Schings
Summary Dissertation
April 2022

The dissertation titled "The expansion of public charging infrastructure for electric vehicles - perspectives of state control for climate protection and mobility guarantee" deals with the regulation of the expansion of publicly accessible charging stations for battery electric cars in Germany.

Parts 1 and 2: Need for regulation of the expansion of public charging infrastructure

In its first two parts, the dissertation examines the need for regulation of the charging infrastructure expansion. Especially in the transport sector there is an urgent need to reduce greenhouse gas emissions. In addition to traffic avoidance and modal shift, the traffic turnaround also demands that the use of conventional, emission-intensive fuels in internal combustion engines to be phased out as quickly as possible. In the area of private motorized transport, such a change in engine systems will be based to a large extent on battery-powered electromobility. This is because other low-emission drive technologies – biofuels and e-fuels, fuel cells and plug-in hybrids – have a significantly poorer CO_2 balance or cannot be expected to gain significant market share in the passenger car drive segment in the foreseeable future.

However, the success of electromobility in replacing conventional combustion engines depends on whether sufficient charging options are available in good time. The fear of losses in mobility is currently deterring many people from buying an electric car. In rural areas in particular, there is still too little charging infrastructure in public spaces. This undersupply stems from the fact that charging infrastructure operation is currently not profitable anywhere due to a lack of sufficient capacity utilization. The scope of charging infrastructure provision and sales figures for electric vehicles are linked by a chicken-and-egg problem that needs to be solved.

In addition, there is a risk of excessive charging prices at the existing charging stations in terms of market power. Public charging infrastructure is characterized by a tendency for market power concentrations to emerge among individual infrastructure operators. Contrary to what has been assumed in the legal literature to date, this is not a temporary phenomenon that can be attributed solely to the granting of exclusive operating rights to individual charging point operators by municipalities. Rather, the charging infrastructure – comparable to other network infrastructures – has special economic features, such as significant positive network effects, that make it difficult to duplicate. A functioning competition between different charging infrastructure operators is therefore unlikely in the long term. Instead, oligopolistic, if not monopolistic structures will become entrenched on the charging infrastructure markets.

The dissertation finds that the German state has a constitutionally based responsibility to guarantee the provision of affordable charging infrastructure throughout the country. In the future, public charging stations will enable fundamental rights with regard to the right to mobility (Article 2 (1) in conjunction with Article 3 (1) Grundgesetz). The two-degree target of the Paris Climate Agreement, which has constitutional status (Article 20a Grundgesetz), calls for a rapid phasing-out of fossil-fueled combustion engines. Since considerable parts of the population – especially people living in rural regions – will remain dependent on their own cars in the medium term, alternatives to gasoline and diesel-powered passenger cars will be indispensable in the future.

The dissertation takes an intertemporal perspective on the scope that remains for the state to fulfill its obligation to provide mobility. Since the establishment of low-emission drive systems in a governance environment still dominated by the conventional, fossil-fueled combustion engine takes time, the state must not accept significant future mobility losses for the population by waiting any longer. The intertemporal safeguarding of individual mobility participation already calls for increased government action today. Thus, in a first step, a state mandate to ensure clean mobility can be justified.

In a further step, the dissertation elaborates that the legislative scope for assessment and design in guaranteeing mobility participation in the face of the prohibition of insufficient actions is exceptionally narrowed down to a specific state mandate for action – namely the promotion of battery electric mobility together with the associated charging infrastructure. This can be justified on the basis of consequential considerations. Compared with other low-emission drive options in the passenger car sector, battery-powered electric vehicles have a significant head start in development. This is primarily the result of the government's management of the drive system turnaround to date, which has placed a focus on battery-powered electromobility. Due to path dependencies, these decisions largely rule out alternative actions by the state to protect the climate on the one hand and ensure mobility on the other. Intensified promotion of battery electric mobility, including charging infrastructure, is the most effective instrument for the state to be able to meet the emission reduction targets in the transport sector in good time and to ensure mobility participation in the long term. At the same time, it is also the most efficient solution that saves time and money, i.e., it helps the state, which is under great time pressure, to achieve its climate targets.

In addition, publicly accessible charging infrastructure will be indispensable for many people in Germany in the future. Charging options are needed in public spaces in order to cover longer distances. Moreover, part of the population will still not have (regular) access to private charging infrastructure in the future.

Part 3: Instrument debate from a governance perspective – development of a regulatory concept for a nationwide charging infrastructure supply

The third part of the dissertation examines government planning and implementation strategies for ensuring nationwide charging infrastructure coverage.

The dissertation shows that the standard used to date for assessing the need for public charging points must be modified in the interest of a rapid turnaround in propulsion. The determination of demand must no longer be based solely on objectively measurable demand but must also include the subjective "range anxiety" of the population. What is required, therefore, is a temporary oversizing of the infrastructure provided, which must also supply remote locations regardless of their actual capacity utilization. This oversizing, however, must be gradually reduced, taking into account the simultaneously necessary expansion of the private charging infrastructure, but also the supply of collective transport modes on road and rail. This requires intelligent planning that provides charging points specifically at interfaces between different modes of transport and thereby forms mobility chains.

Capacity and location planning for public charging stations is the responsibility of the municipalities due to their proximity to the location. Consensual instruments already open up the possibility of involving private investors at an early stage in urban land use planning. This accelerates planning and plan implementation and saves state resources. However, such an approach is accompanied by coordination and implementation problems that are unlikely to be solved satisfactorily at the municipal level and through voluntary municipal efforts alone.

The dissertation therefore proposes a municipal realization planning concept based on the model of a transport planning concept already developed in the 2000s, which can now be used for the charging infrastructure expansion. This concept takes the traffic turnaround as a whole into consideration. The municipalities must be required by federal state law to draw up integrated overall traffic plans, including implementation and time schedules. In particular, the federal states must ensure that these plans are coordinated with other spatial and specialized plans, as well as with local transportation and environmental plans. The added value of such an overall municipal plan outweighs the associated increase in the financial and human resources

required by the state if the individual measures are intelligently interlinked with the involvement of private-sector knowledge and willingness to invest.

At the same time, the dissertation draws attention to the necessary modifications and additions to the previous conception of such transport planning. The plans must not be limited to urban areas but must also specifically cover rural areas to ensure socially acceptable and climate-friendly mobility there. In addition, motorized electrified individual transport must be assigned its own role in the "environmental network" (Umweltverbund).

At the implementation level, a mix of pure incentive and direct control instruments is necessary. Purely indirect control, as has been predominant in charging infrastructure promotion to date, is not sufficient for the timely achievement of the control objectives. The dissertation proposes a two-stage concept. The first stage involves state-private cooperation, the core of which is the initiation of competition for regional charging infrastructure markets by means of tender procedures. In this context, municipalities can also take an active role in the provision of charging facilities within the framework of mixed-economy companies. If these incentives for voluntary private service provision are not sufficient to ensure nationwide charging infrastructure coverage, the invitations to tender should be supplemented in a second stage by selective commissioning measures as part of a universal service model.

In developing this governance model, the dissertation takes a comparative approach to other network sectors, such as government support for broadband expansion and the universal service regimes already established in the energy, postal and telecommunications sectors.

The dissertation also looks at the financing of the proposed concept. In order to break through the chicken-and-egg problem, financing the infrastructure expansion from the state budget initially seems unavoidable. However, this is only a temporary supply condition. On the one hand, players in the automotive industry can already be called upon to finance the construction of the charging infrastructure through special levies. On the other hand, the charging infrastructure will be more heavily utilized in the future and will therefore be profitable, at least in cities and metropolitan areas. The dissertation shows ways in which the financing risk can be (re)shifted to the market: In the tendering process, the profitability gap model will be replaced by operator models; in the future, municipalities will award concessions for charging point operation. The universal service will then be financed by a special levy on all charging point operators.

However, the dissertation shows that there is a permanent conflict of objectives between comprehensive charging infrastructure coverage and competition between charging point operators. Promoting nationwide coverage necessarily favors the consolidation of regional area oligopolies or monopolies. However, this development must be accepted for the success of the drive turnaround.

Part 4: Ensuring appropriate prices for charging via the introduction of temporary ex ante access regulation of the public charging infrastructure

In its fourth and final part, the dissertation examines how the regulatory concept must be designed to ensure not only nationwide coverage but also the appropriateness of charging electricity prices (which are rising continuously).

Direct price regulation of charging electricity tariffs at the retail level is inefficient and therefore not recommended. It hinders competition and lowers the incentives for charging point operators to invest in their infrastructure. Even ex post access control under antitrust law is not sufficient at the current market stage to effectively prevent excessive charging power prices. The essential facilities doctrine under antitrust law is not relevant due to the difficult, yet possible duplicability of public charging infrastructure. In view of the large number of charging infrastructure markets to be regulated, the sanctioning of price exploitation abuses via the general clauses of Article 102 sentence 1 TFEU or Section 19 (1) German Competition Act (GWB) threatens to overburden the antitrust authorities, whose instruments for determining non-discriminatory access conditions are geared more towards selective interventions.

The dissertation finds that, contrary to the prevailing view in literature, there is a need for ex ante access regulation for the public charging infrastructure, in which the infrastructure operators are obliged, following the example of other grid sectors, to grant third-party providers (especially electricity and mobility providers) non-discriminatory access to their charging points. However, reintegrating the public charging infrastructure into the regulatory system of the German Energy Industry Act (EnWG) does not promise success in this regard. On the one hand, this is due to EU law, which requires unbundling of the operation of electricity distribution networks and charging points. On the other hand, many provisions of electricity grid regulation are transferable to the charging infrastructure and the rapidly changing charging power consumers only to a limited extent: Thus, there is a risk of overregulation.

The goal must be therefore the introduction of an independent, charging infrastructure-specific access regulation. The dissertation proposes a concept for this that is based on the energy

industry law system but retains the separation from the electricity distribution network and thus leaves the provider structure on the charging infrastructure markets untouched. The core of such access regulation is an incentive regulation along a revenue cap, which prevents excessive access charges, promotes competition at the level of charging and at the same time sets incentives for the charging infrastructure operators to operate efficiently and make investments.

The proposed charging infrastructure-specific access regulation will be temporary in nature. This is because intramodal competition between conductive and inductive charging solutions can be expected in the future, which offers potential for deregulation – i.e., handing over competition control over the charging infrastructure to the antitrust authorities.