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Requirements regarding supply and funding regimes for the introduction of ERS

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Summary

The introduction of ERS for heavy commercial vehicles poses major challenges for the market players involved in the logistics sector. In addition to cost concerns, a number of other uncertainties need to be taken into account to allow players in a demand-driven market to switch to a new propulsion system. With the help of the new institutional economy, this article looks at the requirements that must be met by successful supply and promotion regimes.

1 Research Questions

The aim of the work presented here is to derive potentially successful supply and funding regimes that will simplify and support the use of ERS and make it possible in the medium and long term. To this end, it is necessary to investigate whether and how conceivable scenarios for the expansion of ERS can be embedded into the microeconomic rationality of players in the logistics and transport sector and how the effects of these scenarios influence decision-making within companies. In this abstract, we work out some factors that need to be taken into account when designing support regimes for ERS in the future. In case of a presentation at the conference these factors will be illustrated with examples. The focus is on Germany, but in principle the considerations can also be applied to other countries.

2 Methodology

By neglecting transaction costs (and thus making the usual neoclassical assumptions), the monetary funding requirement for novel ERSs can be determined "simply" within the framework of so-called TCO analyses (total cost of ownership). The intertemporal design of the necessary payments (for investment in vehicles, for the duration of its operation or for "electrically driven km") within the framework of the support scheme can then provide (more or less) hard incentives to maximise the number of electrically driven kilometres.

In reality, however, there are transaction costs. For this reason, the analyses on the topics mentioned under point 1 are also based on (industrial and institutional) economic findings. For this purpose, it is first necessary to include the technical system of the ERS under question and in this context also to consider various conceivable technical-systemic development scenarios. Then, taking into account theoretical findings on transaction cost, it has to be asked which forms of coordination (integration, contracts, "simple" market relations, ...) are suitable to ensure the interaction between the various tasks and roles that exist due to the technical system. In this context, for example, the question arises as to whether subsidy regimes should also (directly) address value creation stages or tasks beyond the transport companies, e.g. maintenance, leasing companies and insurance companies. It should be noted, however, that the complexity of funding regimes, which increases with the addressing of upstream stages of the value chain, places

increased demands on the public sector in terms of knowledge. In this context, not only findings from New Institutional Economics (in particular transaction cost theory) but also from the Resource-Based-View and the Knowledge-Based-View must be taken into account in order to assess whether and under what conditions the public sector can achieve and maintain the levels of knowledge required for the design of certain forms of funding regimes.

3 Results

Strategic corporate decisions in the logistics sector are to a large extent influenced by a tough price war (low margins), a shortage of drivers (especially in long-distance traffic) and high demands on quality criteria such as adherence to delivery dates and safety. Under these conditions, the company's development is mostly risk-averse, which in turn is reflected in a limited affinity for innovative vehicle concepts and technologies [1]. Even if a new technology pays off in terms of TCO (total cost of ownership), its introduction can be rejected by the transport companies with reference to other risks (e.g. default risk, future cost risks).

Apart from personnel costs, vehicle and energy costs are the largest cost blocks for transport companies. When examining the supply and subsidy regimes, the areas of rolling stock (truck acquisition / ownership models) and operation should therefore be considered. As far as rolling stock is concerned, there is always the possibility of providing incentives on the part of the vehicle manufacturers (e.g. R&D funding, CO_2 limits) or on the part of the operators (e.g. investment cost subsidies). It should be borne in mind that the risk aversion of vehicle operators, at least in an introductory phase, will only allow leasing as ownership model. Concerning vehicle operation, it’s always the operators that are addressed, and energy taxes (electricity/diesel) and tolls can be used as starting points for subsidies.

It follows from the hurdles mentioned above that supply and funding regimes for ERS should also provide support, where appropriate, with regard to networking and cooperation between system-relevant organisations and actors such as maintenance, insurance companies and lessors, in order to ensure the necessary security for operators. However, this may be dispensable if actors with sufficient market power (such as vehicle manufacturers) act as so-called "system integrators" and voluntarily organise the integration of the value-added stages mentioned into a bundled ERS offer.

Important general decision variables in the development of funding regimes are

- **Knowledge levels** - How can funding regimes be designed to be robust against presently unknown future technical developments?
- **Volume of Remuneration / funding** - Which technical and economic criteria should be used for its determination?
- **Distribution issues** - Who bears the costs of the funding regime?
- **Complexity** - What are the costs (including opportunity costs) of taking advantage of the funding and how can they be minimised?

The need for explicit addressing ERS technology in the regulatory framework can also be derived from general economic and systematic considerations. The following factors, among others, play a role here:

- ERS needs a complementary infrastructure and thus has a starting disadvantage in competition with established technologies.
- In addition to greenhouse gas reduction, ERS affects various other policy objectives (e.g. energy efficiency, air quality, technology policy), which must be taken into account when setting incentives.
- The future development of ERS depends to a large extent on the scope and timetable of the system expansion in the introduction phase (due to network effects, learning curves and effects related to economies of scale), so there are path dependencies.

The design of suitable supply and funding regimes for ERS thus will determine if society will be able to take advantage of the technology.

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