, the State Council of the People's Republic of China adopted the New Energy Automobile Industry Development Plan (2021 to 2035), [25] which, as a framework document, defines the further development of the electric vehicle industry for the specified period. Among the main statistical forecasts (for example, the volume of sales of cars powered by new energy will be about 20% in 2025), one of the basic factors for the development of this industry is timely planning, construction of charging and replacement infrastructure, coordination of the manufacture of smart road network facilities, etc.
- Interestingly, back in 2015, the General Office of the State Council issued Guidelines on Accelerating the Electric Vehicle Charging Infrastructure Construction No. 73, [26] according to which the charging infrastructure is understood as a new type of urban infrastructure that provides various charging and exchange devices for supplying electric vehicles with electricity. The charging infrastructure called "charging facilities" is also commonly known as "charging piles".
- Quite promising provisions of state regulation and support of such energy facilities have been established, namely:
- (1)State financial support for the charging infrastructure. It is implemented through the provision of subsidies to local government agencies that achieve their annual goals for the promotion of the electric vehicle transport sector. The subsidy has a target purpose and is used exclusively as financial support for the construction and operation of the charging infrastructure, maintenance and updating of charging and battery replacement management networks, as well as improving the overall level of charging services. It should be borne in mind that local authorities are prohibited from using financial support as subsidies for the purchase of EVs or subsidies for EV manufacturers;
- (2)Preferential treatment for charging stations on the initiative of two state monopolies (the State Grid Corporation of China (SGCC) and the China Southern Power Grid), which consists in the fact that station operators can pay only for the electricity actually used and are exempt from paying "basic fees" (this is a fixed fee determined by the capacity of transformers of large industrial electricity consumers), which are paid by other large industrial energy consumers.

- The legal peculiarities of the construction and operation of electric vehicle charging infrastructure are established by a whole set of laws and regulations.
- Thus, according to the Standard System for Electric Vehicle Charging Stations for Electric Vehicles adopted by the National Energy Administration in 2015, manufacturers of charging piles should pay attention to the design and development of a standard system of charging facilities. The standard system of loading devices is the main criterion in the production of loading and interchangeable facilities, as well as one of the important benchmarks for assessing whether loading and interchangeable facilities meet the requirements, which is of great importance. Besides, manufacturers of charging piles are responsible for the quality and safety of their products. In addition to these entities, requirements concerning the land use and urban planning, as well as construction norms and regulations, including obtaining certain types of construction qualifications, are applied.
- A separate subject is companies engaged in charging of piles, which are entitled to receive payment for electricity consumed and service fees.
- The final recipients of the services provided are the owners of vehicles, who at the same time can exercise the rights and perform the duties of the applicant for the construction of a charging station, as well as perform its direct use.

# 79 Conclusion

- At the moment, the use of EVs is not stable both on a global scale and within individual states, however, it can already be said that the EV fleet is somehow becoming an integral part of the transport and energy complex. In order to ensure the qualitative development of the industry under consideration, in view of the environmental agenda for reducing greenhouse gas emissions and other aspects, as well as promoting the interests of EV owners, guaranteed EV maintenance is required, including an accessible charging infrastructure.
- Thus, a fully developed network of charging stations is a key infrastructure factor that will contribute to the rapid deployment of the electric vehicle industry.
- This article analyzes the legal regulation for the construction and operation of electric vehicle charging infrastructure in the Russian Federation and foreign countries, namely Germany, Italy, Great Britain and China.
- Of course, only the main aspects of the legal regulation of public relations arising in this area have been studied. However, the research performed allows us to conclude that the modern laws regulating the charging infrastructure of all states differ in their fragmentation, and in some cases is at the nascent stage.
- Nevertheless, it is possible to highlight some positive legal experience of the selected states, the application of which will allow updating and supplementing the current Russian laws, as well as creating an optimal model of legal regulation.
- In the Russian Federation, one of the main issues is the lack of regulatory regulation within the framework of special laws, namely the Federal Law on Electric Power Industry No. 35-Φ3 dated March 26, 2003, and subordinate legal regulation. Updating is required on pricing and tariffs, the legal status of subjects (manufacturers of charging stations, operators, and end users), the legal regime of the charging infrastructure, including the procedure for its connection, etc.
- One of the most promising examples of the legal provision of electric vehicle charging infrastructure is Germany, where a whole set of laws and regulations has been created that establish both definitive provisions and safety features during the construction and operation of these energy facilities. In addition, the legal status of the subjects of the relations under study is clearly defined.
- The legal experience of Italy is characterized by the presence of high-quality declarative regulations that determine the planning of the electric vehicle charging infrastructure. Legal norms related to the provision of gratuitous benefits in favor of the new charging infrastructure are also of interest.
- In the UK, a fairly promising system of investing in the construction and operation of the charging infrastructure has been created within the framework of the activities of a special state institution,

#### the OLEV.

So China's regulatory framework also establishes detailed requirements for the charging infrastructure, starting with planning and investing in projects for the construction of these energy facilities, and ending with a clear definition of the rights and obligations of the parties to such legal relations.

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#### Abstract

At the moment, the use of electric vehicles (EV) is not stable both on a global scale and within a single state. Nevertheless, the electric vehicle industry, as a key technology to decarbonize road transport, is somehow becoming an integral part of the transport and energy complex. However, the full-fledged development of this industry faces a number of issues that can directly affect the state of demand and promote the interests and rights of end consumers. One of these issues is the construction and operation of the electric vehicle charging infrastructure. This is due not only to special technological standards for the construction, operation and decommissioning of such energy facilities, but also to the allocation of additional capacities in the energy system of inhabited areas and highways. Besides, the Russian legal and regulatory framework regulating public relations in the electric vehicles and their charging infrastructure is at the nascent stage, therefore, it is relevant to study and compare the current legal regulation of electric vehicle charging infrastructure in the Russian Federation and foreign countries. This article examines the legal experience of regulating public relations related to electric vehicle charging infrastructure, Germany and Italy (as member states of the European Union), as well as Great Britain and China. Each of the above states offers an independent scheme of legal regulation of one or another aspect of activities related to electric vehicles and their charging infrastructure. The research performed allows us to study foreign experience in order to update the current Russian laws and form a model of legal regulation.

**Keywords:** energy law, energy law of foreign countries, electric vehicle, electric vehicle charging infrastructure, construction and operation of electric vehicle charging infrastructure

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