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► **To cite this version:**

Julia Hildermeier, Axel Villareal. Two ways of defining sustainable mobility: Autolib' and BeMobility. *Journal of Environmental Policy and Planning*, 2014, 16 (1), 10.1080/1523908X.2014.880336 . halshs-00949278

HAL Id: halshs-00949278

<https://shs.hal.science/halshs-00949278>

Submitted on 3 Apr 2023

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Two ways of defining sustainable mobility: Autolib' and BeMobility

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ABSTRACT European cities have emerged as laboratories for 'sustainable mobility'. In the last few years, they have supported numerous electric car projects which combine clean engine technologies with offers on public or shared mobility. This paper compares two ongoing public electric car services in Berlin (BeMobility) and Paris (Autolib'). We explain how both projects shape future visions of sustainable mobility and transform regional transport systems in specific ways through their performative impact as local transport policy tools. Focusing on the socio-economic and political processes through which both projects were conceived and put into practice, we explain their differences as they reflect participating actors' interests in a French versus German industrial and transport policy context after the economic crisis in 2008. We find that whereas BeMobility integrates electric cars as one element in Berlin's intermodal transport system, and thus is centred around 'intermodality' as the central vision of sustainable transport, Autolib' in Paris essentially reproduces the dominant mode of private passenger car transport through adding a shared electric car fleet.

KEY WORDS: Sustainable mobility, Autolib', BeMobility, electric car, new transport system, intermodality, shared mobility

Introduction

Due to growing urbanization (UN, 2011), Europe's largest cities suffer from congestion and noise pollution caused by passenger car traffic. It is estimated that urban transport is responsible for about a quarter of CO₂ emissions from overall transport (European Commission, 2011, p. 8). CO₂ emissions from road transport account for about one-fifth of the European Union's (EU) total CO₂ emissions and have increased by 23% between 1990 and 2010 (European Environmental Agency, 2012). In general, the passenger car remains the dominant mode of travel, representing 73.7% of all private inland transport inside the EU (2012). Europe's passenger car fleet keeps growing with increasing motorization: the number of cars per 1000 inhabitants grew from 393 in 1990 to 473 in 2009 (EU, 2012), the EU-15

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countries remain the largest market for new cars with 94% of total registrations (European Environmental Agency, 2012, p. 6).

Facing an increasing emission and congestion problem, the EU Commission (2011) states in the *European White Paper for Transport*, cars need to be used more efficiently in urban areas, where growing population density requires shorter and multiple ways to get to work and greater choice of transport, including walking and cycling. In the name of 'sustainable mobility', city planners, automotive, energy and infrastructure enterprises and consumers search for joint solutions to reduce emissions and congestion. Some have developed ambitious transport policy programmes including infrastructure measures (London) or integrated sustainable urban planning based on public transport and bicycle use (Copenhagen).

Sustainable forms of individual motorized passenger transport such as car-pooling for commercial or private use have existed for decades and show considerable growth rates in recent years (bcs, 2012). The success of electric bikes (pedelecs) and electric scooters extends the offer of emission-efficient vehicles for urban use. Numerous European cities have introduced new concepts of public and shared transport such as the shared public bikes (Velib' Paris, Barclaybike London) or small city cars (Car2go Ulm, LIVOP Paris or ZipCar in various US cities) available at public parking spaces or as free-floating cars¹ for short distances. These trends continue since the choice of means to ensure personal mobility is becoming less connected to individual passenger car ownership. The status symbol of individual ownership could transform towards new forms of shared use especially among the young urban population (Bratzel, 2011).

The emergence of these offers partly coincides with the economic crisis in 2008, during which the European automotive sector started to massively invest in electric and hybrid engine technologies and battery technology (Villareal, 2011). In addition to being a low emission powertrain solution because it is driven by electricity, the electric car² has also been much discussed as means of future value creation for Europe's large but stagnating automotive industry (for Germany and France, see Hildermeier, Villareal, 2011). Accordingly, car makers have developed car and battery know-how and production facilities, supported by political programmes to launch an electric car-based automotive and transport sector (Calabrese, 2011; Lung & Jullien, 2011).

Pure electric cars are adapted to urban short-distance use and can considerably reduce traffic emissions if used with renewable energy. It thus came to be considered a product that could ensure sustainable mobility, especially, if it is shared and part of local transport systems.³ As some mobility researchers argue, electrifying private cars does not transform the deeply rooted cultural image of automobility (Canzler & Knie, 1994, 2011). The key concept for sustainable mobility, they claim, should be intermodality, i.e. sharing (electric) cars and connecting their usage with that of buses, the metro, bikes and trains to enhance both individual autonomy and environmental protection (Knie *et al.*, 2012). As a consequence, the showcasing of electric car projects as part of local transport systems has sought to demonstrate electric cars' public use and positive environmental effects. The local implementation of these projects is supported through national and EU politics, e.g. the European Commission's Green E-motion (2013) project, encouraging regional and local actors from the transport, car, telecommunication and electricity sectors to set up a market for sustainable mobility products and services. Overall, these electric mobility projects vary considerably depending upon

local sustainability criteria, project outlines and local interest configurations with competitors (such as taxi drivers and car rental companies). Since there is no unanimous definition of sustainable mobility, and local mobility and economic conditions vary considerably, current electric car experimentations play a crucial role in defining future ideas and politics on sustainable transport.

In this paper, we compare two electric mobility car-sharing systems, BeMobility in Berlin and Autolib' in Paris, as two different answers to the challenge of defining what 'sustainable mobility' can be. Though they both address pollution, congestion and traffic management, the two projects outline contrasting understandings. Both projects' conception and implementation depended upon a range of interactions between mobility consumers, policy-makers, and firms supplying mobility services and products such as electric cars, charging stations and use systems. They reflect the outcome of locally specific political processes and interest negotiations between industrial actors and public policy-makers. Accordingly, the next section introduces currently competing visions of sustainable transport policy and firms' collaborative market explorations. It is followed by a short introduction into the theoretical concepts used. The main part of this paper, after providing some context on Berlin's and Paris' mobility patterns, reconstructs the history and implementation of each project based on interviews with key actors and an analysis of publications and press coverage (see Appendix).

Sustainable Transport: Exploring the Market

Across Europe, two visions of sustainable mobility coexist in recent regional transport policies. On the one hand, the European car makers explore electric cars as an alternative fuel-efficient engine technology. Supported by industrial policy programmes to compensate sales and job losses in the sector after the severe crisis since 2008–2009 (Jullien & Lung, 2011), these tests remain centred on the private passenger car and its mass individual use (European Commission, 2010). They thus do not put into question the dominant paradigm of individual car ownership and its private use, but focus on emission reduction through renewing the existing car fleet.

On the other hand, transport policy-makers and planners have put forward new and potentially eco-efficient ways of using cars. Expecting a transformation of the dominant form of (auto-)mobility tied to individual car ownership (Canzler & Schmidt, 2003) towards collective, flexible and intermodal use, an efficient urban transport system should allow passengers, for example, to rapidly use shared electric vehicles as a 'public automobile' (Honsel, 2011) if adequate for their journey.

When support schemes multiplied in 2008, these different perspectives came into competition with one another at the regional level. Firms, planners and consumers held different understandings of how to position the electric car as a means to ensure citizens' mobility in pre-existing urban transport systems. As a result, there is currently a broad range of integration strategies from simple promotional purchase boni for sales to electric commercial car fleets, small-case car-sharing offers or the integration of electric cars into collective (metro, tram, bus and train) or individual (bike and pedelec) shared transport. While the former options can be considered 'conservative' and a continuation of individual car use, the latter can be considered as 'progressive' in the sense that it includes intermodal offers and incites different forms of use. This analytical distinction

helps to grasp how electric car projects determine the future position of the electric car in local transport systems.

The combination of car-sharing services with electric cars triggered innovative patterns of collaboration. Established actors on the car market (producers and rental firms) enter into collaboration with city administrations and develop new business models around car-sharing and electric cars. Their offers cover simple (electric) car-sharing fleets, by leasing or renting out eco-efficient or electric cars, three- or two-wheeled vehicles in small quantities. Tests were run in cooperation with energy firms, such as BMW-Vattenfall or Daimler-RWE in Germany, where customers could test drive and charge electric cars, and EDF-Renault or Schneider Electric-BMW in France, where electric car fleets are tested for professional use. Car makers also invest in car-sharing as a new opportunity to sell cars. In 2009, Daimler started a free-floating public car-sharing system in collaboration with EuropCar as an operator. 'Car2go' has been expanding since in response to high customer acceptance from Ulm (Germany) into 25 European and North American cities, sharing 9000 Smarts, among which 1100 are purely battery-driven (Jordan, 2013). Firnkorn and Müller (2011) show that the project can reduce emissions in the long term by substituting private cars and by integrating battery vehicles into the local car fleet.⁴

But more importantly, as our paper will show, the emerging market dynamic is triggered by the competition of new players such as niche car producers or non-automotive firms. Complexity is added as many projects are part of public funding schemes, cities and regions are often part of the configuration of actors who are responsible for the projects' implementation. Demand for new means of transport, mobility patterns and environmental problems vary in each city. In order to explain the emergence and impacts of different sustainable transport projects in their local context, we suggest a theoretical framework that can grasp the institutional and market effects of these experiments as 'transport policy tools'.

Electric Car Projects as Transport Policy Instruments

We examined electric car projects as transport policy instruments, co-designed by firms, the cities' policy-planners and public administrations. In each city, they were developed within local heterogeneous networks of actors operating in pre-existing transport systems, policy fields and markets. The transformative effects of these projects, consequently, cannot be evaluated without taking into account the existing economic and political context in which they are implemented. Each instrument brings about a specific vision of the most adapted and 'sustainable' local transport system, depending on participating actors' interests, problem interpretations and preferred solutions.

In order to accurately describe electric car projects as results from this configuration, we use concepts from political sociology that study the 'performative' impact of policy instruments in different sectors, for example, urban or environmental EU politics (Halpern & Le Galès, 2011). The basic idea, as formulated by Le Galès and Lascoumes (2007), is that 'instruments at work are not neutral devices: they produce specific effects, independently of the objective pursued (the aims ascribed to them), which structure public policy according to their own logic' (p. 1). Arguing against functionalist approaches that see instruments as efficient solutions to existing problems, we contend that mobility projects as transport policy tools have a specific transformative capacity. They do not only

respond to the aim of making local transport more sustainable. More than that, once implemented, they shape the (future) way in which planners and consumers understand transport solutions, for example, as a 'need for the public electric car' in the 'conservative' scenario, or 'intermodal connectivity' in the 'progressive' outline. Carrying a specific solution, policy instruments create a specific way to perceive the problem. Revealing this 'performative' effect in electric car projects, our paper aims at showing their long-term institutional and market consequences.

Our case studies focus on electric car projects' 'instrumentation', defined as the set of problems posed by the choice and use of instruments (techniques, methods of operations, devices) that allow government policy to be made material and operational. [...] it involves not only understanding the reasons that drive toward retaining one instrument rather than another, but also envisaging the effects produced by these choices. (Le Galès & Lascoumes, 2007, p. 4)

This means, it is via the proposed solutions that we can see to which problems instruments answer—and understand which vision of transport politics, a progressive or conservative one, is at work. Consequently we study how actors, through problematizing mobility and environmental issues and negotiating their different interests, came to implement the electric car project in its final shape. This includes exploring conflicts over other possible ideas and solutions that were not implemented.

Analysing electric car projects as performative transport tools is especially adapted to the current economic context: as the market for sustainable mobility services is not yet established, it is a space where existing projects can create a new network of actors and new hierarchies between them, through promoting certain criteria of what sustainable mobility (based on electric cars and specific use patterns) could be in a specific urban area. In this sense, conflicting visions in European and national debates on the electric car and its potential applications have opened up a discursive space, in which the definition of sustainable mobility is crucial in orienting the choice of policies and instruments, the outline of mobility projects and, as a result, the shape of future mobility and transport systems (Canzler & Knie, 2011, p. 11).

Autolib' in Paris and BeMobility in Berlin: Two Visions of Sustainable Mobility

Autolib' and BeMobility are two electric car-based projects created in 2009 and 2010 at the peak of an electric car 'hype'⁵ in the global transport and automotive industry. Both are supported by public funding schemes that seek to improve the local transport situation in Paris and Berlin. They offer two different visions of how to do so through shared electric car use. In order to understand the emergence and potential impact of both projects as policy instruments, we need first to examine local transport problems such as pollution and congestion, as well as a potential demand for such projects derived from existing patterns of mobility in Paris and Berlin.

According to a European observatory for road traffic pollution that delivers comparable data for European cities, Berlin's pollution levels have been moderate and continuously lowered since the mid-2000s. In contrast, Paris' scores were high

Modal-split	Paris	Berlin
Walking	52%	29%
Public transports	32%	27%
Car	10%	32%
Bike	3%	13%
Motorcycles	2%	*
Others (Taxis, ...)	1%	*

Figure 1. Modal split in Paris (2010) and Berlin (2008). For Paris, data were taken from the ‘bilan de déplacements’ by the City of Paris, available at http://www.paris.fr/pratique/Portal.lut?page_id=7096&document_type_id=4&document_id=103374&portlet_id=16333 (accessed 13 April 2013). These numbers refer to traffic inside Paris, and not of Ile-de-France, i.e. it equals 18.77% of total journeys (69% of journeys are from suburb to suburb; 11% from suburbs to Paris). This limit in measurement is due to the comparatively small territory of inner Paris compared to the overall agglomeration of Ile-de-France. For Berlin, the most precise survey ‘Mobility in cities’ (SRV) is only available for 2008 (most recent in 2012 was not published at the time of writing).

and rising (Air Quality in Europe, 2013). Struggling to keep EU limits of 35 days in excess of 50 microgram particulate matter (PM10)/m³, the French capital urgently needs to limit its particle emissions (AirParif, 2012). In Berlin, pollution is a less urgent problem, as the city managed in 2012 to meet EU targets (Umweltbundesamt, 2012).

Citizens’ mobility patterns also vary between both cities (Figure 1). With 3.5 million inhabitants, Berlin has the lowest share of cars per capita in Germany with 55% of households owning a car. Berlin’s citizens are increasingly multimodal, combining different means of transport for a single journey (Berliner Senatsverwaltung für Stadtentwicklung, 2012). By contrast, Paris’ citizens use slightly more public transport, and travel far less by car. Taking advantage of short distances in inner Paris, more than half of daily trips are walked. This particular distribution of modes of transport used on daily average goes with a low motorization rate in Paris: only 44% of households own a car (OMNIL, 2012).

Both cities consider public electric car-sharing as an additional instrument as part of their existing transport policy programmes to reduce pollution and noise. Berlin’s senate aims at lowering emissions while increasing accessibility for transport responding to ‘transforming mobility needs’ (Berliner Senatsverwaltung für Stadtentwicklung, 2011, p. 8). Crucial instruments are inter- and multimodal offers to reduce motorized transport overall, based on new technologies. Electric mobility plays an important role, along with public transport, car-sharing and public bike rental (Berliner Senatsverwaltung für Stadtentwicklung, 2011, p. 11). However, specific projects to integrate electric cars into transport are left to private actors such as the national railroad company Deutsche Bahn, energy providers and, to a lesser extent, car makers.

The City of Paris has taken measures on all available public modes of transport in recent years to reduce traffic and pollution. After introducing the public bike rental system Velib’ and building cycling routes from 2007 onwards, the city further developed the existing tramway network, a regional bus service in Ile-de-France replacing individual journeys into Paris and a local bus network to respond to short-distance mobility needs. Additionally, the Mayor of Paris has implemented a new mobility service Autolib’, a ‘one-way mobility system’

and based on battery electric cars, to demonstrate Paris' ambition in transport politics.

If both cities' governments clearly see the task of putting into practice sustainable mobility systems, they have chosen to do so in contrasting ways. In the following case studies of two electric car projects 'Autolib' and 'BeMobility', we show that the specific ways projects aim to solve local transport problems reflect two different conceptions of sustainable mobility that translate specific political and economic interests.

Autolib'

With the successful public bike rental system Velib', the Mayor Bertrand Delanoë put in place one of Paris' most prestigious transport policy projects. When reflecting on the idea of Autolib' in 2009, he stated that its objectives were 'to have less cars parked in our streets, less traffic jams and less pollution' (Interview in *Le Nouvel Observateur*, 4 December 2011). Having consulted internal expertise on Parisians' mobility needs, the City of Paris issued a call for proposals for a mobility service that should be

- electric car-based and usable for one-way journeys,
- publicly accessible and shared,
- auto-sufficient (no additional public staff) and
- accessible for charging to other electric cars not provided by the service.

Three out of five applications were considered closest to meeting these requirements: first, the '4city' consortium led by SNCF,⁶ with Vinci Park,⁷ Daimler with Smart ed from Car2go as vehicle supplier, Avis,⁸ and the RATP⁹ transport company. According to their proposals, the use of the public electric car would become part of an intermodal public mobility service to be created. To this end, public transport season tickets should include the right to use the electric car during a specific journey. This solution represented interests of all actors in Paris' transport system at a time when the possible gains of the electric car were very uncertain. The second candidate 'VTLIB' (Veolia urban transport) proposed the Peugeot-Ion based on the Mitsubishi iMIEV as a shared electric car. The third and successful candidate was a single firm, managed by the Bolloré group,¹⁰ through its subsidiary, the public car operator Autolib', working on the basis of the full electric 'Blue car' assembled by Pininfarina.

Firm owner Vincent Bolloré had invested around 1.5 billion Euros¹¹ in the previous 15 years for the development of a lithium-metal-polymer (LMP) battery through its subsidiary Batscap. This technology is expected to surpass in autonomy the lithium-ion battery chosen by all major car makers and electric car producers. Among all the competitors, Bolloré was the only one not specialized in mobility services or transport. Involved in import/export, media and diverse manufactured products, the group began in the 1990s to conduct research on high-capacity batteries to store energy and investigated a very promising but little developed technology, the LMP battery. Called the 'dry battery' due to its technical specificities, it offered a higher potential than lithium-ion batteries, especially on its durability whereby it could store energy and last for up to 250 km (Batscap, 2013). In 2005, the group confirmed its interest in electric cars which were considered coherent with the LMP technology. For the Bolloré group, producing an electric car was an opportunity to prove that the LMP tech-

nology was industrially relevant and could be used in other applications (mainly high-capacity energy storage). As far as Autolib's interests were concerned, this newcomer on the market gained an important platform to demonstrate the quality and operability of its main products. As the Autolib's CEO confirmed in an interview, 'our objective is to deliver public service, to market this solution in the international context and finally to sell our batteries. I remind you that the major strategic issue nowadays in the world is energy storage' (Interview F.1).¹² This confirms that Autolib's application was based on a long-term industrial objective beyond the mobility-related considerations of the Paris service. At the same time, the City of Paris would benefit from being the first to implement an extensive public electric car rental system.

Although Bolloré was a newcomer in both urban transport and the automotive sector, autonomy and money were given to Autolib' as the single operator of Paris' public electric car service (a total of 65 million Euros comes from different public authorities). Announcing a 'revolution', through which 'the city will seem more open and travel more fluid and serene with these clean and silent cars moving through the streets' (Autolib', 2013), Autolib' presented itself as an integrated solution to traffic problems in Paris, providing the answer to changing mobility demand. Concerning emission goals, a yearly reduction of 261.818 tons of CO₂ was announced (Autolib, 2011, p. 6), evaluations are not available yet. Regarding congestion, the press document issued at the start of the service in December 2011 stated that the private car fleet was expected to be reduced by 22.500 vehicles¹³ (4.19%). According to Autolib's CEO, this should be achieved through the long-term replacement of private cars by users who will renounce buying cars and instead use public shared cars as an alternative. In order to achieve these goals, Autolib's business model relies on changing mobility behaviours of predominantly young drivers. This presupposes demand for short-distance use of public shared electric vehicles in the Paris urban area, including commuters from closer suburbs. As the City of Paris responsible officer states, 'our objective was to offer a mobility service for occasional trips. For example, when you need a car to go shopping and bring back to your flat a bulky object' (F.4).

However, the degree to which this demand really exists remains questionable. The City of Paris insists that studies have revealed a demand for additional, occasional car use. However, as Figure 1 shows, Parisians do not use the car very often: in 2010, only 10% of daily journeys were done by car, compared to 32% with public transport. The project's efficiency is equally unproven regarding congestion. In Paris, most traffic is caused by journeys from the suburbs to the centre, which is not primarily addressed by the Autolib' service. Indeed, all the charging and parking stations are located inside Paris or around its borders, where users can find alternatives in the form of the metro, tramway, buses or trains. Doubts on substitution effects of private cars were confirmed by a survey from the national consumers' association, conducted in November 2011. While 45.4% of Autolib' customers responded that the service did not incite them to considerably reduce private car use, 43.4% answered that it did (CLCV, 2012, p. 9). The survey also revealed that 47% of Autolib' customers use it because it is judged to be 'faster and/or more comfortable than public transport' (CLCV, 2012, p. 10). The report concludes that 'this situation is worrying because it would be better if a service such as Autolib' became complementary to public transport in order to limit the use of personal cars, and not in

competition with it' (CLCV, 2012, p. 10). Nearly all interviewed actors concluded that Autolib' did not correspond to an integrated management of transport, but rather represented a new carbon-free mobility service in conjunction with other existing means of transport.

This 'additional' aspect of the Autolib service provoked political contestation by Parisian Senate deputies. Several districts¹⁴ in the Ile-de-France chose not to be part of the 'syndicat mixte Autolib', the steering group for all administrative districts implementing the service in their area. The best-known example was the city of Montreuil, governed by a member of the French Green party and former environment minister Dominique Voynet, who prominently refused to install charging stations. The Green party had been opposed to the project since its planning phase and did not consider Autolib' an appropriate solution to Paris' pollution problem (EELV, 2011). From their perspective, it wrongfully promotes individual passenger transport as a dominant and 'sustainable' means of transport. The energy used to fuel its electric version represented in the BlueCars, presented as 'clean', comes in France by 78% from nuclear sources (CEA, 2013). According to the Green party, Autolib' contributes to the City's congestion by remaining a 'car solution' replacing other forms of clean transport such as bikes with Velib' or public transports.

Bolloré's main commercial competitors, car rental firms, maintain another counter-argument: for ULPRO,¹⁵ the association of short-time car rental firms, Autolib is an unrightfully subsidized competitor:

Autolib has benefited from 50 M Euro from the City of Paris, 130 M Euros from the European Investment Bank and 70 M Euros from Ile-de-France's collectivités, all of which subsidizes a service that competes with existing car rental firms without any compensation having been discussed or offered. (F.2)¹⁶

Similarly, the price of charging and parking stations granted to Autolib' was judged unfair compared with the price that car rental firms have to pay to keep their vehicles on or off Parisian streets. This conflict reflects a lack of consultation between the City of Paris and other mobility actors.

Autolib' has been 'politicized' since it started. Its implementation triggered a more general debate on the reliability and viability of the electric car. As France is one of the European countries that is most implicated in its development, the implementation of an exclusively electric car-based service allows users to get accustomed to the product and overcomes psychological barriers concerning its limited range and technical problems (Villareal, 2011). As a platform to test the innovative battery technology, the Bolloré group's industrial ambitions are also aligned to the French government's goal to foster value creation in the car industry based on the electric car.

BeMobility

BeMobility was an e-car demonstration project funded by the German government as part of a comprehensive 'economic recovery' plan to support innovative research and development projects from 2009 onwards. The government allocated 130 Mio € to demonstration projects of electric cars in eight innovation clusters called 'model regions' (BMVBS, 2011).¹⁷ As one of these projects, BeMobility was funded in the capital's cluster region Berlin-Brandenburg between August

2009 and November 2011 with 4.6 Mio €. We estimate the overall cost of the project to be about 8 Mio €. ¹⁸

The project was mainly conceived by the Deutsche Bahn subsidiary DB Fuhrpark, ¹⁹ and co-developed and implemented through an institute of applied mobility research in Berlin, InnoZ (innovation centre for mobility and societal change). InnoZ's role can be described as a think-tank developing innovative mobility products and services in close cooperation with commercial partners and researchers (Canzler & Knie, 2010). Co-funded among others by DB and WZB (Berlin Social Science Research Center), it operated as an intermediary actor, uniting nine consortium partners and five associated partners from the research, telecommunication, energy, automotive and public transport sectors. As project coordinator, InnoZ's task was to align a heterogeneous constellation of interests and strategies to the overall vision of the project and manage potential trade-offs.

Embedded into this pre-market logic of research and innovation, BeMobility's official objective was 'to establish new multimodal mobility concepts and to integrate electric vehicles into public transport' (BeMobility, 2013). Its authors at InnoZ addressed the transport system as a whole, linking existing innovations in products (electric cars) and new forms of mobility (shared and publicly accessible), emission-efficient energy infrastructure (charged at stations fed with renewable energy sources) and telecommunication. As a project coordinator stressed (G.2), the project's 'unique selling point' was the vision of an intermodal, efficient and thus sustainable transport system in Berlin. The project was centred on a station-based electric car-sharing system. 'BeMobility' offered the combined use of an electric car, public bike rental and all modes of public transport in Berlin through a so-called mobility card, offered between June and September 2011 to 135 customers. ²⁰ To make informed choices they could select the most suitable means of transport for their journeys via a newly developed smartphone application.

In the general objective to realize intermodal transport, participating firms shared an interest in the development of a smartphone application to gather real-time information on all available modes of transport. According to a member of the project coordination (G.2), participants could also gain experience by developing projects with partners in other sectors. Participating firms also had similar interests in collecting detailed data on use and feasibility of the charging infrastructure (RWE, Vattenfall) or in collecting feedback on customer acceptability of new commercial offers (DB).

BeMobility enabled large firms to explore a future e-car market. Berlin is a highly innovative territory in terms of transport policy, given spacious, flexible work and living conditions, low motorization and concentrated research and development capacities. It is not, however, the site of large automotive cluster structures or car makers' headquarter as Stuttgart, Munich or Wolfsburg. DB thus identified Berlin as an appropriate geographic and economic territory to test customized flexible mobility offers. Yet, DB's ambitions are also a critical issue for local transport planners and firms. As a representative of the Berlin Senate responsible for electric mobility projects stated (G.4), the DB's 'Mobility Card' created problems for existing transport firms. Because the 'Mobility card' offer included a monthly public transport ticket, Berlin-Brandenburg's union of transport companies (VBB, associated project partner) had to sell its season ticket below regular sales prices as DB's car-sharing had to be included in the overall offer. This remained an internal conflict. InnoZ's project coordinator confirmed that much effort was needed to realize 'intermodality' including individ-

ual and collective transport, run by public and private companies, since participants' interests sometimes collided (G.2).

For accompanying researchers, the project's research question was if and how customers would respond to this test offer at all (G.1). After the first project phase, uncertainty over demand for intermodal offers remains. Indeed, according to the final report, results are mixed. Test customers used the 'Mobility Card' first and foremost for public transport and not for car-sharing: 83% used public transport daily and 36% never used the car-sharing part of the package (BeMobility, 2011, p. 80). InnoZ's project coordinator confirmed that most car-sharing use was occasional (G.2). The Berlin Senate (interview G.4) considers the project's car-sharing offer as free-riding on the then less expensive public transport (G.4). In the view of the necessarily limited outcomes (short time period, small number of customers, etc.), the Berlin's Senate responsible officer concludes that electric car-sharing was only one part of the solution to Berlin's transport problems.

Further administrative and market conflicts characterized the implementation phase of the project. In 2010–2011, BeMobility was implemented alongside parallel small-scale demonstration projects. However, no standardized concept or network of charging stations was put in place in Berlin, an issue still being worked on by the Senate at the time of writing. The German energy market is an oligopoly of four utilities for whom economic opportunities linked to the electric car had soon become a subject of competition. They cooperate individually with Berlin's districts to place charging stations for their test customers. 'There are districts that more or less intentionally follow their individual plans and do not integrate their actions into an overall strategy' (G.4). Consequently, BeMobility had to deal with several energy firms and differently managed charging procedures provided by two utilities as part of the consortium. The specific interest coalition on the energy market, jointly with Deutsche Bahn's intention to extend off-rail mobility services, has considerably determined the shape and scope of the project.

Weak cooperation with partners from the automotive industry was an additional characteristic. It illustrates existing gaps between the automotive industry's market strategies and the project's vision of an integrated transport system. BeMobility was conceived in 2009 when electric cars were expected to enter the car market quickly. DB Fuhrpark had optimistically planned to provide a fleet of 40–50 electrically driven cars from the start. However, they struggled to procure electric cars. The final report is quite explicit on the initial asymmetry between expectations and reality: 'After a few months into the project it became clear that the electric car market is even more than expected a supplier market only' (BeMobility, 2011, p. 211, our translation). Some of the difficulties were technical, as there were no standards on how to convert conventional cars into electric ones (BeMobility, 2011, p. 212). Others were market-related: German car makers were not selling electric models yet, and non-German car makers preferred markets in which purchase bonuses were paid such as France (Villareal, 2011). Lacking alternatives, after long negotiations, DB had to buy cars little by little rather than all at once which caused additional costs and risk. In the end, the project began on a smaller scale with 18 Toyota Plug-In Hybrid Prius, as well as electric Smarts. During the project, other vehicles were added, such as Citroen C-Zero, to create a rather heterogeneous fleet of 47 cars.

Overall, BeMobility focused on organizational innovation: linking public and private modes of transport through new patterns of use and existing technologies. Project participants' vision of 'sustainable transport' thus lies precisely in the effi-

	Autolib (November 2012)	BeMobility (October 2011)
Global investments	180 Mio €	8 Mio €
Share of Public investments	65 Mio €	4.6 Mio €
Shareholders/ Stakeholders	Syndicat Mixte Autolib' (Public service delegation agreement) City of Paris + 47 other Communes) Bolloré Group	Project consortium: Deutsche Bahn AG/ DB FuhrparkService GmbH; Technische Universität Berlin/ DAI Labor; Robert Bosch Car Multimedia GmbH; RWE Effizienz GmbH; InnoZ GmbH; Contipark Parkgaragengesellschaft mbH; Vattenfall Europe Innovation GmbH; Solon SE HaCon Ingenieursgesellschaft mbH
Implementation Period	Ongoing, started on 5 December 2011	DB CarSharing: June 2010 - September 2011; Mobility Card test period: 1 June until September 30, 2011
Total number of customers	47.500 in total, 17.500 with a yearly abonnement	1209 CarSharing customers; 135 test customers (limited number of Mobility Cards),
Total rents since start	820.000	2.853
Number of charging stations	720 (470 in Paris, 250 in neighbouring communities) 3000 charging points	16 in Berlin's inner district (public transport zone A)
Number of cars in service	1750 BlueCar in 2011(3000 in full term)	47 mixed hybrid, electric and conventional cars.
Average distance/rent	9 km	51 km Pure EV-driven ways: 28km

Source: own compilation from: Autolib' press communication 29/11/12, Berlin elektroMobil final report (31/10/2011), own calculations

Figure 2. General characteristics of both projects in comparison.

cient combination and integration of existing strengths. This systemic interpretation corresponds with the Berlin Senate's overall transport policy objectives. In practice, however, the project has missed its aim so far: the vision could not be implemented with sufficiently high numbers of vehicles and participants. Due to its trial character competing with other projects, and the city's lacking coherent infrastructure concept, no mass effects could be reached (Figure 2).

Conclusion

Based on the concept of the performativity of policy instruments, our paper has shown how visions of sustainable transport materialized in strategies and policies of interested actors, and shaped the way testing projects have been designed and implemented. While the Autolib' project understood Paris' traffic problems in terms of emissions and offers a technological solution as an additional shared means of transport, BeMobility authors interpreted Berlin's situation as the need for inter-sectoral research and development cooperation bringing about system change towards intermodal and energy-efficient transport. Depending on these interpretations, projects were carried out as possible solutions. First

effects on market configuration and use patterns could be identified in terms of a progressive and conservative development.

Autolib' gives a more 'conservative answer' insofar as it remains centred on the car as a dominant means of transport without intermodal compatibility. In terms of its unclear contribution to the efficiency of the transport system and environmental gains yet to be proven, it can be considered a small, narrow-targeted instrument that gives a restricted answer to transport problems. However, it had impacts as a standard-setter. As full-scale infrastructure has been deployed, and Bolloré has an exclusive contract with the City of Paris, all future projects will have to deal with Autolib' as a new status quo that established shared use of public electric cars as one option for passenger transport among others. Autolib' seems to have important development effects as a market instrument: as a subsidized innovative 'niche' service, it allowed Bolloré, an automotive 'new-comer', to compete with established car makers and proves to be a solid base for Bolloré's future business development, as its recent expansions into Bordeaux, Lyon and Indianapolis (US) show (Bolloré, 2013).

In contrast, BeMobility gives a 'progressive answer' in the sense that it calls upon politicians and firms to think in terms of sustainable transport system as a whole. The aim is to develop joint efforts to shape urban mobility among firms, passengers and cities, as put forward by the *European White Paper for Transport* (European Commission, 2011). Intermodality being the key concept, the car is being given the function of a public, individual means of transport compatible with other modes in citizens' mobility chains. Due to its marginal market effects and strong competition of other e-car testing projects in Berlin, its main performative effects lie in forging a broad and heterogeneous interest coalition with existing market actors; an effort that failed in the case of Autolib'. A durable interest coalition emerged, and a follow-up project has been started in 2012.

In general, both projects benefit from the environmental, political and symbolical effects of the electric car as an innovation. But as transport policy instruments, both projects seek to realize these effects in contrasting ways. As both are side gains of industrial strategies, these partly account for their differences. One remarkable difference is the German energy firms' interest in 'electric mobility' and their strong competition on this emerging market. In France, where EDF retains a monopoly and Renault is strongly investing in this technology, no major market shifts are expected. In comparison to BeMobility, Autolib's implementation depends more on the Bolloré group's global industrial strategy. Whereas Bolloré's interest is to bring its battery technology into the market, BeMobility's outline is rather influenced by visions of Deutsche Bahn to unify and extend their mobility offer.

Firms' interests are driven by their role as competitors of the traditional automotive industry. In both projects, leaders are outsiders to the traditional car market seeking to establish a dominant position in an emerging market for electric mobility. Neither Bolloré nor Deutsche Bahn had previous experience in the automotive sector. Governments' interest in funding new electric car technologies and applications allowed them to gain subsidized access. As 'electric mobility' and corresponding battery technology are still fields that need to be created and defined, the door is open for sufficiently large firms willing to invest in a new market. To better understand market shifts, further research needs to compare more regional electric car demonstration projects, nationally, and Europe-wide, in terms of their conservative or progressive impact on future sustainable transport.

Notes

1. Free-floating car-sharing systems are systems in which cars can be used and parked anywhere. In contrast, in 'stationary' public car-sharing, cars can be booked and parked at fixed stations (see Firnkorn & Müller, 2011). Both models allow one-way use if cars do not need to be returned to a 'home base'.
2. In this paper, we use the term 'electric car' referring to the battery electric vehicle, i.e. a car moving only with an electric engine and a rechargeable battery.
3. This idea is not new. The electric car appeared in the 1970s' oil crises and was implemented in numerous fleet tests in the 1990s (France: Peugeot LISELEC at la Rochelle, Germany: VW/Rügen), however, without market effects. Since then, transforming mobility patterns, increasing emission problems and high prices for gasoline have created more favourable conditions for the diffusion of electric vehicles.
4. In a similar effort on a small and local scale, in 2011 Volkswagen started a local station-bound car-sharing service in Hanover with 200 Golf BlueMotion Diesel as *Quicar* and additional customized offers with cars from other segments for families or commercial use. Under the label *DriveNow*, BMW offers a free-floating use of mini cars in several German cities. A comprehensive 'mobility' offer is made by Peugeot with *Mu*, a rental service including (electric) bikes, small cars and light utility vehicles, and scooters, on demand. Citroën has extended its *multicity* offer in France and Germany, allowing car and scooter rental journey planning and 'call a car' service delivered at home.
5. The term 'hype' is used, for example, in Transport & Environment (2009).
6. SNCF is the French national railway company.
7. Vinci is one of the most important construction and concessions group in the world, financing, designing, managing and implementing public and private transports, facilities, water and energy networks and public infrastructures.
8. Avis is a French short- and long-term car rental company.
9. The RATP Group is the French major public transport company operating in collective mobility such as bus, metro, train and tramway in Ile-de-France (Paris and Greater Paris).
10. Bolloré group is one of the most important world import/export companies. Activities range from media to transport and paper production.
11. Unpublished figure, confirmed in interview at Autolib'.
12. All interview quotes are translated from French and German into English by the authors.
13. This is a marginal impact. According to APUR, a public agency observing urbanism and socio-demographic developments of Paris and its suburbs, the city of Paris' car fleet was 537,382 vehicles in 2006 and has continuously diminished since then. Paris and its suburbs counted more than 4.3 million vehicles in the same year (APUR, 2010).
14. Montreuil, Gentilly, Le Kremlin-Bicêtre, Ivry, Vincennes, Le Pré-Saint-Gervais, Aubervilliers, Saint-Denis and Clichy-la-Garenne.
15. Union des Loueurs professionnels: Union of Commercial renters.
16. The mentioned amounts refer to research, development and implementation of the cars and charging infrastructure. They could so far not be confirmed by other independent sources.
17. From 2012, three automotive clusters hosting headquarters of car makers, that is, Stuttgart, Munich, Wolfsburg and Berlin as the capital region, were defined as 'showcase' regions for new mobility services based on electric cars.
18. Calculations based on BeMobility final project report and BMVBS (2011). The total cost is estimated by doubling private partners' funding shares, as government funded 50% of their overall investments.
19. Hereafter referred to as 'DB'. Beyond its national rail services, Berlin's S-Bahn and suburban train network operation, DB has extended its activities into electric car rental (called 'Flinkster') and public bike rental (DB Call-a-Bike).
20. The offer (78€/month) included a monthly ticket for the public transport system, a 50€ voucher to use DB 'e-Flinkster', car-sharing offer for electric cars and free DB call a bike rental for 30 minutes per journey. Twenty parking spaces (contipark) were free for users as well as 100 public charging stations in Berlin. In its final phase, a total of 40 electric and hybrid cars could be rented.

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Appendix. Table of Interviews

Country	ID	Status	Location	Date
France	F.1	CEO Autolib’, Bolloré Group	Paris	20 March 2012
France	F.2	CEO, ADA rent	Paris	28 March 2012
France	F.3	President Transport and Mobility Committee, Strategic Analysis Council	Paris	27 March 2012
France	F.4	Coordinator electric mobility, City of Paris	Paris	17 April 2012
Germany	G.1	Senior researcher, Science Policy Studies, WZB	Berlin	26 January 2012
Germany	G.2	Project Coordinator BeMobility, InnoZ	Berlin	29 August 2012
Germany	G.3	Managing Director, InnoZ	Berlin	26 January 2012
Germany	G.4	Coordinator electric mobility Berlin Senate	Berlin	08 October 2012