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# E-MOBILITY 2025 SCENARIOS FOR GREATER BERLIN

Technische Universität Berlin



IKT

INTEGRATION DER ELEKTROMOBILITÄT  
IN DIE NETZSYSTEME DER ZUKUNFT

# **E-MOBILITY 2025 SCENARIOS FOR GREATER BERLIN**

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# PREFACE

As the scarcity of fossil energy resources grows and greenhouse gas emissions rise as a result of continuously increasing traffic volumes, new drive technologies and innovative mobility concepts are playing an increasingly greater role. In this area, electric mobility is considered a beacon of hope which is why introducing this mobility to Germany during the coming decade has become a political goal.

To traffic planning and management, the introduction of electric mobility brings great challenges. It remains to be seen whether and how mobility behaviour will change and what requirements traffic infrastructure will have to meet.

In the framework of the project “e-mobility – ICT-based Integration of Electric Mobility into Future Network Systems”, supported by the Federal Ministry of Economics and Technology, the Department for Integrated Trans-

portation Planning at the TU Berlin focused on, among others, analysing the user behaviour of electric vehicles now and in 2025. This sub-project aims at contributing to a change in perspective – from supply-based to demand-based planning. These results and those of the project partners will be incorporated into an infrastructure plan which consists of the levels “future user profiles”, “energy grid”, “communication network”, and “public space”.

As a first step towards implementing the project’s objectives, we applied a methodologically controlled scenario process in collaboration with the consultancy Z\_punkt The Foresight Company. The resulting scenarios “e-mobility 2025 – Scenarios for Greater Berlin” presented in this booklet are to support long-term assessments of the impacts of electric mobility. They offer a first glance into alternative futures of electric mobility in Berlin’s metropolitan area.

Scenarios on mobility and traffic development have already become a part of traffic planning and management. Scenario processes create visions of the future and not only make it possible to visually imagine possible futures, but also build a foundation for strategic decision-making. In political, technological, and economically complex and contingent environments, they are a useful tool for reducing complexity and discovering possible courses of action. Unexpected and previously unconsidered aspects and connections become evident and new ideas emerge – both during the scenario process as such and in the concluding discussion of the scenarios.

In the overall context, the roles of the presented scenarios vary. Initially, the creation of alternative visions for Greater Berlin was to be an analysis which determined key parameters and trends in the future of electric mobility.

We examined how the system “electric mobility” might develop, driven by specific conditions in commerce, politics, technology, society and the environment as well as by the influence of relevant stakeholder groups. The aim of the analysis was to derive robust strategies for implementing future-proof and marketable e-mobility concepts. On this analytical basis, the scenarios stimulate a debate on the future of electric mobility in Berlin.

Scenarios are processes of structured communication, and as such depend on interdisciplinarity and intersubjectivity. This scenario process involved a large number of experts who contributed their expertise and competences to the process, both in workshops and in individual assessments. In the name of the entire project group I would like to thank each expert for her or his focused participation and monitoring.

**Univ. Prof. Dr.-Ing. Christine Ahrend**

Head of Department  
Technical University of Berlin,  
School for Mechanical Engineering  
and Transport Systems  
Institute of Land and Sea  
Transport Systems  
Department for Integrated  
Transportation Planning

# SCENARIO 01

## IT-CAR ELECTRIC MOBILITY





## CORE IDEA OF THE SCENARIO

Electric mobility remains in its niche, limited to the premium segment. While most manufacturers offer various electric vehicle models, cars with combustion engines retain their cost edge as battery prices remain high. Battery-powered electric vehicles are (at this point) considered to be status symbols for environmentally-conscious early adopters with higher incomes. They only play a marginal role for traffic in urban spaces and specifically in the Berlin metropolitan area. For the media, however, they still represent the automotive future.

## KEY PREMISES

- Battery technology: only incremental improvement (by a factor of two at most)
- Combustion engine has been optimised
- Public funding is not broadened/ no pro-electric regulation
- Wide TCO-gap between vehicles with combustion and electric engines remains
- No fundamental change in mobility behaviour

## FUTURE VISION 2025

Compared to 2010, Berlin's streetscape has seen few changes, and the latter are in the main of a quantitative nature only. In some main arteries, traffic volumes have increased a little elsewhere, another traffic-calmed zone has been added; and in general, there are more subcompacts – with some Berlin wags claiming that at least in the outskirts, dismal road conditions make SUVs a much more sensible choice. Electric roadsters, convertibles, and limos, however, are something new.

Occasionally, these will be found running with the pack of "combustibles" and continue to turn a lot of heads. Almost without exception, these are high-priced, well-equipped, and well-designed vehicles, with rapid acceleration emphasised by sleek design. People often talk of "Teslas" even though they usually are premium products of national manufacturers such as Audi's e-tron, Daimler's BlueZero or

Porsche's eRUF and Berlin had at best half a dozen real Tesla roadsters registered during all those years.

Electric runabouts may not be quite as "cool" as they were in 2015, when acquiring one of these vehicles was considered to be a trailblazing move. But in 2025, those who want to stand out and have the necessary spare cash spring for an e-car – even if it's just a second car. The media regularly feature electric cars prominently, no matter what class, on the one hand, because eco-celebs drive them, and on the other, because their entire design continues to embody tomorrow's ideal mobility. Berlin's movie and media in-crowd loves to be seen in futuristic e-models with gullwing doors or a colour scheme capable of changing like a chameleon.

The principal reason behind the limited luxury existence of electric mobility are consistently high battery prices. There may be model calculations of life cycle costs

that show how some battery-powered electric cars would be able to draw level with combustion counterparts – but only if most of the mileage is inner-city, fuel prices continue to rise, electricity price remain level, and with relatively low maintenance costs. Only a handful of cab companies have found these arguments convincing and acquired one or two VW Milanos – before waiting in vain for tax rebates for e-cabs.

Typical owners of electric vehicles care little about taxes, nor about the small number of recharging stations in the city. He or she only "refuels" at home in any event. The members of the real eco-technology vanguard have even put up SunCarports: They use solar power coming from their very own photovoltaic system. Others charge their battery on their company's dedicated parking space. Two of the large utility companies have entered vehicle-to-grid contracts with some customers and use parked cars as buffer storage.

However, the number of electric vehicles is far too small to have a measurable impact on electricity grids, and neither power companies nor their V2G customers achieve noteworthy financial gains. Yet V2G dovetails with the eco-high-tech forefront's spin doctoring, which relies on any means to promote the use of renewables. But it is more than mere PR. Power companies have the opportunity to test different business models: Which billing models and load curves will work in an assumed future mass market? What demands will be made on grids and batteries? The experiment with battery changing stations (modelled on Betterplace) has already shown to be a failure: Not enough electric vehicles, too diverse models, and insufficient interest in rented batteries have made achieving profitability impossible.

On the other hand, "electric racers" and large luxury-class electric vehicles with range extenders enjoy great popularity. These "range extenders" – using either

power generators with diesels or of late also fuel cells – are rather heavy and waste energy during pure battery operation in inner-city traffic and, as a consequence, also hurt range. On holidays or during spontaneous weekend getaways to the Schorfheide nature reserve, however, one could, at best, hope for charging stations at motorway filling stations, and only a select few among the hotel owners have already realised that offering charging options on their lot will attract a specific, solvent group of customers. Here, the additional range comes in handy. Berliners like to comment with some irony on range extenders: “Just like a hybrid, only inside out.”

The city itself, plagued by a notoriously bad budgetary situation and limited scope for action, offers few stimuli for electric mobility. Declaring special parking zones for electric cars was doomed by the districts’ unwillingness to provide public space for, as they were able to point out, miniscule

demand from a tiny number of electric motorists. Occasionally, there were also social arguments: Why should we offer additional privileges to those who are better off in the first place? The campaign “electrically mobile across Berlin” remained a half-hearted advertising effort: Tourists were to pay the surcharge for an e-mobile city tour themselves.

On the whole Berlin in 2025 has at best provided rudimentary solutions for its problems with maintaining traffic infrastructures, parking spaces, noise, and particulate matter. Even though the lack of significant progress in electric mobility is not an issue specific to Berlin, it matches the overall picture.

## THE DEVELOPMENT IN HINDSIGHT

By 2010, people were euphoric about electric mobility. Analysts engaged in one-upmanship when it came to ever higher forecasts and the media willingly bought into a vision of a post-fossil, climate-neutral, humane and environmentally-friendly electric future of mobility. Occasionally, they even suggested that “eMob” would save the car: Once electric power systems and batteries have replaced combustion engines and fuel tanks, we’ll continue to drive the way we used to, yet with a clean conscience.

Between 2010 and 2013, many manufacturers tossed diverse electric vehicle models on the market. In accordance with the traditional hype cycle, the up and down of euphoria and disillusionment, disappointment soon followed. The limitations of electric cars were only too evident: severely limited range (in particular during winter, especially

when running a heater), long charging times, plus the teething troubles to be expected in new technologies, in particular with regard to batteries. Pivotal for the far too low sales in electric vehicles, however, was their high price: ten to twenty-thousand euro over that of comparable petrol cars – and this in view of the limitations listed above! Lacking a sufficiently high “switch-to-electric-incentive”, which had been demanded modelled on the previous cash-for-clunkers-scheme, electric vehicles only had a chance with exceptionally status-oriented buyers.

Around 2015, lack of sales leads to the phasing out of some series, other models remained mere concept cars. The media went hunting for culprits. They saw the blame for the electric vehicles’ lack of success in the manufacturers’ insufficient efforts. The latter had, it was claimed, preferred to push the combustion engine to extremes and had

introduced electric cars only grudgingly, sluggishly, and with a far too narrow range of models. As a matter of fact, engineers had managed to optimise cars with combustion engines to the point where they were able to comply with the CO<sub>2</sub> limits established by the EU in its 2007 climate and energy package “20-20-20 by 2020”. Extremely light construction, higher engine efficiencies, and improved aerodynamics made it possible to achieve the stipulated CO<sub>2</sub> emission standard of 95g/km in 2020. The industry’s achievements were impressive. And for reasons of global industrial policy, the EU abandoned efforts to introduce even tougher standards.

In this situation, it came as no surprise that many claimed neither national nor international automotive companies could have any interest in a post-fossil future, considering that they would be forced to play only second fiddle to dominating battery producers and service

integrators. Public funding of electric mobility was also heavily criticised: It was called half-hearted and consequently without effect, and – most importantly – the government had failed to sufficiently toughen regulations, which in turn was understood to be the fault of highly efficient automotive lobbying. And the models which had made it onto the market? Fig leaves!

According to the critics, among them the German Taxpayers’ Alliance, the not inconsiderable public subsidies which had gone into research and diverse pilot projects with public charging stations had ultimately more or less vanished without a trace. The only parties to profit had been big industry and a few SMEs which had leased subsidised electric vehicles and even deducted them from their taxes.

Actually, however, the reasons why electric mobility became stuck were

much more trivial. No matter how high research expenditure is, some results cannot be forced. Physics and chemistry set limits on the efficiency of batteries, and tremendous development efforts notwithstanding, there was no breakthrough of the necessary dimensions up to 2025. Yet even by 2025, numerous innovative projects remain in the development pipeline – some of these based on nanotechnology – so hope springs eternal.

The fact that people tried to make the concept of electric mobility a carbon copy of fossil automotive mobility with its dominating idea of a high-powered, long-distance saloon car was another factor which held back development.

In 2025, however, the hype cycle is already advancing to its next euphoric peak: Maybe hydrogen and the fuel cell will win the next round! And Berlin will become a pilot market for hydrogen cars!



# SCENARIO 02

## E-MICRO MOBILITY



STOP

20

RENT A  
e-CAR

Be mobile!  
Mobility-Card  
4 Berlin

P+R+C

e mobility  
start  
ticket



## CORE IDEA OF THE SCENARIO

Electric mobility is completely implemented: But not by battery-electric vehicles simply replacing vehicles with combustion engines. The change in transportation goes much deeper. Individual mobility remains highly prized, yet is achieved almost exclusively in a framework of multi- and intermodality and changed patterns of mobility. In urban spaces and, more specifically, in the Berlin metropolitan area, electric mini- and micro-vehicles play a prominent role. Thanks to an intelligent, IT-supported networking of means and modes of transport, the environmental and economic advantages of electric mobility are fully realised.

## KEY PREMISES

- Battery technology: rapid progress (by a factor of ca. 3.5)
- Changed mobility preferences (micro-mobility and multi-modality)
- Integrated and systematic funding of electric mobility
- Significant narrowing of the TCO gap between vehicles with combustion and electric engines

## FUTURE VISION 2025

In 2025, Berlin has remained a city on the go. Yet on the streets, a lot has changed since 2010: Although cars with combustion engines continue to dominate downtown traffic, small and agile electric vehicles of vastly differing design are increasingly making their presence felt, beginning with pedelecs and e-bikes, diverse electric scooters and Segway variants to little e-cars and small utility vehicles with electric drives. Naturally, every now and then you see a Tesla successor, an electric roadster. But not even on the city's highways can these be pushed to their limits.

Change is also apparent in the infrastructure: Bike lanes have been replaced by broader lanes for "slow traffic" – bicycles and small electric vehicles. Wherever possible, the right-hand lane is reserved not only for busses and cabs, but also for CO<sub>2</sub>-free vehicles, designated such by the Blue Badge (introduced at the federal level)

carried by all electric vehicles. In particular at commuter stations, but also at some underground stations and even bus stops, charging zones have been allocated where people may park and recharge their e-bikes or e-cars using standardised charging dispensers. P&R&C for “Park, Ride, and Charge” may have become reality, but failed to become a household expression. Charging zones can also be found in front of supermarkets and department stores and are mostly provided on a “free first hour”-principle. What is mostly only said in the small print, however, is that for all subsequent hours electricity becomes far more expensive than at commuter stations or at your own utility provider’s charging dispenser. Some supermarkets and DIY superstores are collaborating with a power company and have established the “Network for Inductive Recharging”. However, the necessary technology – induction coils in parking spaces and vehicle floors – remains at the stage of market introduction.

Even though e-scooters are pricier than customary motorcycles, and electric com-pacts remain more expensive to acquire than combustion vehicles, dropping battery prices notwithstanding, electric mobility has become a familiar sight in Berlin’s modal mix. High and volatile fuel prices have definitely alienated potential car buyers – even in the mid-term, costs are considered to be incalculable. Another factor seems to be more important: Electric mobility is not only seen as (eco-) fashionable and up-to-date, but also as faster and more flexible. Parking spaces for e-scooters and small e-cars can be found almost everywhere, and vehicles with blue stickers can also be parked free-of-charge or at reduced fees in many parking lots.

Primarily young Berliners in the inner city prefer not to “burden” themselves with a car to begin with. They want to be mobile and flexible 24/7, and for their purposes, agile electric mini-vehicles are ideal.

Furthermore, using mobility services and combining different means of transport have simply become natural for them. Should they need a car, they rely on the services of an e-car rental – if they aren’t members of an e-car sharing network in the first place. In particular for short distances, new forms of IT-based car sharing offer faster and more comfortable access to a set of (electric) wheels.

Smartphones and mobility cards make it easier to select and pay for transport modes. Mobility cards, in particular, have become “keys” for various leasing and sharing services. In Berlin, experienced travellers decide which means of transport to use on a case-by-case basis, depending on the situation, reason for their trip, and even their mood. Suppliers call this “mobility on demand” and claim to have a comfortable and attractively priced concept for any customer. Tourists, too, profit from these versatile offers. “Electrically mobile across Berlin” bolsters the city’s

image as a creative and innovative metropolis. A large number of small businesses use this slogan to compete with highly specialised services for the city's visitors.

Only very few commuters use their own cars to reach downtown Berlin. An ever growing number prefers to ride their (electric) bicycles or small e-cars to the next public transport stop – usually a commuter station – , leaving their vehicle at the recharging station and transferring to public transport. And even some Brandenburgers who use their traditional middle-class cars for the way to the station rely on e-bikes in the city centre. In recent years, the *Berliner Verkehrsbetriebe* (BVG) and the S-Bahn have invested considerable sums to improve train frequencies, connections, and overall service quality, even though funding stagnated. Primarily, however, they extended their business models and integrated individual e-mobility. Many of the e-bikes, e-scooters, and e-cars parked in the charging zone during the day

depict the logo of the *Verkehrsverbund* or of other mobility services providers. During the night, most commuters leave them in their own garage or carport. Some housing associations also participate in this new trend and provide their tenants with electric vehicle fleets for common use, mostly in the large housing estates on the outskirts. Only major suppliers such as Deutsche Bahn, BVG, or “E-Car-Sharing Deutschland” have integrated their fleets into vehicle-to-grid concepts. It is still volume that counts: Tailor-made business models for small fleets and individuals are only now being developed or tested. Overall, electric mobility remains an experimental ground for innovative start-ups, be it the development of novel mini-cabin scooters, maintenance of electric vehicles of all kinds, secondary use of batteries, new charging concepts, and even in battery development. The “electric mobility cluster” now provides significant momentum for Berlin’s economy.

Notwithstanding all these changes, conventionally powered vehicles with combustion engines continue to dominate in Berlin’s affluent suburbs and other suburban spaces. Primarily older people are loath to do without their own cars, even if they use them less – mostly for longer distances – and postpone buying a new one again and again: “Once the electrics are less expensive.” With second cars, however, the situation is different: Households that can afford a second car have often acquired a small, battery-electric model. Could this also be due to the fact that second cars are still mostly used by women – and that, as everyone knows, women have a more rational attitude towards mobility than men? Whatever the case may be, car ownership has become statistically much less significant. At best, it is electric roadsters modelled on the Tesla which would be considered a status symbol among well-heeled speed junkies.

Overall, Berlin has become cleaner and less noisy by embracing electric mobility, even though particulate matter from tire particles continues to remain a problem and many e-car owners have definitely splashed out too much money on providing their electric vehicle with individual soundscapes.

### THE DEVELOPMENT IN HINDSIGHT

Starting points for an electric mobility breakthrough in micro-mobility already existed in 2010. It was primarily large cities such as Berlin that saw a growth in the share of “metro-mobile people”, i.e. those who choose their means of transport depending on the situation. Whereas the number of cyclists rose, particularly in Berlin, overcrowded streets and ever-longer searches for parking spots increasingly made driving a car a burden. As a result, car ownership dropped, and those buying a car opted for mini- or micro-cars – a preference which did not reverse even in economically prosperous years. Gradually, car sharing and leasing left their niche among modern mobility pioneers. Finally, sustainability and health arguments also increasingly played a role in personal mobility decisions.

National and European legislation also provide strong stimuli. Regulations to improve environmental quality and quality of life were consistently intensified: limits for fleet CO<sub>2</sub> emissions were cut from 130g/km in 2015 to 95g/km in 2020 to 75g/km in 2024, emissions trading was introduced in the transport sector, and the limits for particulate matter and noise emissions were reduced. In diverse areas of regulation, emission limits were tightened. To promote urbanity and upgrade inner cities, city tolls were introduced in many major cities – among them Berlin. All proceeds are earmarked for refinancing infrastructures. Or, as Berliners are wont to say: “These euros go straight into potholes.” Vehicles showing the Blue Badge are exempt from tolls.

The State of Berlin promoted the re-orientation towards public transport and electric mobility indirectly, championing an integrated policy for sustainable

mobility – from the 2004 to 2006 “City Development Concept Berlin 2020” and its continuation in the 2010 “City Development Traffic Plan” which had already intended to reduce traffic in the districts inside the S-Bahn-Ring, to the “Masterplan Bicycle Mobility” and the “Networking Initiative Public Transport – Motorised Personal Transport” launched in 2015. In this way, intelligent mobility concepts – Deutsche Bahn was a trailblazer with its BeMobility concept – could establish themselves in the city. At about the same time, public spaces were re-negotiated: parking space privileges for Blue Badge vehicles, lanes reserved for CO<sub>2</sub>-free traffic, mixed spaces where pedestrians are entitled to use the street. Electric vehicles were generally classified as CO<sub>2</sub>-free. Only for some of the private users was this problematic: All public and commercial charging stations are contractually obliged to deliver only renewable electricity.

In the mid-2020s, Berlin made great strides and became a pioneering region not only for electric mobility, but also for new mobility concepts as such. One milestone was the introduction of the so-called mobility card which enables its owner to combine various modes of transport flexibly: public transport and car- or bike-sharing, radio cabs, and others. Not less, improved services and conditions of use helped to increase the popularity of the BVG and the S-Bahn.

Also, financial bottlenecks prevented a further expansion of the road infrastructure network. However, the state’s senate did not act on all suggestions in the traffic policy. Among these were, hotly debated topics like “Low Emission Zone – electrics only!” in the media, closing off large parts of the inner city to cars with combustion engines. However, this proved to be neither sensible nor enforceable, in contrast to the restrictive management of parking space and the introduction of

a city toll. Special parking spaces were reserved for electric car-sharing vehicles; battery-driven vehicles (if below specific performance limits) received the Blue Badge and thus enjoyed privileges when it came to city toll, parking fees, and lane usage. These favourable conditions notwithstanding, electric mobility found it hard to gain momentum, not just in Berlin. The models which manufacturers marketed soon after 2010 were generally considered to be too expensive and too limited in their performance. Compared to the handful of countries pioneering electric mobility, financial incentives were lower in Germany and proved to be insufficient. In 2013, at least, the Senate sent a clear message, announcing a gradual transfer of all public fleets to electric vehicles. The first Segways for traffic wardens, however, let people suspect that the Senate would restrict itself to highly visible, symbolic measures. Yet in 2017, the first “Senate-electros” began to roll through Berlin’s streets.

As oil prices skyrocketed in the mid-2010s and next-generation electric vehicles became available – featuring a broad range from pedelecs to e-cars 2.0 with advanced batteries – the mood turned. Rentals and sharing associations gradually retired their combustion cars. From 2016/17 on, the proportion of electric cars in new car registrations grew steadily. Providers of personal services, with fleets having to manage short distances in urban stop-and-go traffic, slowly followed suit. From about 2020 onward, businesses with small delivery vehicles joined.

In 2025, after a fair number of delays, the transfer to electric mobility has really begun. Optimised “combustions” still dominate, but the manufacturers’ finely differentiated model ranges of electric vehicles show which direction we’re headed for.



# SCENARIO 03

## CATALYST

## COMMERCIAL TRAFFIC





## CORE IDEA OF THE SCENARIO

In this scenario, electric mobility prevails by way of commercial traffic. The rapid expansion of the share of battery-driven vehicles in this sector is first and foremost the result of a systematic policy promoting both demand and supply. Public authorities provide momentum to electric mobility not only through financial incentives, but also by thoroughly electrifying their own fleets. In addition, electric mobility is also favoured by a policy of town planning which consistently tries to push back from the city's centre heavy goods traffic with its environmental impacts and hazardous potential. Stimulated by commercial passenger transport, which plays an enormously important role in Berlin, the service metropolis, electric mobility ultimately also gains a foothold in individual transport.

## KEY PREMISES

- Battery technology: rapid progress (by a factor of ca. 3.5)
- State as a demand driver
- Systematic promotion of demand and supply
- Significant narrowing of the TCO gap between vehicles with combustion and electric engines
- Sustainability-oriented development of inner cities (including pushing back heavy goods traffic)

## FUTURE VISION 2025

If, in 2025, you return to Berlin after a long absence, the first thing you'll notice is that the famous "Berliner Luft" somehow tastes fresher than it used to, and that the city is less noisy. Only 15 years ago, one witnessed streams of commuters and lorries crawling towards the city through crowded lanes in the morning and leave for the suburbs and the hinterland in the evening, and even at night, the engines' roar almost never waned. Today, Berlin may have quieted down a bit, but by no means has it become idle or ground to a halt – quite the opposite. On the streets, you see customary cars with combustion engines and a colourful variety of vehicles, from traditional midsize cars with hybrid drives to small electric scooters of all kinds and small lorries powered by fuel cells. Even cars with combustion engines smell less, are less visible, and less noisy. Their engines have become considerably more environmentally-friendly. However,

the most conspicuous change is the broad range of battery-driven commercial vehicles which diligently ferry people, goods, and packages back and forth: small delivery vans with box bodies or flatbeds, dump trucks and pickups, two-seated three-wheelers, open and closed taxis with box bodies for luggage, and even pedelecs with trailers.

In the past one and a half decades, Berlin has lost nothing of its lively activity and attractiveness to young people and creative talent from all over the world. To tie executives and intellectuals permanently to Berlin's science and creative locations, the city needed a little more than just interesting jobs and the launching of new research and technology clusters – one of which is electric mobility. It also needed investments into an inner-city quality of life which not only offers something to people on the move, but also to families with children and a yearning for a settled existence. Even the large group

of “baby boomers”, who had now entered retirement age, now voiced demands for more sustainability oriented and thus simultaneously more senior-focused town and traffic planning.

Compared to 2010, both cityscape and traffic spaces have changed visibly: Gone are the long, refrigerated tractor-trailer rigs from Holland which, double parking, blocked ten parking bays simultaneously to supply a single, tiny florist. There are also significantly fewer light lorries and delivery vans whose drivers, in overcrowded streets, transfer their loading zones into lanes or pedestrian crossings or co-opt parking space as storage room for fruit and vegetable crates or construction materials. This behaviour in traffic would be almost impossible today, quite apart from the fact that within the inner-city ring, freight service using vehicles with a gross weight of more than 7.5 tonnes is now only allowed with strictly regulated individual permits (e.g. unavoidable

transports of heavy goods for construction sites). Not only were low-speed zones and traffic-calmed areas considerably extended during the past 15 years. Also, large parts of the parking space previously available were turned into other uses, and the cross sections of many streets – even main arteries – were narrowed or remodelled to the advantage of pedestrians, cyclists, shared taxis, and busses. A congestion charge has been levied for the past years. Tariffs rise annually and vary according to vehicle and emission classes, time of day and length of stay in the inner city. For some downtown areas, strict vehicle entry bans are in place. Here, only vehicles with specific uses such as deliveries, patient transport ambulances, and home care services may enter – and even they need a “zero emissions badge”. The most important urban thoroughfares now feature express lanes for bicycles and emission-free mini- and micro-vehicles with a gross weight of no more than 1.5 tonnes including load.

A comprehensive and efficient car sharing and car pooling system exists for all necessary trips. No longer merely a variation of private individualised transport, it also offers highly popular solutions for effective urban logistics. In commercial traffic, Berlin had already relied on three cargo transport centres right outside the city gates in 2010, and had been able to build on its strengths. In the centres, goods of all kinds are, optimised for volume and routes, bundled, transferred to electric delivery vans suitable for the city, in the case of larger packaged goods to fuel cell lorries and transports with hybrid drive systems, and transported into the city. The GVZ Westhafen's inner city logistics centre profited most from the electric mobility boom in goods traffic. It is only a short way from the retail branch locations in the inner city shopping centres, which can hence be served efficiently with smaller electric cars and higher delivery frequencies. However, both traffic planners and business associations question

the sensibility of dispatching into crowded inner city areas ten small delivery vans rather than two large lorries. Logisticians, on the other hand, emphasise the process made in the intelligent bundling of traffic.

The continued increase in internet mail-order volumes also lead to significant growth in courier, express, and parcel services. Ultimately, delivery to individual households – in Berlin, often one-person households – proved to be no longer economically feasible. Today, the so-called “last mile” to the customer is covered by a tightly knitted net of automated booths for self-service collection of parcels, open 24/7 and within easy reach by foot or e-bike. Surcharges apply if customers insist on door-to-door delivery.

A much greater impulse for the electrification of commercial traffic comes not from goods, but from commercial passenger transport. Just as in 2010, cars and delivery vans dominate Berlin's commercial

traffic with almost 90% in 2025. Passenger cars claim just under two thirds of the total transport performance in commercial traffic – hardly surprising if one considers the tremendous significance of the service sector in Berlin. Private tradespeople with low volumes of transported materials, maintenance and repair services of municipal housing associations, Berlin's city cleaning services, park and gardens departments, and many others, in particular companies owned by the state, today operate in the city with a significant share of pure e-vehicles. In addition, there are doctors and mobile nursing services, the commercial traffic of salesmen, advisors, and authorities, and a wide range of security firms and emergency services, ambulance services, and police officers. And the use of self-balancing vehicles, so-called Segways by police patrols and private security personnel who roll quietly through parks and shopping malls no longer attracts a great deal of attention.

From e-scooters to battery-powered vans: users of commercial and private e-vehicles appreciate not only the privileges they enjoy when using parking spaces for emission-free vehicles or dedicated lanes, but also the economic advantages of electric mobility: Word has spread that e-cars not only offer tax advantages, but also have a clear economic edge over “combustibles” when it comes to energy, servicing, and insurance costs. Criticism voiced 15 years ago, of formerly considerable initial costs, low ranges, and long recharging times has all but disappeared. Deliveries of goods and customer services are usually pre-planned and conducted during regular working hours and in limited areas of operation. Once vehicles have returned to the depots and company premises, they are charged during the night to help balance grid loads. The possibility of charging entire commercial fleets and sending power to the grid offers considerable advantages to utility providers. They are able to use the vehicles’ batteries as

buffer storage for “peak shaving” (sending power back to the grid when demand is high). Companies which sign “vehicle-to-grid” contracts with utility providers pay lower rates for each kWh. During daytime use, the advantages of recuperation, i.e. recovery of energy during braking, come to play in urban traffic.

Fleet operation also enjoys numerous other economic advantages compared to maintaining individual e-cars. The cost advantage of vehicles with combustion engines over battery-electric vehicles has narrowed considerably – a result of dropping battery prices, yet even more of high fuel costs – but has not completely disappeared. The fact that electric vehicles do not compare badly to combustion vehicles with regard to life cycle costs has not been lost on keenly calculating fleet managers. This is mainly due to considerably lower energy costs – electricity does cost less than fuel – but also due to lower maintenance costs (no oil changes, no

emission checks, etc.). While this may not fully compensate for the still rather high battery prices reflected in the vehicles’ acquisition costs, the higher mileage of fleet operations compared to private use make energy costs a more relevant cost factor. Government interference is responsible for helping commercial traffic to ultimately bridge the narrow, yet persisting TCO-gap: Ever since zero emission vehicles were made exempt from road tolls and motor vehicle tax, with fuel taxes for petrol engines raised and, simultaneously, depreciation allowances for “electrics” expanded, the pendulum unequivocally swung the other way in favour of e-drives – not even counting privileges such as preferred parking for CO<sub>2</sub>-free vehicles and other amenities.

In any case, leasing rather than buying vehicles or at least batteries (even in 2025, life cycles remain limited) has become more popular. All leading automotive companies now offer a wide variety of graded

leasing models: billing based on residual value or mileage, including or excluding integrated car electricity packages, adapted maintenance, inspection, and software services, driver training, and many other optional services. The bigger the fleet, the more favourable conditions fleet managers will be able to negotiate with the manufacturer, who will generally act as a one-stop supplier and also offer his partners' (utility providers, software providers, etc.) service modules.

In 2025, electrified commercial traffic in Berlin is making progress across the board. In particular the State of Berlin, which now has equipped most of its fleets in its administration, state-owned companies, and subsidiaries with e-vehicles, benefits from advantages in operating costs. The considerable initial outlay may have been controversial, but ultimately the goal of switching towards e-fleets was to send a positive signal and set a good example. Busses and lorries, on the

other hand, increasingly rely on hybrid or hydrogen fuel cell drives.

Private passenger traffic is also becoming increasingly "electrified", stimulated by the highly visible success of electric mobility in commercial traffic. Here, too, individual mobility is more important than ever in 2025. People still consider private cars, available 24/7 right outside the door, the best possible mobility vehicle. At the same time, the long evident trend towards mini- and micro cars has continued. The societal debate on using energy resources carefully while enjoying a high urban quality of life may not have fundamentally changed driving patterns. But it has contributed to large, powerful cars no longer being considered as status symbols by all groups of buyers.

## THE DEVELOPMENT IN HINDSIGHT

After long years of pilot schemes and prototypes, a first smaller wave of e-vehicles – which did not except commercial vehicles – entered the market in 2012/2013. However, previous support for electric mobility, which had so far been limited to R&D funding and a temporary exemption from motor vehicle tax, now proved to be too ineffective a tool to achieve an even approximately sufficient market penetration with e-vehicles. In view of reluctant demand for e-vehicles which, at the time of introduction on the market, were comparatively expensive to buy and to operate, federal and state governments felt forced to actively influence market developments. By stepping into the breach and becoming the main customer, the government provided for the necessary sales of e-vehicles and created the required critical mass. This was the only chance to help electric mobility cross the threshold and make

it economically competitive. There had been much previous dispute about the best suited form of support: Should e-vehicle premiums be used to subsidise purchases, similar to practices in many other countries? Even higher tax rebates and depreciation allowances? In a time of tight budgets, this would cost the state billions. In order to promote the market penetration of electric mobility and simultaneously avoid arbitrage effects in subsidies and tax breaks, the Federal Government decided to lead the way by converting its own fleets.

Much to the delight of the European automotive industry, competition was hence reduced to products of national car manufacturers. In Berlin, the Senate enacted corresponding procurement rules for the civil service and municipal enterprises under which the state's and districts' fleets were gradually equipped with electric vehicles.

In the framework of the National Development Programme for Electric Mobility in Germany, the course was set for promoting e-mobility in 2011. If the major manufacturers priced their vehicles to break even, demand would likely remain insufficient. Hence, increasing supply and demand became the most important instrument in the introduction and establishment of electric mobility. Coordinated by the "Shared Agency for Electric Mobility", *Gemeinsame Geschäftsstelle Elektromobilität* (GGEMO), a customer incentive programme was launched which combined various support measures and subsidies. At the start of market introduction, the state paid premiums to purchasers of e-vehicles – but these were temporary. In the corresponding programmes, funding for the development of efficient and inexpensive battery technologies continued.

Also supported was the installation and extension of recharging infrastructure,

even though it soon became apparent that Berlin's commercial traffic – with the possible exception of services such as tax accountants and pharmaceutical representatives – to a large part did not depend on public recharging stations, as public and commercial fleets are recharged during the night in corporate depots. Furthermore, incentives to support the integration of e-vehicles into fleets were introduced for businesspeople: Motor vehicle tax for e-vehicles was permanently abolished, private use of company cars exempted from tax, and tax relief through depreciation allowances increased. In addition to these economic stimuli, tougher environmental regulations, both on the level of the EU and nationally, helped to convince previous sceptics to change course towards electric mobility. Step by step, limits for fleet CO<sub>2</sub> emissions were cut drastically – from 130g/km in 2015 to 95g/km in 2020 to 75g/km in 2024.

In 2016, a national car toll was introduced which expressly excludes emission-free vehicles.

At the beginning of the 21st century, Berlin's urban development policy had already initiated a development towards gradually pushing back fossil-based motorised car traffic by introducing a low emission zone, restrictive management of parking spaces, and traffic calming measures. Efforts towards sustainable development were repeatedly intensified. Years before, Berlin had joined the global initiative "Clean Cities International". Since that time, the city has made efforts to realise a traffic concept designed to avoid traffic increases and bring a conversion to alternative energies in the transport sector.

Initially, trade associations and trades people met these efforts with open resistance. The CCI, the German Automotive Society, and other lobbying groups

campaigns against being "forced" to transform fleets – the yellow press even revived the battle cry "eco dictatorship", an expression long deemed forgotten – and supported initiatives of business people and legal actions against restraints on inner city deliveries. However, as efficient and cross-business solutions – route optimisation based on the principle of bundling commodity flows – continuously improved urban logistics while customers and tourists found the quality of their stay in the shopping streets to be superior; even small shop owners were increasingly convinced. Today, settlement policy directs clear requirements at investors and planners. Once construction projects reach a specific size, they have to provide charging infrastructure for electric vehicles. Many housing associations are discovering that it pays to offer tenants memberships in e-car sharing networks. The street was rediscovered as a place to meet others, and total motorised

traffic – both commercial and private – was pushed back. In 2025, electric mobility in Berlin is finally no longer considered to be exotic. Thanks to massive public support and a gradual attitude shift, it has entered the first stage of a dynamic development phase. An essential contribution came from economies of scale and the high visibility of electric mobility in commercial traffic.





# COMPARING THE SCENARIOS

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MOBILITY BEHAVIOUR

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VEHICLES

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RECHARGING STATIONS  
INFRASTRUCTURE

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DOMINATING MARKET ACTORS AND  
BUSINESS MODELS

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FUNDING AND  
REGULATION

**SCENARIO 01:  
IT-CAR ELECTRIC MOBILITY**

**SCENARIO 02:  
E-MICRO MOBILITY**

**SCENARIO 03: CATALYST  
COMMERCIAL TRAFFIC**

- Unchanged preference for motorised individual transport
- Increasingly, event-related selection of transport modes
- E-cars as status symbols of "eco-celebs"

- Inter- and multi-modal mobility
- Use of diverse mobility services

- Commercial traffic as a trailblazer of e-mobility
- Service city Berlin: significant share of commercial passenger transport

- Continued dominance of (optimised) combustion vehicles
- E-roadsters and e-sedans with range-extendors
- E-cars as second cars

- Great diversity of battery-powered mini- and micro vehicles, from pedelecs to e-cars
- Combination of e-vehicles and public transport
- In addition to (optimised) combustion also increasing numbers of hybrid vehicles

- Broad range of e-utility vehicles: from Segways for law enforcement services to pick-ups
- Private traffic: trend towards mini- and micro-cars
- Busses and lorries with hybrid or H<sub>2</sub>-fuel cells drive systems

- Charging at home or on designated company parking spaces
- Sporadic recharging stations in public spaces

- Charging zones in public spaces: „Park, Ride & Charge“ at stations, shopping malls, etc.
- At public and commercial charging stations, only electricity from renewables

- Charging predominately at night in depots and company premises
- Vehicle-2-Grid tariffs for commercial fleets

- Car manufacturers as market integrators
- E-mobility almost completely limited to premium segment

- Collaboration of car manufacturers, utilities, and IT services
- New mobility services extend value chain

- Car manufacturers as market integrators
- Leasing models with integrated electricity packages and a wide range of optional services

- Just like today, funding for electric mobility not extended
- Environmental regulation adjusted
- No parking or other privileges for CO<sub>2</sub>-free vehicles

- Integrated and systematic funding
- Toughening of environmental regulations
- Privileges for CO<sub>2</sub>-free vehicles with regard to parking, inner city tolls, and privileged lanes

- Government drives demand: electrification of public vehicle fleets
- Toughening of environmental regulations and constraints in settlement policy
- Privileges for CO<sub>2</sub>-free vehicles with regard to parking, inner city tolls, privileged lanes, and taxation

# IMPRINT

This publication is the product of the joint research project “e-mobility – ICT-based Integration of Electric Mobility into Future Network Systems”. This project was supported by the German Federal Ministry of Economics and Technology within the framework of the Federal Government’s Package of Measures II as a result of a resolution of the German Bundestag (Project Management: DLR, Reference Number: 01ME09013). The scenarios were developed in collaboration with the consultancy Z\_punkt GmbH The Foresight Company, Cologne and Berlin.

Information on the project and other reports can be accessed at:  
[www.verkehrsplanung.tu-berlin.de/menue/forschung/aktuelle\\_forschungsprojekte/e-mobility/](http://www.verkehrsplanung.tu-berlin.de/menue/forschung/aktuelle_forschungsprojekte/e-mobility/)

## EDITOR

**Prof. Dr.-Ing. Christine Ahrend**  
School for Mechanical Engineering  
and Transport Systems

Institute of Land and Sea  
Transport Systems  
Department for Integrated  
Transportation Planning

Sekr. SG 4, Salzufer 17 – 19  
D – 10587 Berlin

Telephone: +49 (0)30 314-78772  
Office: +49 (0)30 314-25145  
Fax: +49 (0)30 314-27875

[www.verkehrsplanung.tu-berlin.de](http://www.verkehrsplanung.tu-berlin.de)

## AUTHORS

**Ingo Kollosche**  
Technical University of Berlin  
**Beate Schulz-Montag**  
Z\_punkt The Foresight Company  
**Dr. Karlheinz Steinmüller**  
Z\_punkt The Foresight Company

## DESIGN AND ILLUSTRATIONS

**großgestalten**  
Kommunikationsdesign, Cologne

**Berlin, June 2011**

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