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Julia Hildermeier, Axel Villareal

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Shaping an emerging market for electric cars: How politics in France and Germany transform the European automotive industry

Julia Hildermeier

Axel Villareal

Our account of the interaction between politics and market actors in the French and German automotive industries tries to show how a classical economic explanation is not sufficient to understand and analyse the sector's current transformation based on the development of the electric car. From an economic-sociological point of view, we analyse how the negotiations between incumbent firms and challengers on the one hand, and public politics on electric cars on the other, affect the existing power balance in the French and German car industries. Although most carmakers are contributing to stabilising the sector's existing "conception of control" by adapting to the electric vehicle (EV) as a challenge to their strategies, national electric car programmes support carmakers in their desire to control innovation know-how as much as challengers seek to establish themselves in an emerging market. Together with carmakers' strategies, the role of politics is decisive in determining the degree to which the industry is changing. The transformative influence of politics should thus be taken more explicitly into account by economic sociology.

Electric Car, France, Germany, Low-carbon Vehicles,
Automotive Industry, Automobile Politics, Industrial
Policy, Politicisation

Introduction

The global economic crisis of 2008-2009 revealed that the European automotive industry faces a number of structural problems (Freyssenet, 2009). While struggling with overcapacities, a saturated European market, and increasingly having to compete with firms in emerging countries such as Brazil, India, and China, one of the major challenges for the European car industry is the question of "green cars",¹ which could ensure the sustainability and future of the automobile system while maintaining value creation and employment in many European countries. To prepare their industries for a transition towards sustainability and environmental concerns,

¹ The notion of green cars is vague and there is no consensus on the definition of what is actually "green." Depending on the language used by market actors, green cars are also called "clean cars" or "eco-friendly cars" and "low-carbon vehicles," referring to their lower CO₂ emission rates compared to internal combustion engine vehicles (ICEVs). Green cars' actual energy efficiency depends on the use of renewable power sources. The notion is present in a broad debate on the environmental effects of individual transport, and includes a range of alternative power train technologies displaying between incremental and radical degrees of innovation, from engine downsizing and new efficiency technologies to alternative fuels, hybrid, and pure battery or fuel cell electric vehicles. We define "green cars" as vehicles emitting little or no pollutants and CO₂. Nevertheless, the threshold of considering emissions to be green or not depends on the energy mixes present in the countries analysed.

many European governments have created programmes to promote and develop electric cars,² that is, alternative power trains based on electric motors such as hybrid engines,³ battery electric technology,⁴ and fuel cell technology.⁵ The issue of green cars and new forms of mobility poses a strategic and economic challenge in many areas for firms and policy makers and is becoming an increasingly relevant consideration for the future of the automotive industry.

Such a transformation is not a natural evolution within the automotive industry's development path. Rather, it was driven by economic and political actors in 2009 and 2010 who encouraged structural changes through a massive intervention in the industry and the implementation of several instruments influencing industry strategies.⁶ Increasing uncertainties due to global competition, the severe sales cutbacks of 2008-2009 and states' interventions opened an era of negotiation in which actors from automotive and related sectors, as well as public regulators, have been shaping a new conception of the industry. This has inevitably created conflicts between industrial actors over the industry's identity, relevance, and development objectives. Looking at the ongoing debates in the political sphere and fuelled by national governments' politics, the media, and public opinion, the question of green cars and the future of the industry needs to be apprehended both using economics and sociology but also political science. Social and economic dimensions are consubstantial in industry and cannot be separated in a serious analysis. According to our investigation ongoing⁷, the national plans for green and electric vehicles promoted by governments in several European countries (France, Germany, Ireland, Spain, etc.) have been the result of numerous interactions and conflicting logics in which firms of the automobile sector, but also its periphery and public authorities at national and local levels, have strongly influenced what the automotive industry could become in the future.

By using the political-cultural approach to the organisation of markets and industries developed by Neil Fligstein (1996, 2001), the purpose of this article is to

² It is important to note the difference between green cars and electric cars. In this article, we focus on "electric cars" as they are at the heart of the political programmes we look at in our case studies.

³ There is a difference between two types of hybrid technology: the most common one, including the two modes of hybridisation, "mild hybrid" and "micro hybrid," defines the hybrid electric vehicle (HEV) as a vehicle propelled by two or more sources of power, usually a battery and an internal combustion engine. The other type is the plug-in hybrid vehicle (PHEV), a hybrid vehicle that uses rechargeable batteries charged by a plugged-in external electric power source.

⁴ The battery electric vehicle (BEV) uses only an electric engine and is propelled solely by electricity stored in a rechargeable battery pack.

⁵ The fuel cell vehicle is a vehicle propelled by electricity generated by an electrochemical cell that produces electric power.

⁶ French and German plans implemented subsidies and incentives for research and development (R&D) but also experimentations and, in France only, purchase bonus programmes. These instruments give preference to BEVs as the most promising technological option. For more, see Villareal (2011).

⁷ This article is based on a work in progress focusing on a public policies comparison between France and Germany. Here, we are referring to Fligstein's approach (1996, 2001) and using a qualitative sociological methodology to understand markets. Thus, data for case studies has been gathered through semi-structured interviews and document analysis (press reviews, companies' publications).

show how firms and governments have been constructing a new market and new institutions (defined as a set of stabilised rules and norms) for the automotive industry. That is to say, we must consider how political and economic actors have been interacting, intentionally or not, formally or not, and how these interactions have contributed to building new modes of actions that are constitutive of the industry and its functioning. The sector's transformation in the name of sustainability is a recent process, and the debates on its future are still ongoing. Nevertheless, at the time of writing (mid-2011), we can observe struggles to change the industry's identity or, as we will explain further, the "conception of control" (Fligstein, 1996, 2001) of the sector. In this article we provide a photograph of this current transformation by explaining how some actors challenge and some defend the sector's power structures and "shared understandings" (Fligstein, 1996, 2001) of the industry's identity. By analysing these institutional changes, we are able to better understand how the industry may be transforming and what public policies contributed to this process.

By focusing on the electric car plans⁸ in France and Germany, we show how this policy constitutes a new arena for political and economic actors to set and challenge relations of power and hierarchy and, consequently, how these plans have contributed to changing the industry's institutional structure and conception of control (Fligstein, 1996, 2001). As we will show, the question of new engine technologies and the policies implemented after the 2008-2009 crisis symbolise a return of politics to the industry. Accordingly, the crisis has created conditions of competition for power within and across sectoral borders: states have reinforced support for new business opportunities that emerged from the crisis and the concurrent increase in environmental concerns, and have also created a regulative space allowing new actors to enter a market that had traditionally been dominated by a few global carmakers controlling the supply chain. By implementing a plan focused on electric and hybrid technologies, by investing in research and development, and by elaborating specific instruments to promote demand and the economy of scale (especially in France), but also by *politicising* the question at a national level, the French and German governments have contributed to opening the automobile system up to other mobility operators, energy providers, and charging point suppliers, and all this whilst giving a stronger role to traditional suppliers. The stakeholders who now focus on new technologies were formerly peripheral to the automotive industry, but they have become increasingly powerful and their choices influence a part of the industry's identity and development.

In addition to the impact of the economic crisis, the increasing fuel consumption and emission patterns in European markets, as well as stricter European CO₂ regulation during the 2000s, was interpreted by French and German carmakers as an urgent issue forcing them to adapt their products and production processes to ecological sustainability criteria⁹. Moreover, this adjustment process did not

⁸ In France, the plan is called the "low-carbon vehicles plan", but most of the key instruments implemented are actually focused on electric cars. The term "low-carbon" is intentionally vague to preserve a consensus. In Germany, the plan is also focused on electric cars, but in public debate, the term "electric mobility" prevails.

⁹ In our constructivist approach to (the transformation of) markets, we understand all strategies, solutions or problems put forward by firms' as results of interaction and thus socially constructed. It

challenge European carmakers' dominant positions in the industry. Prior to the crisis, they adapted successfully to the challenge by selling "eco-efficient" vehicles that offered more fuel efficiency, but mostly used combustion-engine-based technologies. This moderately ecologically oriented product strategy defended the internal-combustion-engine-based passenger car as the dominant product. It was only after 2008 that the question of electric cars came to be presented as relevant for the industry. This article tries to understand how this change for EVs occurred in less than two years and how the debates around the "EV challenge" transformed the basic elements of an industrywide dominant perception of Internal Combustion Engine Vehicles (ICEVs).

Consequently, our theoretical purpose is not to show how a new conception of control has emerged in the automotive industry as a whole, which, in our view, cannot yet be determined. Our aim instead is to highlight the role of public authorities in the industry's transformation and its market impact as part of ongoing process of change we have closely observed: the emerging market for electric cars and the role of public and private actors in it are shaped to a significant degree by public policies implemented in France and Germany.

Consequently, we argue that politics does matter in industrial transformations. As our example shows, it can strongly influence the way that firms build and promote their strategies and how markets are organised. Our commentary thus goes beyond explanations based on technological push and demand pull, and instead gives a stronger role to politics as a cause of market creation.

The first section of this article explains our Fligsteinian perspective upon changes in industry. In the second part we analyse the impact of public policies on markets by comparing French and German plans for electric cars, to explain these two different forms of a government's impact on the automotive industry's transformation. Finally, in a conclusive step we explain how politics matters in industry and why it is important to take it into account when analysing the political and social dimensions of markets.

1. A political-cultural approach to markets and industries

To analyse the role of public institutions in the change of industry and markets and to explain how politics can affect economy and firm strategies, we use a sociological approach developed by Neil Fligstein that introduces the importance of politics¹⁰ in firms' behaviour and market creation and functioning. Most key insights of the sociology of markets emerged in a reaction to views solely based on neoclassical economics of the functioning of markets. These point of views would explain the current situation of the automotive industry with the technological

means we do not presuppose to find "natural" interests or pre-existing solutions, but rather interpretations that are subject to reproduction or change, as we can see here.

¹⁰ In this article, the term "politics" describes a negotiation process producing collective actions and decisions. Politics represent the arena where the struggle to impose one's representation in a given group, that is, corporate, governmental, religious, and so on, takes place. Politics is a space of interaction among public, private, and civil society actors, and an arena for struggle to impose or defend a conception of control (Fligstein, 1996, 2001).

evolution of battery systems and with the current mutation of the automobile markets. During the crisis and before, European carmakers faced difficulties due to structural problems linked to their development model and competition from emerging BRIC markets (Freyssenet, 2009). To confront these problems and to avoid a technological leapfrogging by China and India on BEVs, the development of electric cars came to appear as a strategic challenge for the European automotive industry. According to this explanation, the current focus on green cars in Europe emerged as a competitive advantage to ensure firms' profitability in the European market. This explanation is based on a rational behaviour model, however, and is insufficient to explain the strong focus on BEVs now made in European countries. As the history of this technology shows (Shacket, 1979; Mom, 2004; Kirsh, 2000), the BEV could not emerge on its own due only to a market-based strategy. Each time, the price of technology, the limited autonomy of the vehicle, and the lack of charging infrastructures were serious handicaps to a mass market form of development.

This rational market-based explanation thus ignores the political and social dimensions of industry and its evolution. As many publications in economic sociology show (Granovetter, 1985; Fligstein, 1996, 2001; François, 2008; Jullien and Smith, 2008), market transformation is also a social and political process that needs to be comprehended by developing specific approaches. In order to analyse the causes of change in the industry, the political-cultural approach of markets developed by Neil Fligstein (1996, 2001) provides a suitable framework. Starting from an institutionalist theory of economic change, Fligstein's research has shown that markets are structured by cognitive and formal rules, such as conditions of exchange, the organisation of competition, and the distribution of property rights, which he considers to be "institutions".¹¹ Such rules exist to reduce risk and uncertainty and to avoid excessive competition. This approach can show that the main driver for this market is not in fact competition or technological evolution, which generates uncertainty and destabilises existing positions. Rather, the key driver is the dominant organisations' development and preservation of local orders, which have led to the stabilisation of social and power relationships. In addition, Fligstein highlights the major role that political authorities and private parties play in the creation of markets and in the development of mechanisms and fields of action.

Political authorities (i.e., states, local governments, public institutions, and political parties) are therefore no longer conceptualised as neutral judges operating "above" companies, but as biased entities that are constantly interacting with them and are also embodied in rules defined on behalf of actors who depend greatly on the dominant groups' interests. Fligstein's approach reveals the complexity of the interrelation between state and companies, and his basic insight outlines how social structures, public policies, and cultural organisation are produced to control competition and organise the firms.

Instead of what he sees as an insufficient account of politics as drivers of institutional development in institutionalist theory, Fligstein introduces the

¹¹ "Institutions refer to shared rules which can be laws or collective understandings, held in place by custom, explicit agreement, or tacit agreement. These institutions enable actors in markets to organize themselves to compete and cooperate, and to exchange" (Fligstein, 1996, p. 658).

importance of states' roles in organising markets and existing or emerging conceptions of control, i.e, sets of norms and rules that shape and order the markets, the actors, and the way in which they interact. As he defines it, "conceptions of control refer to understandings that structure perceptions of how a market works and that allow actors to interpret their world and act to control situations. A conception of control is simultaneously a worldview that allows actors to interpret the actions of others and a reflection of how the market is structured. Conceptions of control reflect market-specific agreements between actors in firms on principles of internal organization (i.e., forms of hierarchy), tactics for competition or cooperation, and the hierarchy or status ordering of firms in a given market. The state must ratify, help to create, or at the very least, not oppose a conception of control" (Fligstein, 1996, p. 658).

According to this definition, an existing conception of control builds common understandings whereby firms and private actors can avoid strong competition on prices. By endeavouring to control the instability and uncertainty, market actors ensure the survival of their firm. At the same time, firms share a common perception of the industry and agree on what competition is and should be in their sector, how to manage it, and how to interact with each other. These rules which shape actor behaviour are most of the time informal and observable only through the firms' strategies and actors' views. Conceptualising industrial change as a transformation of an existing conception of control helps to explain and interpret changes in markets and industries during a period of crisis (but not exclusively).

Indeed, conceptions of control change when structures of exchange are unstable, following a state intervention, a crisis, or a newcomers' market entry, for example. According to Fligstein, in cases of instability, a power struggle takes place between incumbents and challengers to impose a representation of a firm's problem and a way to solve it. Once a broad solution is adopted by a dominant firm, it diffuses to other firms by managers' imitative behaviour, and a new hierarchy of the market emerges and gives stability to exchanges. During that process, governments play a key role in imposing new rules and representations, especially in cases of crisis, as we will show in the following section.

But more than providing a regulative framework in which a new conception of control can be formed, government actors can be actively involved in policy making and defining the emergence of a new industrial power structure. As we will see, the intervention of states in the industry following the economic crisis and the proactive role of Renault, a major carmaker in Europe, gave rise to the emergence of a struggle to impose a new conception of control in the automotive industry, promoted and endorsed by states, which involved new behaviour of competitors in other countries, especially in Germany. This framework enables us to understand why a technological option such as the BEV, that was marginal before the crisis, became a viable and a desirable political solution during these years. Accordingly, the French and the German states played a strong role in legitimising and stabilising new socio-economic configurations promoting electric cars. In addition, they encouraged the emergence of new actors in the automobile industry through the promotion of new

types of mobility, which gave new importance to the BEV.¹² In order to adequately describe their role, we will now take a closer look at how the function of the state is framed by the sociology of markets.

As many scholars underline (Fligstein, 1990; Hooks, 1990; Campbell et al., 1991; Dobbin, 1994; Evans, 1995), the governance of economies is part of state-building processes. According to Fligstein (2001), this means that the state takes part in the setting of institutional and formal conditions that allow stable markets. Formalising social understandings through policies or formal rules and laws, the state contributes to the creation of a market, its stability, and viability in the long term.

“Property rights, governance structures and rules of exchange are arenas in which modern states establish rules for economic actors. States provide stable and reliable conditions under which firms organize, compete, cooperate and exchange. The enforcement of the laws affects what conceptions of control can produce stable markets. There are political contests over the content of laws, their applicability to given firms and markets, and the extent and direction of state intervention into economy. Such laws are never neutral. They favor certain groups of firms” (Fligstein, 1996, p. 657).

Politics are therefore a key arena in the struggle to impose new rules and laws in markets, and governments thus appear as major players. Indeed, the political arena is a crucial place of discussion within which economic actors try to take advantage (mainly through incentives and subsidies) and collaborate in processes of problematisation¹³ and policy making.

In our case study, public actors have engaged actively in this process: the politicisation¹⁴ (Lagroye, 2003) of the electric car in France and Germany and its emphasis in the media as a “sustainable” solution contributed to shaping new representations of the sector’s future development. During and after the crisis, the “greening” question took centre stage in the debate because the industry’s power balance was disturbed by government-backed rescue plans (loans to carmakers, scrap bonus programmes) and by the European Commissions’ intervention (European Green Cars Initiative¹⁵ and CO₂ emission regulations). However, in both countries the question was discussed in the different market and policy contexts

¹² The BEV is not strictly a new technology. As shown by Shacket (1979), Mom (2004), and Kirsh (2000), the electric car is in fact an old solution that preceded the massive commercialisation of ICEVs in the early twentieth century.

¹³ By problematisation, we mean the process that requalifies issues of industry, “which takes the form of a claim advocating new collective, public or political action. It is only once the definition of an issue has become shared by a range of actors who render themselves capable of collectively making a case for change that it becomes a problem” (Jullien and Smith, 2010, p. 14).

¹⁴ By politicisation, we mean the process that allows certain companies to acquire additional symbolic and cognitive resources guaranteeing their position in the system. Here, the term “politicisation” means the process of politicising a question, problem, or discourse, that is, having it taken over by actors with sufficient influence to turn it into an object of debate on the political, institutional, or media scene (see Lagroye, 2003). For actors participating in this process, the goal is to requalify issues through problematisation and by mobilising state authorities and using the rhetoric of general interest to transgress the traditional spaces of competition and help develop public policy (see also Villareal, 2011; Jullien and Smith, 2008, 2010).

¹⁵ The European Green Cars Initiative was a European Commission’s credit programme that linked national scrap bonus schemes to reanimate sales to emission criteria for new cars. It was continued in the European Strategy for Clean and Efficient Vehicles that enhances R&D and testing projects as well as infrastructure support for low-carbon vehicles.

related to differences in institutional setting and culture. Indeed, there are national differences in how states approach regulating the economy through their varying capacities for intervention because of the countries' institutional history (Evans, Skocpol, and Rueschmeyer, 1985; Laumann and Knoke, 1989). Because of its past and its centralised polity, actors in France developed a culture of intervention based on a corporatist vision of the economy (Cohen, 1996; Muller and Jobert, 1987). By contrast, the German socio-economic model is based on the diversification of public action because of its institutional structure (Federation, Länder, and independent public organisms) and the strong role of social partnerships and collective bargaining in industries (Thelen and Turner, 1997). These institutional features shape a more coordinated representation of the state and its role in economic policy making.

Consequently, if we are to fully describe the role of politics in shaping the institutional setting of markets, these structural features need to be taken into account. The different institutional settings in France and Germany influencing the governance of their economies and thus are our empirical point of departure. Although the two countries' central role as core European automotive industries justifies focusing on them empirically, their different institutional settings provide a theoretical reason for comparing France and Germany when assessing the role of politics in transforming this industry.

The dissimilarities between the two countries are clearly visible in their different plans for EVs. The French state intervened with the purpose of creating a national and European market for electric cars (BEVs and HEVs) and to promote French firms as leaders in this type of technology. This is illustrated by the creation of specific instruments for the creation of demand and incentives, such as a collective public command of BEVs and a €5,000 purchasing bonus for vehicles emitting less than 60g CO₂/km. Overall, the state's intervention was strongly centralised and planned in close cooperation between central firms and government.

By contrast, the German government has engaged in a more coordinative approach, encouraging competition for technological innovation between carmakers and initiating a public-private agenda-setting process for the electric car. Compared to the French government's attitude, Germany has pursued a more supply-oriented, innovation-centred approach by setting framework regulations and relying on purely market dynamics (supply and demand) to promote the sector's transformation through the electric car.

French and German governments have therefore intervened in their industries in different ways but towards the same aim –to promote and create a market for electric cars in Europe– giving a stronger role to politics and underlining the political dimension of industrial strategies.

2. How has politics transformed the French and German automotive industries?

In any given market, large firms control more resources than small ones, including the pricing from suppliers, financial assistance, and legitimacy. They may possess control over key technologies or large customers (Fligstein, 1996). This distinction organises the market in two major types of actors: the incumbent firms,

which are the biggest firms setting the rules of market, and the challengers, which are smaller and target their strategies as regards the larger competitors. In the German and French automotive industries, the dichotomy between incumbent and challengers is strongly visible: carmakers such as Volkswagen, Renault, PSA, BMW, or Daimler are the largest firms in the automotive market, shaping the rules of exchange, the prices of products, and the financial model of the automobile (Freyssenet, 2009). In the institutional structure of the sector, the hierarchy is organised and visible, and suppliers and distributors, in spite of their respective sizes, continue to act as challengers. Fligstein makes the distinction between incumbents and challengers to explain the stability of markets and the existing and necessary hierarchy which ensures their continued existence. In his view, politics stabilises the positions of groups and the existing hierarchy.

Because the state is a place of struggle for position in markets, it can be conservative in stabilising the status quo. But it can also change rules, intentionally or not by unravelling a stasis in a given market or establishing a new distribution of power in times of economic crisis. That was the case in 2008-2009: major European carmakers weakened and states' rescue plans restructured the automobile system. Moreover some suppliers and mobility operators, in addition to public authorities, took a stronger role in the definition of future industrial strategies.

2.1. Policy making on electric cars in France

In 2007, the Grenelle agreements¹⁶ and the resulting regulation created the bases of a more global reflection on cars and transport effects on the environment. From this public and intersectoral debate came the first assumptions about the need for public policies to promote and encourage clean cars at the national and European levels. During this public deliberation process, a Bonus/Malus purchase bonus scheme was developed to directly address these considerations. This incentive fixed an average level of emission, imposed a tax on the most-polluting vehicles, and distributed a bonus for the purchase of less-polluting vehicles. This measure was created to encourage the renewal of car fleets with low emission cars and to sustain the sales of new cars in France. At this moment, the BEV remains marginal in the debates, mainly because none of the domestic carmakers attributed a key strategic value to developing this technology further. Instead, inspired by the previous commercial success of the Toyota Prius,¹⁷ hybridisation of vehicles remains the main solution to cut emissions on ICEVs and thus be the most attractive technology for the future. It was only during the crisis of 2008-2009 and after the speech of French president Nicolas Sarkozy in October at the "Mondial de l'automobile", that the BEV came to the fore. Announcing the setting up of a major plan on "véhicules décarbonés" (decarboned vehicles), the president's speech aimed to promote all clean technologies in automobiles, that is, BEVs, hybrid cars, and alternative-fuels vehicles. For the government, the official ambitions of such a plan were energy

¹⁶ The Grenelle agreements emerged from the "Grenelle de l'environnement", an encompassing conference organised in France by president Nicolas Sarkozy, bringing together the state, civil society representatives, and local authorities in order to introduce specific actions for sustainable development in the economy of the country.

¹⁷ The Prius was the first hybrid vehicle produced in the world by Toyota in 1997 and has been considered a commercial success in comparison to its market expectations.

independence, to cut CO₂ emissions to meet with EU criteria, and to ensure the competitiveness of the French automotive industry. The formalisation of the plan alongside the “Mondial de l’automobile” initiated a politicisation of strategic questions within the national industry (Villareal, 2011). The setting up of such a plan added the strong political support of the state and contributed to changing carmakers’ views and expectations on the electric car’s future. Because the French state created a public call for 100,000 electric vehicles it seems that a demand for BEVs already existed in the country. Moreover, at the beginning of 2008, the French carmaker Renault announced a very media-friendly alliance with the Californian start-up, ‘Better Place’¹⁸, to develop electric cars and electric mobility in Israel, endorsed by the Israeli government. Both states agreed that the electric car would have political and geopolitical advantages and could create a new business opportunity.

More generally, the French governments’ commitments to the creation of demand for EVs initiated a change in carmakers’ strategic opportunities and orientations. If we look at Renault’s and PSA’s annual reports between 2005 and 2009, we can see that before the economic crisis, neither Renault nor PSA, just like German manufacturers, were strongly committed to electric vehicles and especially the BEV: instead, both were developing and anticipating the sector’s future development by cutting emissions through downsizing¹⁹ and hybridisation, and considering eventually the arrival of fuel cell technology. The situation changed significantly with the crisis and the setting into motion of a national plan. Just after the president’s speech and in the middle of the global economic crisis in January 2009, the “Etats Généraux de l’Industrie” (a group of all French industrial actors) was organised in order to create a broad and coherent industrial policy for France. During this process, financial assistance was decided and €3.5 billion was allocated to both carmakers (Renault and PSA each received €1.5 billion and Renault Trucks €500 million). In return, the two manufacturers committed to invest in R&D and to preserve employment and production in France. The aim was to protect the French industry from delocalisation and to modernise the national sector to ensure the competitiveness and the dynamism of factories. The low-carbon vehicles plan implemented in October 2009 was designed to ensure the relevance and to promote the relocalisation of production and the creation of a new sector based on electric technology. To that end, the government agreed to finance a part of the conversion of the factory in Flins (near Paris) to produce the ZOE, the Renault’s future main electric car, whose manufacture is supposed to employ new qualified workers.

In addition, the plan proposed fourteen actions to ensure the fast development of electric battery and hybrid vehicles to attain the conversion of 5 percent of the current French motor vehicle fleet by 2020, that is about two million vehicles. The plan, implemented by the Departments of Industry and Environment, set up five main levers that were supposed to create demand and supply at the same time. To create demand, a purchasing bonus of €5,000 for the 100,000 first buyers of vehicles

¹⁸ Better Place is a start-up delivering new charging and mobility services to electric vehicles. The alliance between Renault and Better Place was announced in January 2008 and relied on a first order of 100,000 Fluence ZE.

¹⁹ Downsizing is the reduction of the size of traditional engines in order to increase the fuel-consumption efficiency of the vehicle.

emitting less than 60g CO₂/km was introduced and a collective purchase agreement of 100,000 BEVs by an industrial buyer group led by La Poste (the French postal service) was promoted. The demand side of the plan focused mainly on the BEV because of its relative marginality in the market, but the three other levers concern the normalisation and the regulation around charging standards and infrastructure, subsidies for research and development, and investments in charging infrastructures. All these measures were created with numerous actors: civil society (associations), public and political institutions (ministries, local governments, etc.), carmakers, suppliers, mobility operators, electricity providers, and large paragonovernmental enterprises such as the French mail company La Poste and others like Areva and Vinci.

As we can see using Fligstein's approach, in cases of crisis, power and hierarchy in industry can be renegotiated. Thus, original equipment manufacturers' (OEMs') requirements for support began to be seen as an opportunity for the French environment ministry to demonstrate its influence and expertise in industrial issues and also to intervene more relevantly in the economy. In addition, the internal competition between the two governmental departments –industry and environment– partly explains why the subject gained such a strong place in national political debates and why the BEV was set so high on the political agenda. Because the technology is not yet strongly developed and commercialised, every aspect of the product must be adopted and many stakeholders have participated in the debate to gain decision competence in a future policy field and industrial sector in which established carmakers do not have the same unquestioned influence. To invest in the BEV for political actors (local and national) and newcomers (such as Telecom, embodied by the participation and the involvement of ORANGE SA, suppliers such as Valeo and Heuliez, mobility operators such as Okigo or Bolloré with Autolib, etc.), seemed to be an opportunity to play a stronger role in the industry and its future. This situation opposes incumbents and challengers in the definition of what could or must be the automobile market of the future and structures debates between public and private actors. Nevertheless, the two major French carmakers do not agree on the strategic answer.

From 2008 to 2010 the Renault-Nissan group was the only manufacturer in Europe to present a definite strategy on BEVs. Assuming this technology to be the main challenge for the next twenty years and betting on a strong transformation of the automobile market towards low-carbon vehicles,²⁰ Renault's top managers (and especially the CEO Carlos Ghosn and the deputy executive president Patrick Pélata) are convinced that the BEV is not only a solution to counteract the greenhouse effect and reduce CO₂ emissions, but also a coherent strategy for the future of the firm. Through the promotion of BEVs, Renault tries to anticipate changes in the market and is proactive about imposing this technology, upon which it has invested more than €4 billion²¹, that represents the main development strategy for the firm for the

²⁰ According to Renault, 10 percent of the world automobile market in 2020 will be composed of electric vehicles.

²¹ Source: Renault, annual report 2010, p. 61.

next decade. In the next two years (2012-2013), the firm will offer a complete range of BEVs, one for each segment of the market.²²

In contrast, PSA Peugeot-Citroen, the other major French carmaker, is more sceptical on the future development of the BEV. Investing more on the hybrid technology and developing the hybrid-diesel vehicle, the firm's strategic priority is the internationalisation of the brand and the commercialisation of premium models in China and other BRIC markets. For PSA, the BEV is more a niche market in which investments are very limited. Proposing only one model (I-on for Peugeot and C-0 for Citroen) developed and provided by Mitsubishi, the carmaker is less committed despite its early involvement in electric vehicles as far back as the 1990s.

The strategic divergence between the two biggest French manufacturers is probably due to the differences of investment in research and development and also to their unique corporate cultures. Before 2008, the Renault-Nissan group mainly focused its new development on premium models, whilst its research on hybrid technology appeared on the scene late compared to its French and German competitors. The crisis and the focus on the environment following the "Grenelle de l'environnement" was a strong opportunity to announce a new broad strategy based on a "revolutionary technology" embodied by the BEV and ask for public help to develop it. The "revolutionary" aspect of the BEV is more a commercial argument than a concrete reality because this technology is older than the ICE and the newness of the product is more aligned with Renault's business and economic models (Midler and Beaume, 2009). Nevertheless, by using the rhetoric of "technological revolution" or "strong innovation" in markets, Renault gained legitimacy when it asked for public help in the development of its strategy and by mixing up 'the general interest' with its private interests (Villareal, 2011).

Nevertheless, this strategy has also given the Renault-Nissan group a competitive advantage. Through its alliance with Nissan, Renault can obtain high-capacity batteries through AESC²³ (a joint venture between NEC and Nissan) and therefore can choose not to pursue hybrid technology. The creation of a market for electric cars could be profitable and less costly than the development of hybrid technology on a wide scale, and so the challenge for Renault was to convince public authorities and public opinion that the BEV could be beneficial for everybody. Due to its strong link with the French state (which has a 15.01 percent capital stake in the company), it was certainly easy to convince the French government that the electric car could become a strategic advantage.²⁴

For the French state and for Renault, the pertinence of the creation of a market for the electric car in Europe comes from the idea they are defending: France could create a new sector and be a leader of this type of technology. At the same time, because the electric energy of the country is mainly nuclear, the ecological dimension of the product has in fact given a stronger legitimacy to an industrial choice made by one carmaker. The intervention of the state and the politicisation of Renault's strategy was the first step in changing the structure of institutions. By

²² The Kangoo Z.E for commercial vehicle, the Fluence Z.E for saloon car, ZOE for compact saloon car and Twizy for two-seater urban car.

²³ Automotive Energy Supply Corporation.

²⁴ At the moment, this idea is more a hypothesis than a real result. The investigation is still in progress.

making a political focus on the BEV and by shaping and promoting the creation of a new market for it, the state opened up a phase of negotiation in which the previous conception of control was destabilised. The equilibrium between competitors indeed became destabilized and the French state gave a technological orientation to the market. Now, in mid-2011, PSA and the other German carmakers who were previously sceptical towards BEV commercialisation have proposed new models of this type of technology and announced new strategic developments in this direction.

2.2. German policy on “electric-mobility”

In Germany, the location of Europe’s largest car industry, firms and politics were comparatively late to take as serious the potential transformative impact of the electric car on the industry and the market. As in France, a political push in favour of alternatives, especially battery power trains, combined with the uncertainty of the major markets and considerable losses suffered during the economic crisis, launched a public debate about the industry’s change. Political dynamics encouraged this process and were motivated by international competition, especially with France, and the traditionally very competitive setting between domestic carmakers. Government and industry entered into a dialogue in support of the development of electric mobility through a “national platform on electric mobility” in 2010. This public-private cooperation in setting industrial policy strategies illustrates that public institutions influence a transformation in the sector.

However, taking a closer look at the market dynamics, this transformation so far appears to be superficial rather than producing substantial change in the industry. First, despite significant public investments that created the impression of a rapid political embracing of the electric car in 2009 and 2010, the market reflects a different picture.²⁵ Carmakers have announced a broad range of electric vehicles for 2013. VW/Audi, Daimler, and BMW have so far only partially integrated “electric mobility” –the electric car, corresponding infrastructure, and mobility services– into their strategies.²⁶ Rather and despite considerable R&D investments in electric car technology, German carmakers have pursued diverse strategies covering all types of alternative fuel and power train options, including efficiency improvements by downsizing internal combustion engines.

The second development stabilising rather than changing the industry’s existing conception of control is rooted in the 2010 policy mix concerning the electric car: the government’s close coordination with automotive firms on the electric car question has indeed enabled renewal of an employment or sustainability-oriented industrial-policy approach (Meißner, 2011) to governing the automotive sector.

²⁵ The 541 electric and 10,661 hybrid cars registered in Germany in 2010 represented 0.38 percent of that year’s overall new registrations, illustrating their marginal position. (Source: Kraftfahrzeugbundesamt, http://www.kba.de/clin_033/nn_191064/DE/Statistik/Fahrzeuge/Neuzulassungen/EmissionenKraftstoff/n_emi_z_teil_2.html)

²⁶ The two US subsidies present in the German market, Opel and Ford, participate in the emerging electric car market, for example, through the Opel Ampera, available since mid-2011. However, because both carmakers do not produce electric cars in Germany and have received less public R&D funding than German OEMs, their impact on German industrial transformation can be considered less crucial. We will focus on Daimler, BMW, and VW/Audi in the following discussion.

However, this potential has not been used so far. Instead, the programmes and instruments applied focus on encouraging market dynamics by targeting mainly public and private research and innovation efforts (for example, in battery technology), as well as infrastructure and testing projects. This approach oriented towards the supply side has opened sectoral borders to energy providers, transport companies, and specialised suppliers of new technology and materials, reinforcing competition for innovations. Nevertheless, privileges continue to exist for dominant firms in the sector.

The following paragraphs illustrate how these two developments call into question and at the same time maintain the existing conception of control in the sector. It then explains which factors might transform its power balance in the years to come.

German politics brought the question of “electric mobility” first to the fore when voting for an “integrated energy and climate package” that launched a more energy-efficient economy and transport system in 2007 that was similar to the French “Grenelle package” (German Government, 2007). When public debate on the “electric mobility revolution” emerged with the crisis in 2008-2009, the government worked out a “national plan for electric mobility” foreseeing a €500 million investment package in battery technology, fleet tests, power train technologies, and trial regions of electric car infrastructures. The plan voted for in 2009 spurred innovation competition between German carmakers by setting the goal of reaching one million registered hybrid and electric cars by 2020 (German Government, 2009). Using this approach, politicians set out an incentive for innovation and competition, and funded it by supporting the dominant carmakers as key innovators.²⁷

This first push from politics responded to German carmakers’ central goal: to build and maintain systemic technological know-how during the sector’s transformation and to increase the capacity to rapidly commercialise innovations in the electric car. This has not gone without structural changes: carmakers are increasingly driven to share development costs and risks in alliances with competitors and system suppliers to make use of this capacity, and thus gain a share in the emerging electric car market. An exemplary case is the Daimler group: in April 2010, the premium carmaker agreed with Renault to cooperate in the small-car segment (Smart and Twingo will be equipped with a Renault electric power train and Daimler will deliver batteries for the two models) and the joint development of the next Smart generation. This strategy of diversifying investment risks at the same time envisions a stronger dominance in the sector. Having confirmed its joint venture with automotive supplier Bosch in order to produce electric engines in spring 2011, a rather unusual R&D collaboration between a carmaker and a supplier, Daimler-Bosch announced the intention to sell their engines to competitors.²⁸ This

²⁷ Daimler received €63.9 million (about half of the allocated public subsidies for electric power train development), BMW €26.8 million, VW €17.6 million, and Audi €4.1 million between 2009 and 2011. Source: German Government, 2011a, p. 4. In addition to the €500 million offered as part of the economic recovery package in 2009, the government increased support for electric vehicle research through a variety of additional public and public-private support programmes.

²⁸ Focused on maintaining technological dominance in electric cars (already disposing of key technological know-how in fuel cell cars), the Daimler group at the same time strives for

increasing sharing of risks implies a potential change in the sector's institutional structure through new alliances and rising uncertainties. But this transformative effect is compensated for by both partners' stated target to dominate the technology and control its diffusion.

With important public innovation support, and a sales recovery in 2009 due to (premium) car sales in China, the electric car became an issue of industrial policy because through integrating electric cars into their strategies, carmakers were encouraged to make employment-effective investment decisions. IG Metall, the trade union that dominates the German automotive sector, urged for employment protection and creation in works councils, but also put the question of new qualification needs through putting the electrification of components on the political agenda (IG Metall, 2011). All carmakers decided to keep the development of electric cars' principal component batteries, engine, and electronics in-house, which has implied investments in production capacities and staff, i.e. value creation in Germany. BMW, for example, is currently pursuing a strategy of electrification and light manufacture that will locate its electric car production by 2013 at the Leipzig site, a decision that gained 800 jobs and €400 million in investment. But overall, in comparison to France, where the "pacte automobile" and the debate on Renault's production site in Flins tied the question of the electric car directly to the relocation of jobs, employment effects were not at the centre of the German electric car debate. Neither were concerns of ecological sustainability or more encompassing mobility concepts in transportation policy.²⁹

Carmakers have been encouraged to create R&D and production capacities as public policy since 2009. However, as these efforts stay concentrated on the dominant firms in the market, it is their strategy that limits the potential transformation of the industry –in other words, that stabilises the existing conception of control. The German case thus depicts a process of mutually reinforcing expectations, contributing to an overall situation of rather cautious and incremental investments compared to the French case in which Renault, with its strategic offensive, aims to gain a first-mover's advantage among carmakers.

The case of Volkswagen illustrates the weight of carmakers' development strategies in sectoral transformation. The ten-brand group aims to become the world's largest carmaker by 2018 and answers the challenge to deploy a coherent strategy on green and electric cars by integrating its EV range into its product-and-development strategy across segments. Audi is the innovative premium brand and has presented several electric cars that are currently being tested. The Volkswagen brand's range by 2013 will consist of electrified versions of existing models (Golf, Jetta) and a new urban small car (Up). Concerning batteries, the group so far relies on alliances with Sanyo and Samsung-Bosch's SBLiMotive.³⁰ Electric engines will

independence by building its own battery production facilities. In a joint venture with conglomerate merger Evonik industries called "LiTec," the carmaker plans to develop Lithium-ion batteries in Kamenz (Saxony). Production of up to 300,000 battery cells per year is scheduled to begin in 2013.

²⁹ See Meißner (2011, p. 11). It is the IG Metall that essentially deals with the challenge to estimate employment effects. The fact that ecological concerns were not sufficiently addressed in the policy process on electric mobility is highlighted in an inquiry by the left-wing party *Die LINKE* (German Government, 2011b).

³⁰ The packaging of batteries, however, will be done at the VW site in Braunschweig.

be produced in-house at Kassel. This strategy of partial integration is reflected by the group's goal announced in 2010 to attain three percent of sales through electric vehicles by 2018 (DiePresse.com, 2010), which is, in fact, rather careful and based on a broad alternative power train portfolio using existing models and production platforms.

An additional reason for the fact that carmakers' strategies determine the pace of change towards an electric car market in Germany, can be found in the political decision-making process itself. It was dominated by a dialogue between representatives of the car industry and energy industry and the German economics ministry. Although they have been making these investment decisions since 2010, all carmakers (including Opel and Ford Deutschland) have taken part in the "national electric mobility platform", the main agenda-setting institution for electric mobility policy in Germany between 2010 and 2011. Inaugurated by the government in May 2010, the 150-member platform integrated energy, information and communications technology (ICT), and automotive industry representatives, encompassing seven working groups dedicated to the main challenges that public and private policy actors are facing: power train technologies (led by VW-Daimler), battery technologies (Evonik, Daimler, Bosch), infrastructure and grid integration (E.ON, Siemens), standardisation and certification (Audi, RWE, Phoenix Contact), materials and recycling (Acatech, BASF, ThyssenKrupp), education and qualification (Magna, University of Ulm, Opel), and general conditions (European School of Management and Technology, BMW, T-Systems). As the few participating representatives of civil society have criticised, among the platform, carmakers and suppliers clearly dominate.³¹

Given the German car industry's general interest in maintaining its successful combustion engine car-based business model, including high-emitting cars in the premium segment,³² the platform's work for one year displayed much of the inability of carmakers and politics to find substantial compromises on the following question: through which instruments should the BEV be supported in the German market? The platform's work resulted nevertheless in a government programme, decided in June 2011, which foresees a ten-year tax exemption for cars emitting below 50g CO₂/km. The government did not concede to OEMs' claims for purchase bonuses on electric cars as in most other European countries. Additionally, they decided infrastructural measures such as free parking and the use of bus lanes which should be counted as the smallest common denominator, especially compared to other European countries. Keeping to its R&D-focused innovation policy approach, which appears to have been the only applicable policy instrument accepted by public and private negotiation partners, the government guaranteed another €1 billion in research

³¹ As criticised by Regine Günther, head of the environmental NGO WWF and participant in the platform's working process: "The platform's final report is almost exclusively shaped by industry's interests, in which industry has calculated its own subsidies" (WWF, 2011).

³² This interest remains dominant, as illustrated by recent regulation on CO₂ labels (to be implemented in December 2011 in the German market): The "efficiency classes" to be displayed on cars to orient consumer choice are calculated by an emission-weight ratio very favourable to heavy-emitting cars. This considerably privileges German producers on the German market at the expense of French and Italian competitors. Criticism was also expressed by German environmental groups and the public transport lobby. See for example the press release of the German NGO for sustainable transport „VCD“: <http://www.vcd.org/co2-label.html>.

investments until 2013 (the remaining €3 billion of investments needed for an electric car market launch will be provided by industry). As a result, the impact of public electric car politics in Germany stays concentrated on competition as the supposedly best driver for innovation.

In sum, within this highly competitive setting, and despite hesitations over public demand incentives, the carmaker-dominated policy network contributed to stabilising the existing distribution of power in the sector by fuelling public innovation support and infrastructure measures. Therefore, until mid-2011, the industry had been able to absorb and thus defend itself against major structural changes and tended to reproduce the existing balance of power.

The second pillar of the German government's electric mobility policy, fleet tests and infrastructure trials, could however not only enhance the electric car market in the years to come, but also confront dominant carmakers with important challenges: the eight trial regions that have existing since 2008 (Munich, Stuttgart, Rhein-Ruhr, Leipzig-Dresden, Berlin, Bremen-Oldenburg, Hamburg, and Rhein-Main), will be reduced to four or five "display" projects concentrated in metropolitan areas to further develop electric mobility applications and thus prepare the market by integrating the local economy, actors across relevant sectors, and customers. The promise of infrastructure investments has encouraged a fierce competition for funding between cities, and the government's decision of locations is expected in autumn 2011. This politics over market launching could change the dynamics in the automotive sector as regards the degree to which its most powerful actors will participate.

Since 2009, an heterogeneous landscape of largely uncoordinated testing activities has emerged. On the one hand, many regional public transport and energy providers benefited from public funding to collect experience in customer acceptance, charging technology, and publicity. This integration was possible based on existing actor networks to promote fuel cell technology, which the government had supported in various earlier innovation plans. On the other hand, carmakers only hesitatingly participated in the public trial regions while running privately financed battery car fleet tests in exclusive cooperation with large energy firms, for example, with RWE and E.ON in Berlin. A divide emerged between public and private activities that might conceivably be reduced through more coordinated government policy. In short, this could produce a shift of the sector's power balance.

The dynamics and power equilibrium of a future market for electric cars has also depended on the distribution of competences in Germany's federal states, regions, and municipalities. The model regions programme from 2009 to 2011 displayed an unclear distribution of competences. The lack of a central management despite the existing governmental coordination office, combined with innovation support programmes, has until now helped incumbent firms to impose their business strategies on electric cars. Electric cars offered by start-ups, smaller energy firms, and research institutes, have so far attained less publicity and participation in existing testing activities. Through niches, however, market entry for challengers is possible.³³

³³ An example is that among only 541 registered electric cars in 2010, 41 percent (i.e., 250) were electric utility vehicles sold by Hamburg-based producer and dealer of electric transport vans

In particular, the four dominant utilities in the German market bring an important change to industrial dynamics: RWE, E.On, Vattenfall, and EnBW discovered a promising source of business expansion by providing energy, charging infrastructure, and endowing data transfer for electric mobility as a complete mobility package. As the most active German utility, RWE has launched numerous cooperative agreements to possibly relevant players in an emerging electric car market. The previously mentioned fleet tests, such as the leasing of one hundred battery-driven Smarts and Mercedes in cooperation with Daimler, thus clearly illustrates the two partners' interests in the emerging market. Utilities are powerful competitors of carmakers over the question of who will become system integrator in the future market.

In this sense, the renewed trial-and-testing politics in 2011 has attempted to re-integrate activities of all players in order to jointly prepare a market for electric cars. The impact of German carmakers' strategies and the government's coordinative industrial-policy approach will no doubt determine to what degree the German car industry's conception will change.

In sum, the German case illustrates two contradicting dynamics: in a structurally conservative industry, main manufacturing players have tried to secure their dominant position and thus reproduce the existing conception of control. This is supported by public technology and innovation support as well as carmakers' successful alliance politics in order to control technology diffusion. At the same time, progressive public policies in favour of integrating the electric car into sustainable (regional) transport networks has opened up opportunities for structural change by favoring public mobility service providers, sustainability arguments and the consumers' voice. In this sense, the renewed trial-and-testing politics in 2011 has re-integrated activities of all players.

Conclusion: A new role for politics in the (European) market for electric cars?

The aim of our case study has been to illustrate how the continuing interaction between public and private players has challenged the existing dominant principles of organisation, the hierarchy, and institutional structures in the European automobile market. By looking at the dynamics around electric car politics in France and Germany through a lens of market sociology, we highlighted that given an unstable economic context (the economic crisis) and available innovative technology, firms and regulators have been encouraged to enter into a phase of renegotiating the existing conception of control in the industry.

Looking into national politics on electric cars indeed shows that in both countries, which represent Europe's largest car markets, we found that the main firms so far have successfully reproduced their dominance in the sector, while at the same time the market's global architecture (Fligstein, 2001) is changing: sectoral borders are moving, challengers have increasing success, and the electric car is touted as an innovation. In France, supporting Renault as a "national champion" has become an issue of industrial policy destabilising the sectoral structure, whereas in Germany,

carmakers' predominantly conservative strategies have allowed only incremental change. In sum, politics surrounding the electric cars have certainly challenged the existing sectoral power balance, but has not (yet) produced a new conception of control.

This outcome is linked to the fact that German firms and PSA have developed a variety of (formerly uncommon) strategies to avoid destabilising effects. Developing new instruments, these firms managed to corner the market by adapting the new dynamics around the electric car to establish themselves as legitimate managers of change. These movements were provoked by Renault, the major promoter of electric vehicles, by new actors formerly peripheral of the automotive industry and by supportive public policies in both countries. The transformations we described are still in progress and we cannot say yet if these are only temporary adjustments, or structural evolution of the industry. Nevertheless, these adaptations produced some changes, especially on electric vehicles, that had formerly been ignored, but are now seen as a main solution for the sustainability of the sector. These changes are partly linked to the strong involvement of political actors and to politics at the different decision making levels. With the crisis and the politicisation of electric technology, the automotive sector reacted in order to maintain the existing hierarchy and to shape the future market. Fligstein's framework allows us to understand these mutation processes and reintroduce the importance and the relevance of political analysis of industries.

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