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► **To cite this version:**

Magali Pierre, Eleonora Morganti, Virginie Boutueil. Will fleet managers really help vehicle fleets to become electric?. Demand Conference 2016, Apr 2016, Lancaster, United Kingdom. hal-01415461

**HAL Id: hal-01415461**

**<https://enpc.hal.science/hal-01415461>**

Submitted on 13 Dec 2016

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## **Will fleet managers really help vehicle fleets to become electric?**

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Paper prepared for DEMAND Centre Conference, Lancaster, 13-15 April 2016

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### **Abstract**

Over the last few years, obligations to reduce carbon dioxide emissions have led European States to propose ambitious targets concerning electrifying car fleets. In France for instance, electric vehicles are required to cover a quarter of all new car purchases in big companies and public administrations. In these organizations, departments that are traditionally in charge of company vehicles have thus been tasked to implement these policy decisions. General Resources have become de facto responsible for testing and managing these new EVs. Illustrating our results through five case-studies that took place in France in 2012-2015, we will show how these departments, and notably fleet managers, carry out the numerous tasks accompanying the spreading of EVs in their organizations: acquiring these vehicles (and the charging infrastructure), allocating them and managing the charging of the cars. The allocation, whether as fleet cars or executive ones, is an important step for the success of their implementation in these companies. We will also point out the contradictory significations and powerful constraints that complicate the performance of these tasks. Their achievement strengthens the role of the fleet managers, who turn out to be crucial but unexpected players in electricity demand.

## Introduction

Many European governments including France recently set about electrifying their administrations' car fleets in order to meet their targets of transport-related CO2 emission reduction and to lighten their dependency on fossil energy resources. In France a memorandum from the 3th December 2012 imposes that EVs represent a quarter of new vehicle acquisitions; it's a mandatory target for state services and a recommendation for big public companies. Public authorities thus sustain the EV industry and concentrate on car fleets due to three main reasons. First, such a deployment will benefit from a massive range of end-users despite of concentrating decision processes on a small range of people. Secondly, car use and car parking patterns of such administrations and big companies are considered as favourable to EVs (Globisch *et al.*, 2013), as most professional journeys are regular, predictable, cover short distances and cars generally stay parked all night long. Lastly these fleets may constitute strong influence conveyors towards mass market in this early deployment phase, as many of these logotyped cars will be quite eye-catching in public places.

Indeed, in recent years, EVs have been offered to organisations (companies of all sizes, institutions and local authorities). Based on CCFA and SNLVLD statistics, Boutueil (2015) states that "every year in France, 4 out of 10 new light-duty vehicles (including passenger cars and light commercial vehicles) are sold to corporations". In order to introduce properly EVs on site, these organisations have worked with a great diversity of departments such as General Resources but also very unexpectedly with departments which do not usually deal with car issues such as Human Resources, Sustainable Development, Purchasing, Real Estate, etc. (see Boutueil, 2016). All kinds of players have been involved in the deployment of these cars in business units. In many companies, fleet managers have become de facto responsible for testing and managing these new EVs.

Illustrating our results through five case-studies that took place in France in 2012-2015, we will show how these departments and notably fleet managers carry out the numerous tasks accompanying the spreading of EVs in their organizations. We will point out the contradictory significations and powerful constraints that complicate the performance of these tasks. Our paper thus borrows concepts from the sociology of professions to study this professional appropriation in its organizational dimension.

Social science literature often considers EVs from a usage dimension (through short-term tests). And sociology of organisations often considers companies as a relational system without taking into account material arrangements structuring them. We will concentrate here on how these cars are spread through the organisations with the help of fleet managers, which means at the same time focusing on the inherent qualities of these cars and on the circumstances surrounding their introduction; and exploring how the cars modify social relations and professional practices within the companies.

This paper is organized as follows. The next section presents the methodology. The following section describes results gathered from the selected five case studies. The last section presents the discussion and a conclusion.

## A multi-survey analysis: context, definitions and methodology

Our study combines five case studies from France, which were originally disconnected but designed with similar goals, and which display consistent results about commercial fleet management and EV adoption. Investigations were aimed at obtaining direct information from EV users and stakeholders

involved in the electro-mobility transition. Although the original case studies generally targeted both private users and fleet users (and among the latter, fleet managers), the present study centers on the sole category of fleet managers and their attitudes towards battery electric vehicles (BEVs) and plug-in hybrid electric vehicles (PHEVs).

In total close to 50 interviews with fleet managers were conducted. All case studies were based on individual face-to-face interviews that were carried out using an exploratory approach, with a semi-structured questionnaire. This allowed us to collect data and information on the managers' acceptance, conceptions and perceptions on EVs.

### Definitions

Given that there is no widely accepted definition of what fleet management is (Boutueil 2015), we choose to give fleet management the widest definition possible, including all decisions involved in the acquisition process (e.g. selection of suppliers, selection of makes and models) as well as in the day-to-day operational management (e.g. reporting and monitoring on vehicle use and running costs) of corporate car fleets. The main rationale for this broad definition lies in the assumption that decisions relating to both acquisition and day-to-day operations are bound to be increasingly intertwined in the future, because of the growing use of reporting and other decision-support tools required for life-cycle cost-benefit analysis. However this paper focuses on the deployment of such cars and leaves aside the purchase decision in order to understand the day-to-day difficulties and constraints that frame the fleet manager practices concerning EV management.

The scientific literature underlines that decisions relating to alternative car purchases by companies are not always linked to a cost-benefit neither life-cycle cost analysis but more frequently to past experience (Nesbitt and Sperling, 1998): "Vehicle selection is often based on past experiences, with fleet operators sometimes being more brand-loyal than cost-conscious" (p.262). EV management follows, as we will see, the same experienced based process.

In the present analysis, we adopt Boutueil's definition (2015) of fleet managers, which includes in-house corporate staff who are involved in the design and/or supervision of fleet management processes<sup>1</sup>.

### Case studies with comparable socio-organizational contexts

The technical setup of the five case studies is slightly different (see Table 1):

- Case study A investigated the adoption of PHEVs in a wide range of companies and local authorities involved in a demonstration project for 4 years;
- Case study B focused on different kinds of EVs (e.g. cars and vans) produced by the same manufacturer; we analyzed the domestication process by users (in a professional context) and how people in charge of the EVs in the companies had managed them.
- Case study C focused on the interoperability of the public charging infrastructure and related to EVs of different brands, charging from various charging stations; this study compared professional and private users of EVs ;
- Case study D explored the decision-making processes involved in corporate fleet management and analyzed the barriers to, and drivers of, the adoption of battery electric vehicles by corporate fleets;

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<sup>1</sup> This definition excludes external providers of fleet management services.

- Case study E explored electric vans used by professional users in the transport sector.

With regard to the socio-organizational contexts, these investigations are comparable, since they look at how public and private institutions of all sizes (from SMEs to large industrial groups through local authorities) deal with the adoption of innovative vehicles in their fleets. Each organization defined its own policy on choosing and allocating EVs (assignment procedures, nominees or call for volunteers, etc.). Designated or volunteer staff were committed to use the vehicles over a long period.

Tableau 1. Overview of the five case studies

	<b>Case study A</b>	<b>Case study B</b>	<b>Case study C</b>	<b>Case study D</b>	<b>Case study E</b>
<b>General context</b>	Pilot case (trial) in 2010-2013	Pilot case (trial) in 2012-2013	Mass deployment in 2012-2013	Mass deployment in 2012-2013	Mass deployment in 2014 - 2015
<b>EV types</b>	PHEVs	Battery electric vans and sedan cars (same brand)	Battery electric light duty vehicles	Battery electric light duty vehicles	Battery electric vans
<b>EVs in use in corporate fleets</b>	80 vehicles	53 vehicles	approximately 80	Close to 500	80 vans and small trucks
<b>Fleets involved in the case study</b>	About 30	About 20	About 30	22 fleets of large organizations (from 55 vehicles to 40,000)	5 fleets
<b>Number of interviewees</b>	16 including 6 fleet managers	13 including 9 fleet managers	5 (fleet managers only)	44 including 22 fleet managers	15 including 5 fleet managers

EVs have been integrated into both large and small fleets. Among the entities which took part in the case studies, there are public institutions and large companies with fleets ranging from tens to thousands of vehicles. In these organizations, internal combustion engine (ICE) vehicles are usually acquired and / or leased and EVs complete the fleets. Some vehicles are pooled, some are assigned to specific services and some are assigned to designed people. The same options apply to EV fleet management.

### Respondents

Respondents have different roles and responsibilities, with wide-ranging backgrounds according to the department they work for. For the present analysis we selected fleet managers and similar positions which include managers from the operations and maintenance division, logistics service, purchasing department. The sample includes facility managers for a public institution, on-site manager for a construction firm, etc. They are employed by agencies in the sector of energy, social welfare and municipal services, or in private companies in the field of construction, transport, retailing, etc.

Within the professional vans market, respondents are part of the goods collection and delivery sector, in particular postal operators, express deliveries companies and retail store deliveries. Some of them are early adopters of electric vans for last-mile operations, others were testing or considering testing electric vans.

### Results

Our purpose here is to show the delicate balance on which the use of EVs in a professional context lays. Organisations (local authorities and companies) need to adapt to the EV constraints such as a limited battery range and high acquisition costs. Similarly to the implementation of other innovations, EVs modify the system of mobility practices of professional users and requires organisational creativity from the fleet managers. Our study concentrates on how fleet managers deal with EV characteristics: cost, battery range and acceptance from garage staff.

#### A car which is uneasy to manage: how to deal with range issues

##### Allocation and training

The EV is uneasy to manage as it requires:

- Training for the new drivers. Fleet managers are often in charge of training the new users on how to drive the EV (how to use an automatic gearbox, how to eco-drive) and how to recharge it. They also have to motivate employees who “do not want to give up their conventional cars”.
- Considering the limited range of this car. It means that they have to systematically assess the distances that the next user is going to drive. Taking this short range radius into account limits (or at least constrains) who they can give the next car to.

But in order to use EVs as efficiently as possible from economical and operational standpoints, they should not be used to short distances only. Fleet managers need to assess both the demand for mobility of employees and the optimal use pattern of each model.

Employees use EVs to travel short and middle range distances in all kinds of urban areas. The battery range of most EV models is barely over 150 km, so that this car is generally given for a short distance or a routine journey. The purposes reported included:

- Collection services and end deliveries in dense areas
- Journeys between 2 sites of a company (for instance to go to a meeting or to deliver mail)
- Commuting

As these purposes are taken into account, EVs are most frequently allocated to people making deliveries, mechanics, local property maintenance, construction site foremen, meter-readers, etc. Allocating EVs requires indeed a beforehand reflexion on its optimum uses. But it causes additional tasks for the fleet managers.

Therefore, EVs are not used as all-purpose cars but as cars that are adapted to certain uses only: to say it quick, fixed daily routes or short distances. This functional specialisation relies on an accurate diagnosis of the needs of the supposed next user.

This diagnosis is more or less painstakingly done depending on whether it goes with a global car fleet rationalisation or not and which professional carries it out. As a matter of fact, « the lead purchasing manager would coordinate a network of contact persons responsible for procurement at a local level (...), most of whom would not be fleet specialists. » (Boutueil, 2015) And some professions share a better field knowledge about the mobility patterns of employees than others. We found two successful configurations in our studies: the first one is about fleet managers who benefit from the statistics from software on mobility analysis<sup>2</sup> and the second one is about some directors in very small businesses<sup>3</sup> who perfectly know their employees' job.

EV allocations can have 2 different statuses:

- Allocation to a person. In this case there is a formal gradation in use rights: an official car can be used for a vaster range of purposes than a service vehicle which has been allocated to a profession within a department. However what really matters in the case of EVs is the possibility (or not) to get full-time access (no authorisation to ask for, keys within easy reach, etc.) and commuting rights. Even if there are 2 users in the same department, these conditions facilitate a real appropriation of the car. Personal allocation displaces battery range management and charging gestures from the fleet manager to the end-user but this status gives the latter all capabilities to assume them.
- Allocation to a pool service. EVs are then shared between numerous employees and therefore require the fleet manager's intervention in order to allocate appropriately the car each time it is borrowed. Some companies consider this kind of allocation as a way to

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<sup>2</sup> As Virginie Boutueil (2015) explains in her Ph.D. dissertation: "Fleet managers use a wide range of reporting tools, from simple spreadsheets to very sophisticated fleet management software, the purpose of which is to store, monitor and report a range of fleet-relevant information on vehicle characteristics, driving licences, running costs (e.g. fuel, maintenance, tyres), maintenance (routine and scheduled), tax and insurance due dates, etc."

<sup>3</sup> Nesbitt and Sperling (2001) distinguished fleets by the decision-making structures within the organization, taking into account the degree of formalization (the extent to which rules and procedures guide the fleet decision process) and centralization (the number of people involved in fleet decisions, and the decision-making autonomy). If we try to adapt this framework to our studies, we would say that the most successful configurations for EV management are both bureaucracy in big companies (high formalisation and disseminated decision process) and autocracy in small businesses (low formalisation and high centralisation of the decision processes). See also Hutchins and Delmonte (2012).

increase the use of cars – but the success of this model depends on the fleet manager’s involvement.

A successful appropriation of EVs in the studied organisations relies on flexible procedures to access EVs, regardless their allocation status. The tasks of the fleet managers are either carried out in advance (a priori allocation to involved persons) or on day-to-day allocation in the case of pool cars. In both cases, fleet managers are bound to be experts of employees’ mobility. Anticipating professional journeys calls for a reflexive posture from fleet managers. Some of them accept it but others consider that “they are not car leasers”. Moreover, the capacity to match technical abilities with social needs is often not recognised by organisations.

Similar adaptation is required in the case of fleet managers planning delivery routes with an electric van, which can have a reduced load capacity compared to its thermic counterpart. In case of carriers and last mile operators, using an electric van thus implies being willing to (partially) re-design delivery operations and re-think logistics platform localization (Morganti and Boutueil, 2015).

#### Managing parking issues

Range issues imply a second task: make sure that EVs are recharged under the best conditions. First of all, it means that the organization needs to identify an appropriate charging and parking location, which has to be quite visible and close to the users and which has to respect safety issues. Secondly recharging cannot hinder the next user’s journey.

This issue is quite important when EVs are allocated to a pool service as it implies a coordination between users. The users then follow the rules that fleet managers generally register in a formal protocol: shared EVs have to be systematically charged each time they come back to their parking spot. Some fleet managers program these buffers so that a delay is taken into account before any new lease.

#### Making the conditions of use more flexible

Fleet managers adopt flexible rules on EV use and they additionally authorise charging at home and in public stations. This initiative contributes to gaining new users’ acceptance and reducing range anxiety issues. Moreover it proves that fleet managers understand the extent to which more relaxed rules (compared to the ones on thermic vehicles) could determine the success of an EV trial in their organisations. Doing so, they convince the reluctant employees to test EVs and they give them a chance to avoid range anxiety.

In freight transport companies, managers adopt new logistics measures such as setting up micro-platforms near the high-density delivery areas (within a 20-30 kilometre range) to reduce the distance travelled by electric vans and to avoid range problems.

These actions show the resourcefulness of fleet managers in promoting the use of EVs.

#### Dealing with budgets

Financing EVs’ implementation in companies modifies the balance of investment and running costs and generates a new assessment of total costs of ownership (TCO).

### What costs?

The acquisition of an EV requires buying or leasing the car itself<sup>4</sup> but also buying a new socket or charging wall-box to be installed on the company site. The latter expense is related to building cost and not included in the car TCO. Another difficulty is connected to the residual vehicle value (resale value) of EVs for which there is no second-hand market yet so that the TCO is difficult to establish.

The high predictability on how much EVs will cost partially compensates the uncertainty about their resale value. As a matter of fact, a frequent business model for EVs involves leasing the main battery of the car due to two main advantages: (i) The investment costs get lower as there is no need to buy the battery; and (ii) The lease is the guarantee that this battery will be replaced in case of any problems. Such an option is likely to encourage EV uptake among fleet managers and remove a barrier identified by Hutchins and Delmonte (2012, p.11).

Moreover, EVs are supposed to increase cost efficiency – in France a full charge generally costs less than 3 Euros. On the other hand, the potential savings may be hidden or difficult to assess because the cost of electricity or fuel is generally taken care of by departments other than General Resources. So it escapes the control of fleet managers who consequently overestimate the investment costs and miss the potential savings of such cars. As Nesbitt and Sperling already said in 1998 (p.263) “in order for fleets to recognize the potential economic benefits of using alternative fuel vehicles vis-à-vis conventional vehicles, the operating costs should be explicitly stated alongside the purchase price.”

### A budget under constraint

According to the first field studies, EVs were extremely expensive because only prototypes were then available. Some fleet managers thus considered EVs as imposed by high management to promote a certain image of the company and simply could not see any economic gain in a situation where for instance they had to acquire a high standard electric car instead of two small conventional cars<sup>5</sup>.

Moreover, as electric cars cannot cover all kinds of distance, this system consequently relies on the availability of others cars for high mileage coverage (Jarrigeon *et al.*, 2013).

Lastly, pilot projects on EVs are often an opportunity for companies to test both leasing models for their fleets and to discuss further their car policy and mobility choices. This is a chance for them to rationalize their fleet and sometimes to reduce it.

### Managing people

Most fleet managers are not only in charge of tracking mobility and following the progress of costs but also of leading teams including mechanics. The problem with EVs' implementation is that it lowers the skill perimeter of garage staff, as repairing a battery pack requires accreditation and training they are not familiar with. As Nesbitt and Sperling say (1998), “there is a trend away from in-house maintenance” (p.262) and electric cars accentuate this trend. For companies which still have a

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<sup>4</sup> There are two options: either purchasing the car or leasing it. This latter model is more and more popular in organizations as it allows to forecast the expenses (Boutueil and Leurent, 2013). The implementation of EVs is sometimes a chance to test leasing models for small companies and local authorities.

<sup>5</sup> Moreover, company fleets sometimes get interesting discounts when they buy a significant number of discontinued items (discounted vehicles). And this is only the case for ancient markets, i.e. combustion engine cars.

proper garage, car leasing model thus shrinks the mechanics' *power* as defined by Crozier and Friedberg<sup>6</sup> (1977). There is indeed a general dynamic of externalization of support services and this dynamic benefits from the deployment of such innovations as they re-configure the routine patterns of the organization. The concomitance of EV implementation and externalisation of car maintenance is likely to be a sensitive issue for fleet managers who are in charge of these teams.

Moreover fleet management is an intermediary profession. Instructions are given through hand-made protocols and driving guidelines.

For all these reasons, the appearance of EVs on the market puts car fleets under pressure. Being an expert of employees' mobility, summarizing car TCOs and mobilizing teams to accept this innovation: the multidimensionality of fleet management is reactivated by the implementation of EVs in companies and local authorities. But fleet managers are rarely recognised enough for all the additional tasks they perform.

## Discussion

Relevant statements from sociology of *concrete system of action* view (Crozier and Friedberg, 1977) can be listed as a summary :

- Workers are well advised to depart from formal rules of organisations. For instance making the conditions of EV use more flexible increases the usage frequency of such cars.
- Companies are not an example of pure industrial efficiency but are also regulated by experience and inventiveness. Eg. systematic charging resolves the need for anticipating a long charging time before a medium distance journey.
- Fleet managers will not endorse the goal of helping EVs implementation if it represents cut down in their budgets or fleets or staff reductions.
- Zones of uncertainty in organisations are related to loopholes that are also great opportunities. For instance the definition of what a service car is is unclear, so in fact empathetic fleet managers can let employees commuting with EVs.

There also are some relevant statements from practice theory perspective:

- The system of fleet management practices is modified by the implementation of EVs in organisations. The implementation of EVs in organisations requires. New skills, for instance the ones that are necessary to the battery range assessment; and to evaluate environmental benefits and make them more visible; new material arrangements: charging stations; accountability tools that have to be shared with other departments; and new significations for professional trips, work efficiency, mobility.
- Fleet managers thus become expert in professional practices and informally develop quite good sociological expertise.

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<sup>6</sup> Crozier and Friedberg (1977) consider that power is the central issue of organisations and define it as the ability from individuals or groups to have an effect on others. One of the four power source is "la possession d'une compétence ou d'une spécialisation fonctionnelle difficilement remplaçable" (ib., p.72) such as mechanic skills.

## Conclusion

Mis en forme : Anglais (États-Unis)

Some EV characteristics represent relevant obstacles on the transition to electromobility. Notably, limited battery range and modified cost allotment become valid obstacles for companies that have to cope with them. Companies and organisations are progressively more aware of these constraints. However, the organisational changes associated with the adoption of EVs are sometimes poorly taken into account. Use of these cars requires the employees to adapt their mobility patterns and practices (Pierre and Fulda, 2015). As showed in this paper, the burden of constraints involved in managing an EV shifts from users (employees) to the fleet managers, who assume the responsibility of facilitating the deployment of EVs in organisations.

Fleet managers face multiple difficulties concerning the implementation of EVs and they come up with solutions to solve them: give training in eco-driving, allocate EVs on the basis of an accurate mobility needs diagnosis, redesign delivery operations, make the conditions of use of these cars more flexible, ask the users to charge systematically, etc. All these tasks require additional work, that some fleet managers accomplish willingly and others prefer to avoid, depending on additional resources that they get for it. In this paper, we pointed out the contradictory significations and powerful constraints that complicate the performance of these tasks.

Fleet managers have multiple roles in organisations: users of EVs, garage leaders, cost managers, etc. A deeper understanding of their position is needed, however we can state that their relation to EVs relies on this multitasking fulfilment and on their resources concerning global changes of the organisations such as fleet rationalisation. They thus obviously play an important but unexpected role in energy demand management.

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