



White Paper

Five reasons why carsharing plays a decisive role in the breakthrough of electric mobility

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Flexible carsharing gives new impetus to electric mobility. The knowledge gained from the operation of a purely electric carsharing fleet facilitates most individual's first contact with electric vehicles, proves the suitability of electric mobility for daily use and solves the chicken-and-egg problem regarding the necessary charging infrastructure in the cities of the world. For this reason, car2go CEO Olivier Reppert repeatedly claims publicly: "We are convinced that the future of carsharing is electric." Carsharing and electric mobility follow the same strategic goal of making cities a cleaner and better place to live, yet there is much more to it. car2go is the world's largest provider of purely electric fleets in the free-floating carsharing sector and has set itself the goal of making the future of carsharing electric. The precondition for this is an "overall system of electric mobility" which understands purely electric driving to be an interaction of a variety of components – from the battery to the customer experience, from the electricity network to the charging infrastructure.

car2go is in a regular exchange with many players in this overall system. No other company has more data and knowledge about the operation of fully electric fleets in different metropolitan areas with various charging infrastructure solutions used intensively on a daily basis. Power network operators, cities and manufacturers all benefit from the knowledge gained.

The role of carsharing in the breakthrough of electric mobility is multifaceted and will be more closely examined in this White Paper based on five reasons:

1. Carsharing solves the chicken-and-egg problem regarding the development of a charging infrastructure
2. Carsharing reduces people's reservations about using electric mobility
3. car2go proves electric mobility is suitable for high intensity usage – through the practical everyday operation of carsharing
4. Purely electric carsharing improves the air quality in the cities – immediately
5. Carsharing is the perfect testing ground and experimental field for electric mobility of the future

Reason 1: Carsharing solves the “chicken-and-egg” problem regarding the development of a charging infrastructure

From the viewpoint of cities, the development of a comprehensive charging infrastructure is an expense with little to no return. Until there are sufficient private electric vehicle owners, the charging stations are not adequately utilized. The private consumer, however, often decides against purchasing an electric vehicle because the existing charging infrastructure is not comprehensive enough for the everyday use of such a vehicle. A classic chicken-and-egg problem. But, who should make the first step?

E-carsharing can be a solution to this problem. On the one hand, carsharing providers, such as car2go, can supply important information to cities about the flow of traffic within a city, the charging behavior of customers and thus the optimal positioning of charging stations. On the other hand, the parallel development of charging infrastructure and electric carsharing fleets ensures a reasonable utilization of the charging network right from the beginning.

The City of Hamburg is a pioneer of this type of partnership. In May 2017, the city signed a general agreement with Daimler AG, the parent company of car2go. An important component of this agreement: cooperation in the simultaneous development of electric charging infrastructure and an electric carsharing fleet in Hamburg. At the same time, a similar partnership was agreed upon with the BMW Group and its carsharing provider, DriveNow.

What exactly does the agreement involve? The City of Hamburg is to provide a total of 1,000 public charging points for electric vehicles and 150 charging points only for carsharing vehicles by the end of 2019. In addition, Hamburg will be the first German city to provide a significant number of parking spaces exclusively for carsharing and electric vehicles.

At the same time, Daimler will methodically electrify all of its 400 car2go smart vehicles in Hamburg until the end of 2019. The number of electric car2go vehicles will increase corresponding with the growth of the whole car2go fleet in Hamburg. The agreement also enhances the integration of carsharing into the municipal mobility platform “switchh”. This will make it possible to offer easy access for citizens to the public transport system, carsharing and bike sharing.

Furthermore, car2go is already working closely with other cities. The greatest asset the carsharing provider has is understanding the daily flow of traffic in metropolitan areas. Additionally, it has more up-to-date information about the operation of purely electric fleets than any other company. This enables the identification of deficiencies in the infrastructure and the prediction of the future demand for individual charging points.

Cities also benefit from an intelligent infrastructure in other ways. An ideal charging infrastructure is required to help convince more and more private people to buy an electric car – and subsequently helps improve the air quality in the cities.

In Stuttgart, a network of 380 charging stations is one of the densest in Germany; and Amsterdam, with over 1,000 charging stations, has the densest worldwide. In Madrid, car2go has installed a unique hub system with its own fast charging stations so that electric cars – despite a less developed charging infrastructure – are still optimally available.



Figure 1: The simultaneous development of charging infrastructure and demand for urban electric mobility solves the chicken-and-egg problem for the electrification of urban traffic.

Reason 2: Carsharing reduces people's reservations about using electric mobility

Because the electric car is not yet truly mainstream, it has not been easy to test drive a vehicle without obligation. However, carsharing with electric vehicles offers a solution: making electric vehicles easily accessible without the commitment.

Over 10,000 journeys are made each day with electric car2gos alone. Hence, car2go facilitates the first contact with electric vehicles for hundreds of thousands of people and thus proves the everyday usefulness of electric mobility. Approximately 1,400 purely electric car2go cars are circulating on the streets of Amsterdam, Madrid and Stuttgart at any given moment.

Following the "learning by driving" principle, car2go therefore plays a decisive role in the breakthrough of electric mobility in the private customer sector. Electric mobility will make its breakthrough when manufacturers manage to convince and impress customers with their electric cars. For this reason, car2go has been making electric mobility tangible for over six years and counting.

Additionally, the number of car2go e-fleets will continue to grow. With Hamburg, the next electric location is already in the pipeline. Further cities will be electrified in 2019 and 2020. This means more exposure to electric mobility for both city inhabitants and visitors.

Feedback is consistently positive: it works! Electric mobility is much more practical for everyday use than many people think. The range of electric cars is already sufficient for more than 99 percent of the reasons for vehicle usage in urban areas. Additionally, electric cars are fun to drive, satisfy the eco-conscience and are pleasantly quiet. Thus, an ever-increasing number of people have discovered in practice that an electric car is already a real alternative to one with a combustion engine.



Figure 2: car2go facilitates the first contact with electric vehicles for many hundreds of thousands of people.

Reason 3: car2go proves electric mobility is suitable for high intensity usage – through the practical everyday operation of carsharing

One of the deciding prerequisites for the breakthrough of electric mobility is the answer to the question of how to quickly overcome typical teething troubles with the new technology. The best and fastest way to find this out is a high performance practical test. car2go is already doing this: 1,400 electric cars, which are rented up to fifteen times per day by the car2go customers, provide valuable data and information.

The results provide definite answers to the question of how electric mobility works in practice. The added value of this experience benefits many different players in the entire electric mobility system, from electricity providers and network operators, to the battery manufacturers and also the cities themselves.

A practical example: the charging of a battery is a sensitive process. The life of a battery reduces if it is charged too quickly. If it is charged too slowly, however, the vehicle is out of action for a longer period of time. How quickly can a battery be charged over 1,000 times without any resulting damages? And, what effects does the temperature have? At lower temperatures, the charging process of the battery must be more closely controlled and regulated to prevent damage to the cells.

The knowledge gained helps in the development of new batteries. Important factors here can include, for example, the ideal positioning of the temperature sensors so that the temperature difference can be accurately estimated for a variety of different charging and driving cycles.

These are just small examples of the practical details of a new technology. They show how valuable knowledge can be gained from everyday practical tests – under different weather conditions and for different types of usage.

Carsharing is the ultimate test of performance for electric mobility. Nowhere else are batteries, motor technology and vehicles so intensively used as in the daily operations of a carsharing company. An electric vehicle from car2go is rented up to 15 times per day. The effects of such intensive use on the battery are thus ideally shown.

With car2go, Daimler not only has the market leader in the flexible carsharing sector, it has also created an important test and learning field for the suitability of electric mobility for everyday use. In order to share the knowledge gained and to help the technology make its breakthrough more quickly, car2go works together with various network operators, electricity and technology providers, as well as cities.



Figure 2: How quickly can a battery be charged without it being damaged after up to 1,000 chargings? car2go provides the data from everyday practical testing.

Reason 4: Purely electric carsharing improves air quality in cities – immediately

If carsharing fleets are purely electrically operated, the positive effects of carsharing on air quality and traffic congestion in city centers increase many times over. This reflects in locations with electric car2go fleets where cities are taking measures to further promote flexible, fully-electric carsharing.

When the City of Madrid applied history’s first driving ban in the inner city due to air pollution in December 2016, the car2go electric vehicles were explicitly excluded from the ban. Hence, car2go customers were still able to remain flexibly mobile within Madrid’s inner core which resulted in higher usage figures.

In Stuttgart, the city wants people to switch to alternative mobility options when weather conditions cause atmospheric pollution. During these particulate matter alarm periods, the minutely rate of car2go electric vehicles decreases. On these days of environmental sensitivity, the usage rates of the environmentally friendly car2go electric cars regularly increase.

For a city like Stuttgart, where several automobile manufacturers and suppliers are located and individual mobility is thus of special importance, this is good news. Thanks to purely electric carsharing, the people in the city are able to remain mobile without further increasing the emission levels in the Stuttgart valley basin.

Many cities in the world face the same challenge. In exactly the same way that the population levels are rising, the demand for mobility is also growing rapidly. At the same time, the negative impact of traffic also increases. This can be seen in the form of insufficient parking, traffic jams, noise and, last but not least, ever-increasing air pollution. The good news: carsharing is a form of social mobility which, in addition to its positive effects on parking and traffic congestion, is also positive for the levels of air pollution in the city.

In total, car2go customers have already driven over 63 million purely electric kilometers. This equates to 1,600 times around the world and a saving of thousands of tons of carbon dioxide.



Figure 3: Each electric carsharing vehicle is good news for the city – mobility which does not pollute the air.

Reason 5: Carsharing is the perfect testing ground and experimental field for electric mobility of the future

An ever-increasing number of companies – both startups and established enterprises – are focusing on the subject of electric mobility. And with this, innovative approaches and new concepts are developing – from charging bikes or the charging trailer with which a car can be easily charged, to charging stations themselves and optimization of the charging process.

Each of these ideas need a testing ground to be tried, improved and developed for everyday use. The purely electric carsharing service from car2go in Stuttgart, Amsterdam and Madrid offers an excellent basis for the development and progression of electric concepts. For this reason, car2go already partners with many think tanks and shares its knowledge for new concepts.

An exciting field of development is, for example, the communication between charging stations and vehicles. Locating the nearest available charging station is a common hurdle experienced by those sharing electric vehicles and owners alike. In cooperation with the other participants, providers of electric carsharing can offer important answers here.



Figure 4: Carsharing from car2go is the best testing ground for new electric mobility ideas.

Summary

Electric mobility has the potential to significantly change the mobility sector. However, further development is required in order for it to realize its full potential. It will only become sustainably popular if the technology passes the “everyday use test” and also impresses customers.

Carsharing is a huge step ahead in the advancement of electric mobility compared with privately owned vehicles. Carsharing benefits from a unique amount of knowledge gained from the everyday use of large electric fleets. Hence, car2go is partner to a wide range of companies that are researching the field of electric mobility – whether they make batteries more efficient, develop infrastructure or make the technology more “clever”.

With the experience from the last years and the expertise gained through being the global market leader, car2go already supports many areas of electric mobility. Charging stations must be available in sufficient numbers and also be positioned in the right places in order to ideally fulfill their purpose. Batteries not only have to function, they also must pass the hardest practical trials. Perhaps most importantly, drivers must have the chance to easily experience electric mobility for themselves.

The prerequisite for this is an “overall system of electric mobility,” which understands purely electric driving to be an interaction of a variety of components – from the battery to the electricity network, charging infrastructure and undeniably positive customer experience.