

Materials on Development Finance

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Financing urban e-mobility – what are the options?

Policy framework

At the 2023 UN Climate Change Conference in Dubai, Member States reaffirmed the goal of limiting global warming to 1.5 degrees. For the first time, they decided to move away from fossil fuels and included this in the final document. This is the “beginning of the end” of fossil fuels according to the UN’s interpretation of the result afterwards. Although the wording remained vague, it is clear that the future now officially belongs to other technologies. When it comes to transport, this is currently electromobility.

A change in local public transport in cities is particularly important. Today more than half of humanity already lives in urban centres; by the middle of the century, that figure is predicted to rise to over two thirds. Sustainably meeting their mobility needs would make a major contribution to climate change mitigation. The main aim is to replace outdated, accident-prone and inefficient fleets with more energy-efficient, electrically powered buses.



Electric buses in India.

Combustion engine still preferred

However, the reality in developing countries is still different at the moment. Vehicles with combustion engines are still preferred there to this day. This is why carbon emissions from transport have also increased significantly in recent years, particularly in non-OECD countries – by 34% between 2010 and 2019 – while the trend in other climate-relevant sectors has slowed down in some cases. In order to decarbonise transport, consistent electrification of road vehicles is required. This also applies to buses, taxis, tuktuks and motorised rickshaws.

What is decarbonisation?

The goal of decarbonisation is to generate energy without using carbon. Technologies based on the combustion of natural gas and petroleum are to be replaced with those that do not generate carbon dioxide emissions. This includes battery- and hydrogen-based electric drives, where the electricity for the production and operation of vehicles comes from non-fossil sources.

Electric vehicles have also been tried and tested from a technological perspective in public transport and are being continuously improved. Their use has now been optimised in terms of range, charging processes and maintenance. Practicality is therefore not the reason why they are being deployed more slowly in most regions of the world.



Bus in Bangalore, Karnataka, India.

A question of economic efficiency

Rather, the big question is economic efficiency. Especially since in developing countries, unlike here at home, the operation of urban vehicle fleets is often in private hands. High margins are often not achievable here because tariffs are capped and cannot rise arbitrarily in view of the social situation and widespread poverty. In addition, these kinds of companies usually receive little or no government subsidies. Accordingly, transport operators must accurately calculate procurement and running expenses.

If the costs over the entire life cycle of an electric vehicle are higher than those of a combustion vehicle, there is no business case. Then a transport company will not switch to electric vehicles on its own initiative. The switch only happens if subsidies are provided by the government. These could be provided from local or national budgets or, to a small extent from proceeds from CO2 certificates, but would then put a corresponding – and long-term – burden on public budgets.

Role of development banks

Although there are differences from country to country and sometimes also from city to city, in many cases it can be assumed that electric vehicles – in addition to having a smaller climate impact – can be economically more advantageous than combustion vehicles, taking into account all the costs of procurement and operation. Although the ongoing operating costs are generally lower due to lower energy expenditure and lower maintenance requirements, the initial investment for procurement is significantly higher than for conventional vehicles.

This is precisely where development banks can get involved and play a role in supporting the transformation. Even if electromobility could be worthwhile here in principle, it would result in high private financing costs, which private transport companies would not want to incur without support. The transition will therefore not take place on its own at the speed necessary for the transport sector to make a significant contribution to achieving the 1.5-degree target.

Three main factors stand in the way of a rapid transition: high procurement costs, lack of charging infrastructure and technology risks

Loans are difficult to obtain

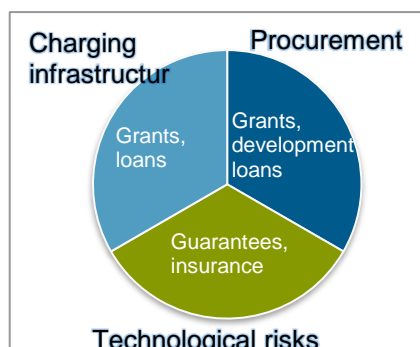
The following paragraphs show which obstacles exist and which (innovative) promotional instruments are available or suitable. In any case, it is clear that transport companies find it difficult or have very high interest rates on loans from commercial banks to cover the high initial costs due to the low profit margins and the resulting low creditworthiness. This is where development banks can come in. In order to achieve maximum effects in the sense of a rapid transition to e-mobility and at the same time not stifle private sector initiatives, it is crucial to find the right mix of grants, financing and risk buffers for the respective needs.

High procurement costs

So far, there are three factors in particular that are hindering a rapid and widespread transition to electromobility. The first concerns

the procurement costs, which are about two to three times higher than those of diesel vehicles. Although this factor is likely to decrease in the future, the procurement costs play a major role in the investment decision. In operational reality, electric vehicles are therefore often considered uneconomical – despite the generally lower operating costs.

Three main hurdles and conceivable solutions



Lack of charging infrastructure, high procurement costs, technological risks.

Grants, development loans:

There are two ways for development banks to increase the incentive to buy electric vehicles. They can work with grants to cushion the initial additional costs. Or they can issue development loans. This is a mixture of loans and grants, which can therefore be issued on more favourable terms than loans on the capital market. They can also be linked to conditions for reduced carbon dioxide emissions. Development loans are a tried-and-tested instrument in financial cooperation, and their combination with emission reductions also has a greater impact. In general, these types of development loans can be offered in consultation with national or local financial institutions and serve to reduce or mitigate the high procurement costs. At the same time, this opens up time for borrowers, as the repayment takes place over the entire lifetime of the vehicle.

Lack of charging infrastructure

Another crucial hurdle in virtually all countries is the charging infrastructure, which must be completely built from scratch. In developing countries, this expansion is progressing particularly slowly. It is estimated that three quarters of all charging stations can currently be

found in China and Europe; the rest are distributed roughly equally between the USA and all other countries. The high initial investments required for this, combined with uncertain framework conditions and inadequate strategies for expansion, hamper further market penetration in public transport.

Grants and loans:

Promotional programmes can help overcome this bottleneck. One possibility is to set up public transport charging systems financed by public funds in the form of investment incentives. The costs on the transport operators' side for setting up the charging infrastructure are usually part of the procurement costs of the electric buses. As in the previous point, these can be reduced via grants or development loans and thus make the e-mobility business model more attractive.

Technological risks

Although the electric drive is now considered a tried-and-tested technology, it still poses technological risks for transport operators. As their financial resources are usually scarce, these types of risks can quickly limit their business activities. One of the risks is that the residual value of an electric vehicle is still subject to uncertainties after purchase.

The range also plays a role here, and the service life of the batteries is also considered uncertain. Most battery manufacturers guarantee that a battery will last for eight years and will cover a certain mileage until the next necessary recharge, but there are no reliable empirical values or guarantees for this so far. If the battery's performance expectations are not met, fleet owners will not be able to repay loans.



Charging station in São Paulo, Brazil.

Guarantees, insurance:

The aforementioned risks can be mitigated by guarantees in order to increase the creditworthiness of transport operators and reduce their financing costs. Guarantees are a type of surety whereby promotional banks secure the interest on a normal loan with another bank. This builds trust and can also contribute to lowering interest rates, increasing the willingness of commercial banks to grant loans to operators of urban bus or taxi fleets to purchase electric vehicles. So far, guarantees have not been recognised as part of Official Development Assistance (ODA), but KfW is committed to ensuring that this will be the case in the future. Guarantees are an innovative financial instrument with high potential. They can promote important investments, but are rare in development cooperation, not least because of the lack of ODA eligibility.

The same applies to battery insurance policies, which reduce the risk of default for operators and thereby also increase their creditworthiness as borrowers. Insurance companies come into play here, for example, to minimise technological risks associated with the use of batteries. These types of insurance offers could ease the burden on transport operators, but also on battery manufacturers in granting warranty periods for their products. They can therefore also contribute to building local battery production and in this way stimulate the market.

Innovations

In addition to these three main hurdles, there is the need for continued innovation to implement the e-mobility ecosystem and bring it to the road or rail. Innovations in this area can help to develop the market and make it more stable. And they can help reduce high upfront costs. These kinds of innovations usually come from start-ups and “incubators” whose business models are nevertheless subject to risks. As a result, they often struggle to gain access to the necessary capital.

Structured funds:

Structured funds are suitable for mobilising private capital for innovation. This is where public and

private funds mix, with public donors bearing the main risks, making investments more attractive for private actors even in a new or still uncertain environment. Specifically, in the event of a loss, the deposits of institutional donors are taken first. Conversely, profits are initially passed on to private investors. Structured funds are not yet available in the widest possible range of sectors. Their application could be expanded because it is now clear that the forthcoming transformation, like the SDGs in general, can only be achieved with private capital.

Other difficulties

Other difficulties that can slow down the transition to e-mobility include:

- Local banks often lack expertise in electromobility. This is another reason why they are reluctant to lend.
- An inadequate power grid, which would quickly become overwhelmed if electric fleets were to be expanded further, can be a burden. Electricity grids are often a problem, especially in developing countries.
- The same applies to limited national capacities in vehicle production, which is dependent on battery production, which makes (expensive) imports from China in particular necessary.
- Uncertainties about spare parts deliveries can also have a deterrent effect.
- Finally, the transport operators' employees must be trained.

These are all obstacles that stand in the way of the further expansion of e-mobility, especially in developing countries. This makes it all the more important that development banks help to remove the major hurdles and set the right incentives to do so.

Development cooperation's conventional financial instruments reach their limits when electric vehicles are to dominate quickly. This is why KfW is also focusing on developing innovative financial products.



Depot with electric buses in São Paulo, Brazil.

Case studies in three countries

In order to gain even more experience with the electrification of urban transport, KfW is testing selected financial instruments in the three countries of Brazil, India and Mexico on behalf of and with funds from the Federal Ministry for Economic Cooperation and Development (BMZ) in close cooperation with local actors. This includes loss guarantees that reduce the risk for private lenders as well as structured funds that help to provide innovative companies with equity and loans with emission reductions to reduce high initial costs. To this end, KfW initially evaluated the urban transport sector in the three countries and derived recommendations for action as to which financing instruments are particularly suitable in the respective countries. These are now being piloted there. According to the plan, they will then also be used in other cities and countries.



E-bus stop in São Jose dos Campos, Brazil.

Conclusion

Electromobility can make an important contribution to climate change mitigation. But it will not proliferate on its own as it has to overcome some major hurdles.

Development banks can support this process with targeted and innovative financial products. However, some prerequisites must be met for this to happen. In principle, they can also be promoted within the framework of development cooperation. The first is that a functioning electricity supply is required, otherwise electric vehicles will be “left high and dry”, and operators will incur losses.

Secondly, it requires a functioning financial sector that co-finances investments. KfW Development Bank cannot grant loans to private actors due to the nature of its mandate, but instead supports regional and national promotional banks or national financial institutions that set up credit lines, for example. After all, it is the private sector in particular that is responsible for the majority of the work behind this transition. In order to bring them on board and create the right incentives for them, development banks should help to mitigate the implementation risks through their corresponding financial instruments – in consultation with local or national partners.

And thirdly, a national strategy for the electrification of mobility is needed. Otherwise, a patchwork of contradictory measures may emerge. Instead, all projects in the urban e-mobility sector should integrate into a national strategy and complement each other or create a logical and rigorous whole over time. In most cases, the absence of this type of strategy is an exclusion criterion for further involvement of financial institutions such as KfW Development Bank. The task of development cooperation must first be to help develop one or to initiate and advance the work on it.

Three basic requirements must be met. Intact power systems, functioning financial markets and national strategies for expanding e-mobility are necessary.

If these prerequisites are met, targeted mobility programmes can take effect. In this process, development banks can buffer risks that stand in the way of the necessary investments, helping to create the right conditions for them.

Just as many promotional banks pushed forward with the expansion of renewable energies years ago until the market was able to bear its own weight, they can achieve and make a difference here too through smart financial products and the right mix of grants and loans. This is possible with already established financial products combined with promising, but not yet as widely applied approaches such as structured funds.



Electric bus in São Jose dos Campos, Brazil.

Finally, it is also about developing new funding instruments for sustainable urban public transport, which must have two main objectives: to mobilise the private sector for the necessary investments and to stimulate further innovation.

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