Automotive industry

REPORT | MAY 2024

PRODUCING SMALL ELECTRIC CARS IN FRANCE

WHY IS IT RELEVANT AND HOW IS IT POSSIBLE?

FONDATION POUR LA NATURE ET L'HOMME

INSTITUT MOBILITÉS EN TRANSITION

summary

CONSOLIDATED RESULTS

foreword

This study is the result of a collaboration between the *Fondation pour la Nature et l'Homme* (Foundation for Nature and Mankind, FNH) and the *Institut Mobilités en Transition* (Mobility and Transition Institute, IMT-IDDRI). These two organizations have worked for several ye ars on the social and industrial impacts of the energy transition in transport, particularly regarding the automotive sector. Given the history of the offshoring of production that has affected the French automotive industry over the last twenty years, we set out to consider the potential strengths and weaknesses of France and French actors in terms of locating the production sites of small electric cars (A and B-segment) in France.

Although the subject of much discussion and high hopes, reindustrialization and the "Made in France" label have in reality met with mixed success. In the automotive sector, a lack of competitiveness is regularly highlighted as an obstacle to the location of production capacity in France, while since 2020 and the boom in battery electric vehicles (EVs), the fear that French markets will inevitably be saturated by vehicles produced abroad, particularly from China, is often cited. Objectivizing these assumptions and challenging preconceived ideas is therefore a prerequisite to giving credibility to the localization of automotive production in France.

While modal shifts and the development of car alternatives remain priority measures for decarbonizing the transport sector, the electrification of the vehicle fleet is one of the essential levers for decarbonizing road transport and moving away from fossil fuels as quickly as possible. A technological revolution is therefore underway, both in terms of innovation and industrial capacity. Asian countries are clearly ahead of the game, and the United States is catching up fast due to Joe Biden's Inflation Reduction Act (IRA) and a series of protectionist measures. In this context, Europe and particularly France cannot afford to be left behind in this technological transition.

The social acceptability of EVs will only be established if they enable an economic transformation associated with activities and jobs, not the other way round. Enabling a more inclusive and socially acceptable transition also requires a greater accessibility of EVs, which can be achieved by lowering their cost. While the range of EVs on offer in Europe has so far tended to focus on large vehicles and SUVs, this trend needs to be reversed towards greater efficiency. The size and weight of vehicles are directly linked to their energy consumption and their carbon footprint of production, not to mention their content of raw materials, which will become increasingly scarce over the next decade. All these factors mean that we must prioritize vehicles that are smaller and better suited to everyday mobility.

This report presents a series of levers that can be used to create the conditions for competitiveness and the localization of small electric vehicle production in France. We show that the conditions for the competitiveness of French production sites are within reach, underlining the importance of supporting the industrial transformation with one-off resources and measures to offset short-term financing and training needs, while also highlighting the need for a framework to establish long-term demand and productivity levers. To this end we show that consistency is crucial regarding the choices made by economic actors, and in particular in their industrial location strategy: offshoring can no longer be regarded as an adjustable variable or as a means of systematically pitting one site against another to achieve cost reductions. There are ways of achieving this objective that give value to environmental performance, which is an asset of European production, and French production in particular.

A virtuous circle should be established as a matter of urgency, to steer vehicle production and demand towards small electric cars. This would serve to remind us that climate and social justice can go hand in hand with a solid industrial strategy, and that the ecological transition can be both the driving force behind reindustrialization and more inclusive policies.

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IMT DIRECTOR

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report
overview

The organization of production sites in the automotive industry has been undergoing profound change for nearly ten years, and this process is far from complete. The main driver of this transformation is the electrification of the vehicle fleet.

In March 2023, the 27 EU Member States definitively approved the ending of sales of new internal combustion engine (ICE) vehicles in 2035, to ensure that the automotive industry is included within the European objective of carbon neutrality by 2050. To achieve this target, the European regulatory framework has defined a pathway with progress thresholds to be achieved by each manufacturer in terms of average in-use vehicle emissions in grams of CO_2/km for new vehicle sales per year (CAFE).[1] To achieve the 2025 and 2030 targets, improvements to ICE vehicles alone (in terms of weight, size, energy efficiency and engine hybridization) will not be sufficient, and a growing proportion of sales must be composed of purely electric vehicles (EVs). As a result, EV sales in Europe jumped by 37% in 2023, accounting for 14.6%[2] of the market share in Europe and overtaking diesel for the first time. France is no exception and has followed the same trend, with 16.8%[3] of vehicles sold in 2023 powered by electric motors.

The second factor structuring the transformation of the European automotive sector is the emergence into the field of major Chinese actors: while the growth of the major emerging markets (BRICS) since the 2000s has taken place under the control of existing companies without the emergence of "national champions", the EV sector has been designed and organized in China to ensure that this is no longer the case. Over the space of ten years, an ecosystem perfectly adapted to this new technology[4] has been created, making Chinese battery and EV giants major actors.

The competitiveness of Chinese companies is based on a very generous system of subsidies and lower unit margins, offset by high overall volumes, in comparison to European manufacturers who in recent years have focused on moving upmarket and increasing the price of their models.[5] The Chinese manufacturer BYD (which stands for Build Your Dreams) became the world EV leader by 2023,[6] ahead of the US company Tesla.

For European carmakers, adapting to these new challenges requires a revision of their industrial strategies. From production to sales, the rise of EVs is leading to a review of processes that were previously well-established and consolidated over decades, with the emergence of new industrial actors on the market. The new competition from Asia is causing concern. The US has formulated a strong political response with its IRA,[7] which takes the form of a plan to finance and support the localization of its new EV ecosystem and the introduction of significant customs duties (up to 27.5%).

Those in favour of the status quo - or of easing the regulatory constraints on electrification in Europe - are convinced of the need to lessen the EU's "forced march" towards electrification. They plan to use the review clause[8] scheduled for 2026 to discuss the pathway agreed up to 2035. These actors are already advancing the following arguments: the European decision to electrify the vehicle fleet would be socially discriminatory, given the price of EVs, and it would also result in an influx of Chinese-produced vehicles, which are cheaper and more attractive, to the detriment of French and European industry.

To prevent this notion from taking hold, to prevent the timetable from being called into question, and to allow this technological transition to succeed, it is therefore necessary for it to be understood not only as a necessity in a climate change context, but also as being acceptable or even desirable to the greatest number of people. If this is not the case, and if it is rejected by a significant part of the population, this will lead to political ramifications that would be damaging for future generations (as we have recently experienced following certain setbacks on the objectives of the European-level agricultural transition).[9] The IMT and the FNH consider that the issues of the equity and social acceptance of the transition are central, and have decided to join forces to work on the nature of these issues and the responses to be provided.

Two socio-economic issues of the technological and ecological transition are at the centre of this study:

1. **The ability to offer a more inclusive transition: making affordable new or used EVs available to as many people as possible**. However, for the past five years, most manufacturers have committed to electrification by offering vehicles in the upper or premium ranges (C, D and E-segments). This strategy has been to the detriment of smaller, more affordable vehicles (A and B-segments), where margins and profitability are reputed to be lower.
2. **The opportunity to reshore French automotive production and to avoid the anticipated social disruption**. Announcements and decisions concerning locations for future EV production oscillate between further offshoring and the desire to locate part of the electrical ecosystem in France. Carmakers and auto parts manufacturers are sending out contradictory messages on this issue: some of the decisions taken are genuinely reassuring for the sector's future in France, but others are far less favourable to maintaining French industry. It is difficult to determine to what extent these decisions are the result of unfavourable and objective structural factors, or whether they are based on pessimistic and exaggerated statements.

The aim of this study is therefore to address these two issues: under what conditions could small EV production sites (A and B-segments) be competitive if located in Europe, and more specifically in France?

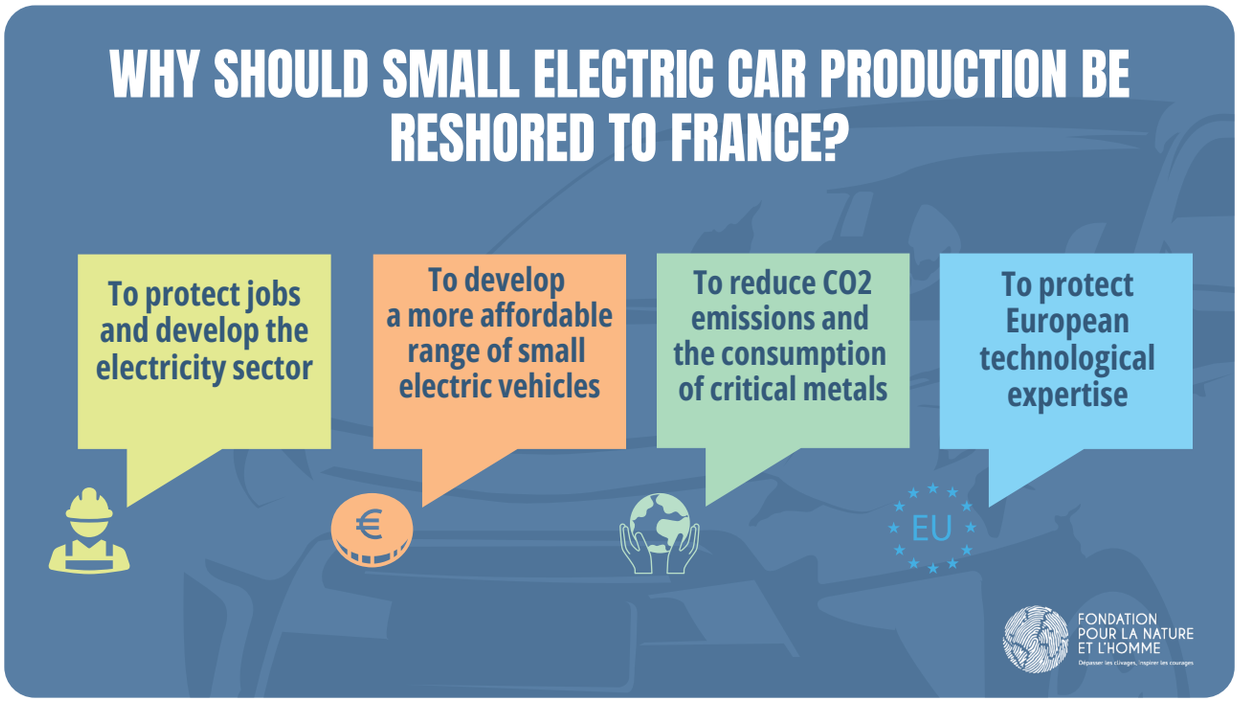
However, the number of vehicles manufactured in France has fallen from 3.5 million in the early 2000s to 1.4 million in 2022, of which 1.1 million are French brands. Part of this decline is linked to the drop in sales during the Covid crisis, but offshoring strategies to countries with low labour costs remain the main cause. As a symbol of these relocations, while the ten best-selling models in France in 2022 are all French and account for one third of sales, only two are assembled in France (the Peugeot 308 at Sochaux and the Peugeot 3008 at Mulhouse).

This offshoring has led to a decline in the number of jobs over the last ten years. Around 100,000 jobs were lost in the automotive industry as a whole, and in 2021 the *Observatoire de la Métallurgie* highlighted the risk of a further 100,000 job losses from the French automotive industry as a whole by 2035.

In 2021, the FNH reiterated the importance of anticipating the industrial transition to electric mobility and recommended that 2.3 million electric motors should be produced in France, and 2 million vehicles assembled in France in 2030[10]. Compared with a deindustrialization scenario,[11] our projections showed that jobs could be saved with a sufficiency scenario[12] that includes a switch to EVs. Today, we need to determine the extent to which French production of small EVs could be a positive turning point for the ecological transition and for employment in France, in a scenario where assembly lines are transitioned to EVs, but above all where reshoring is a key factor.

Over the last 20 years, production in A and B-segment (small cars) has fallen by 10 percentage points in terms of car production in France. From the 2000s onwards, it was smaller segment vehicles that were most subject to the offshoring of production, on the grounds of competitiveness. French carmakers felt that France was not competitive enough, and that it was only worth continuing to produce so-called top-of-the-range vehicles in France. However, there are counter-examples, such as the Toyota Yaris, which has been produced in France for over 20 years and has enjoyed consistent success and production volumes, or the Renault Zoe, which is produced at the Flins car factory in France, which can be considered a success given its longevity. The production of the electric Renault 5 at Douai also seems to contradict this paradigm.

These small vehicles are necessary for the ecological transition: ADEME points out that "*the carbon impact of an EV increases almost in proportion to its weight*", highlighting the ecological imperative of reducing vehicle weight, in contrast to the trend in recent years towards an explosion in SUV sales, which now account for more than 50% of vehicles sold in France, compared with 12% in 2010.[13]



It is this ambivalent situation that we sought to examine and articulate through this study, so that we can share our findings with manufacturers who, we believe, hold contradictory positions on the subject, and also with public and local authorities aiming to reindustrialize their regions.

In summary, if we are to succeed in decarbonizing the automotive industry, preserving jobs, enabling affordable vehicles to be brought to market, then reshoring the small EV industry appears to be a key challenge.

We analyse the industrial policies that will enable these ambitions to be achieved. Will action be the responsibility of carmakers and auto parts manufacturers, or the public authorities? And, above all, how can we ensure that the ambitions and initiatives of all parties converge on a shared objective?


UNEX

context

OFFSHORING, A SOURCE OF JOB LOSSES

For more than a decade France has undergone a sharp decline in industrial production and employment. In 2011 France was the European Union's second-largest car manufacturer (by value), but by 2016 the country ranked fifth behind Italy (7.2%), Spain (7.4%), the UK (8.2%) and Germany (44.5%).[14]

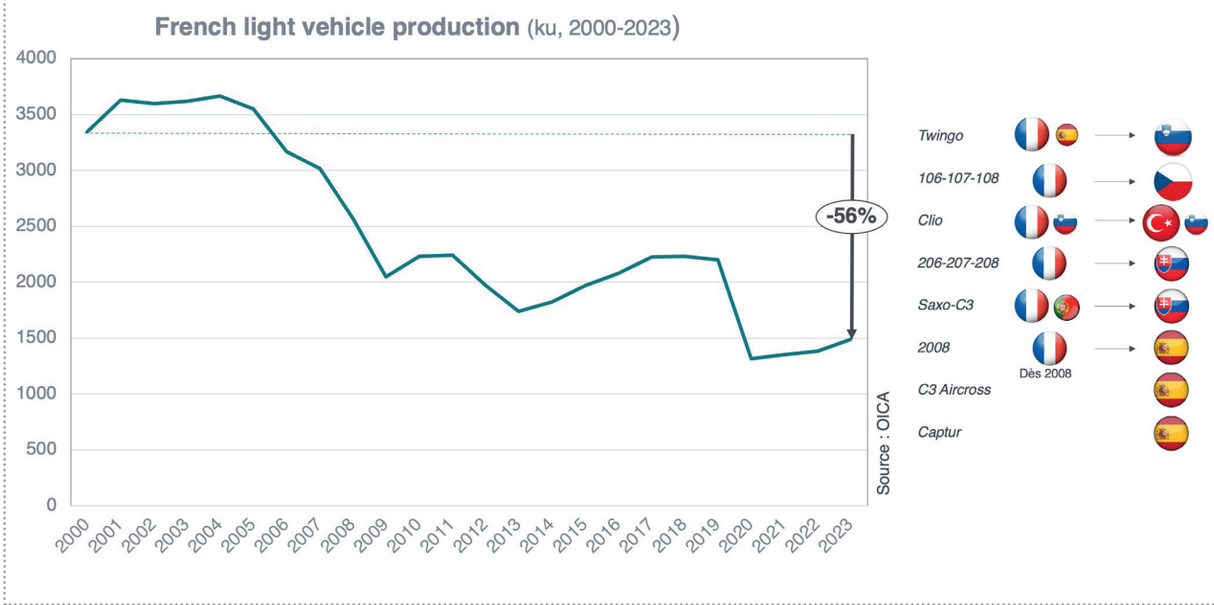
For more than 20 years, following the EU's "second enlargement",[15] the initial desire to bring production sites closer to areas of demand has been transformed into a race for competitiveness, which has lowered labour costs. The resulting offshoring precipitated the fall in car production in France. The number of vehicles assembled in France has fallen from 3.5 million in the early 2000s to 1.4 million in 2022, of which 1.1 million are French brands.[16]

Over the last 22 years, French car production has fallen by almost 60%, mainly due to the offshoring of A and B-segment vehicle production. This is despite the fact that, historically, the majority of vehicles sold in France have been small cars. In the early 2000s, one in every two cars sold on the market was manufactured in France; by 2020, it was one in five.[17]

There are many examples of this offshoring of production, including the relocation of Renault Twingo production to Slovenia, the Renault Clio to Turkey, the Peugeot 208 and Citroën C3 to Slovakia, the Peugeot 108 to the Czech Republic...

This offshoring, which is not related to the need for electrification, has led to a significant reduction in jobs in France among manufacturers and, more generally, throughout the automotive value chain. A vehicle's site of final assembly is a major factor in determining the location of auto parts manufacturers. More than half of a car's value is generally sourced close to the place of assembly.

THE LAST 22 YEARS HAVE SEEN A DECLINE OF ALMOST 60% IN FRENCH CAR PRODUCTION, MAINLY DUE T THE OFFSHORING OF A AND B SEGMENTS



Over the last five years alone, total employment in the French automotive industry has fallen by 7-8%. This deficit first appeared in 2008 following the offshoring by French manufacturers to other countries. This trend did not extend to "equipment" until 2016. Indeed, the relocated production sites were initially supplied by factories in France, either through their own initiative or at the request of the manufacturers. Later, equipment manufacturers in turn relocated some of their production to new sites in countries that provided lower costs. Overall, the decline in the French sector over the last 20 years has trapped production sites and regions in vicious circles, where falling volumes and performance are self-perpetuating.[18] One of the offshoring challenges is therefore legacy, i.e. the importance of pre-existing industrial facilities near to a model's chosen strategic locations. These assets, which are largely depreciated, represent capital expenditure (CapEx) that does not need to be paid for to establish a new production site. On the other hand, the potentially inadequate capacity of this CapEx can lead to significant operating expenses (OpEx), making them less attractive for the implementation of new projects.

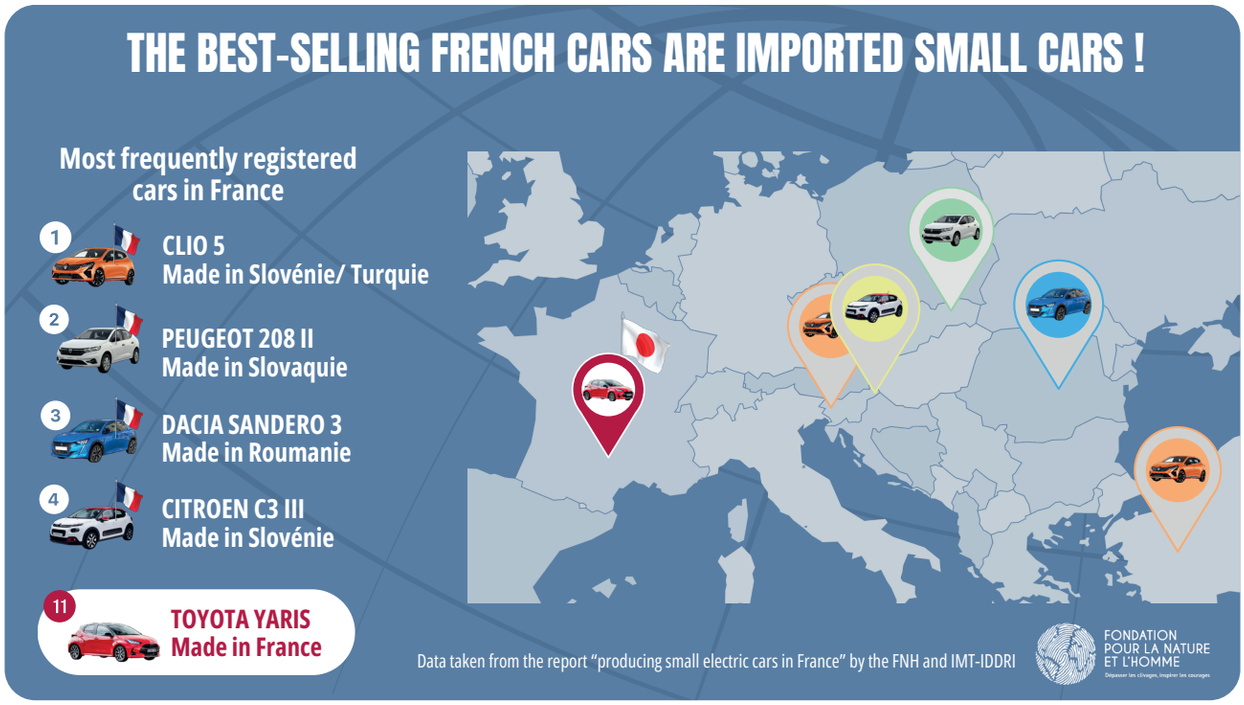
IMPORTED CARS DOMINATE THE FRENCH MARKET

Despite renewed interest and political success in re-industrialization and relocation, the indicators for the automotive sector are not improving.

Figures for light vehicles (PCs and LCVs) production in France show an increase of around 100,000 additional vehicles between 2022 and 2023 (from 1.384 million to 1.486 million), which is much lower than the increase in registrations, which rose by an additional 280,000 light vehicles over the period. In short, French imports are growing faster than French production, and the deficit in the automotive industry is widening.

The majority of French people buy vehicles marketed by the Renault or Stellantis groups, largely as a form of economic patriotism, in the belief that they are helping to maintain a local industry, however, a large proportion of these vehicles are assembled in Spain, Eastern Europe, Turkey or Morocco, as well as China (as is the case for the Dacia Spring). The top five cars registered in France, which are all B-segment cars, are particularly representative of this offshoring of production.

Among the best-selling vehicles in France, the Toyota Yaris ranks eleventh in terms of registrations. This Japanese car is now the most widely produced car in France. The Yaris is a counter-example that proves that by starting from a blank slate (the plant was established in 2001), it is possible to design a factory that can profitably produce a small car in France for the long term. We analyse this example further below, aiming to identify the keys to its success.



THE MOST POPULAR VEHICLES PRODUCED IN FRANCE AND PRODUCTION VOLUMES IN 2022 [19,20,21]

Model	Segment	Number of units	Place of production
Toyota Yaris Cross	B-SUV	191 500	Onnaing (59)
Peugeot 3008	C-SUV	159 000	Sochaux (25)
Peugeot 308	C	107 000	Mulhouse (68)
Opel Mokka	B-SUV	101 000	Poissy (78)
Toyota Yaris	B	85 000	Onnaing (59)
Renault Kangoo	C-MPV	59 000	Maubeuge (59)
Renault Trafic	VUL	55 000	Sandouville (76)
Renault Master	VUL	52 000	Batilly (54)
Citroën C5 Aircross	C-SUV	47 000	Rennes (35)
Peugeot Expert	VUL	44 000	Hordain (59)

Paradoxically, none of the top five best-selling cars in France are also in the top ten of cars made in France, even though the French market remains very much focused on B-segment cars from French brands. Carmakers have developed and implemented a doctrine that considers the manufacture of these vehicles, at least the ICE versions, to be unprofitable in France and thus French foreign trade has become loss-making. This has led to the vast majority of sites once involved in producing these vehicles either facing closure (as happened to the Aulnay-sur-Bois plant), shrinkage (Rennes, Poissy, etc.) or conversion (Flins). Toyota's example at Onnaing and the direction taken by Renault with the R5 suggest that another way forward is possible.

LOW-COST PRODUCTION STRATEGIES AND RECORD PROFITS FOR MANUFACTURERS

This decline in car production in France is less the result of losses for French companies on the export markets, and more related to the offshoring strategies of the major French automotive groups.[22]

The statements of the manufacturers reflect the diversity of their positions. Carlos Tavares, CEO of Stellantis (Peugeot-Citroën-Fiat-Chrysler), said that "It is very difficult to maintain manufacturing in countries with very high cost structures, which are the consequence of the social model that France and Europe have chosen". "You can't build very compact, low-cost cars in a country with high costs".[23] For many years Stellantis has argued - as did Renault until 2020 - that it is economically unreasonable to manufacture small cars in France given the costs involved. As far back as 2009, during the *Etats généraux de l'Automobile* [24] (a general meeting on the automotive industry), which was held in response to the crisis at the time, many Tier 1 to 3 auto parts manufacturers testified to the practices of the purchasing departments of carmakers, which made their continued inclusion in the supply chain conditional on quantified offshoring targets.

The group's strategy is based on pricing power: price increases have largely offset the fall in the number of vehicles sold, to the detriment of industrial production in France. Stellantis profits reached €16.8 billion in 2022, an increase of 26% on the previous year. In 2023, a new record was set with a net profit of €18.6 billion, a rise of 11% on 2022. In comparison, only the oil and gas giant TotalEnergies did better in the CAC 40, with net profits of €20.5 billion in 2022.

Renault, the French automobile manufacturer with the diamond-shaped logo, also stood out in 2023 with a net profit of €2.3 billion, marked by an 11% increase in sales compared with 2022.[25] The leader on the French market, Renault boasts the lead in the C-SUV (compact crossover SUV) segment, with almost 23,000 registrations for the Austral, which has shown considerable growth of 36%.

These results are in line with Renault's new strategy. Luca De Meo, Renault Group CEO, has announced the "Renaulution", i.e. the transformation of the company's strategy to rebalance sales towards less volume and more value.[26]

However, these record profits do not reflect the different strategies adopted by Renault and Stellantis regarding EV development. Stellantis prefers to design EVs on a chassis that can also accommodate an ICE variant, which ultimately limits the performance of these electric models.[27]

Furthermore, it should be noted that two industrial scenarios will be developed depending on the outcome of the European and US elections in June and October 2024, respectively. One scenario aims to accelerate the deployment of EVs, while the other is more likely to slow their development, underlining the reluctance of manufacturers to fully invest in the electric market,[28,29] even at the risk of falling behind technologically in future, which could put these carmakers at a serious disadvantage.

Renault, on the other hand, is taking clear steps towards EVs with the creation of Ampere, its EV division, and a new industrial hub known as Renault ElectriCity. Nine electric models will be produced in France (at Douai, Maubeuge and Ruitz), including the new R5, which will be available from autumn 2024. This example is a reminder of the feasibility of producing small cars in France, although the new electric Twingo is likely to be produced in Slovenia...

The next three years will be decisive: this period will see the beginning of the democratization of the EV, which at Renault will involve France, while at Stellantis it will involve Slovakia, Spain and Italy.

BETWEEN OFFSHORING AND RESHORING: THE TABLE SHOWS THE CONFLICTING STRATEGIES AND STATEMENTS OF AUTOMOBILE MANUFACTURERS

	Towards reshoring	Towards offshoring
RENAULT	Announcement of ElectriCity and company-level agreement (8/6/21) *"My vision for France is as follows: we need to reconnect with our territory. All the strong brands are leaders in their own markets. For us, it is a question of knowing what value we can bring to the country." (L. De Meo)* • Location of Megane E-Tech (2022) and Scenic (2024) • Location of the Envision Gigafactory (2024) • Location of Verkor (2024, Dunkirk) • Location of R5 (2024) and 4L (2025) • Location of Flexivan electric at Sandouville (2024)	• Megane E-tech volumes caught up in a price war with Chinese competitors (mitigated by the introduction of the eco-score in France) • Relaunch of Twingo at Novo Mesto (2023 for 2026) • Possibility of Envision Gigafactory in Spain (2023?)
STELLANTIS	• Commissioning of the Gigafactory ACC in Douvrin (2023)	• ACC plants in Germany and Italy • e-C3 to be built in Trnava (2024) • e-208, e-Corsa, e-2008, Lancia Ypsilon to be built in Vigo and Zaragoza (2024) • electric Fiat Panda to be built in Serbia (2025)
OTHER BRANDS	• Toyota: Location of the Yaris Cross at Onnaing, 2023 record production year with 274,000 units	• BYD: announcement of Hungary plant (2024) • Volvo: Establishment of an assembly plant in Hungary (€267 million in aid for an investment of €1.2 billion)

Sources: Manufacturer data and statements

Small electric vehicle production: an imperative for success in decarbonizing travel and making electric mobility more accessible

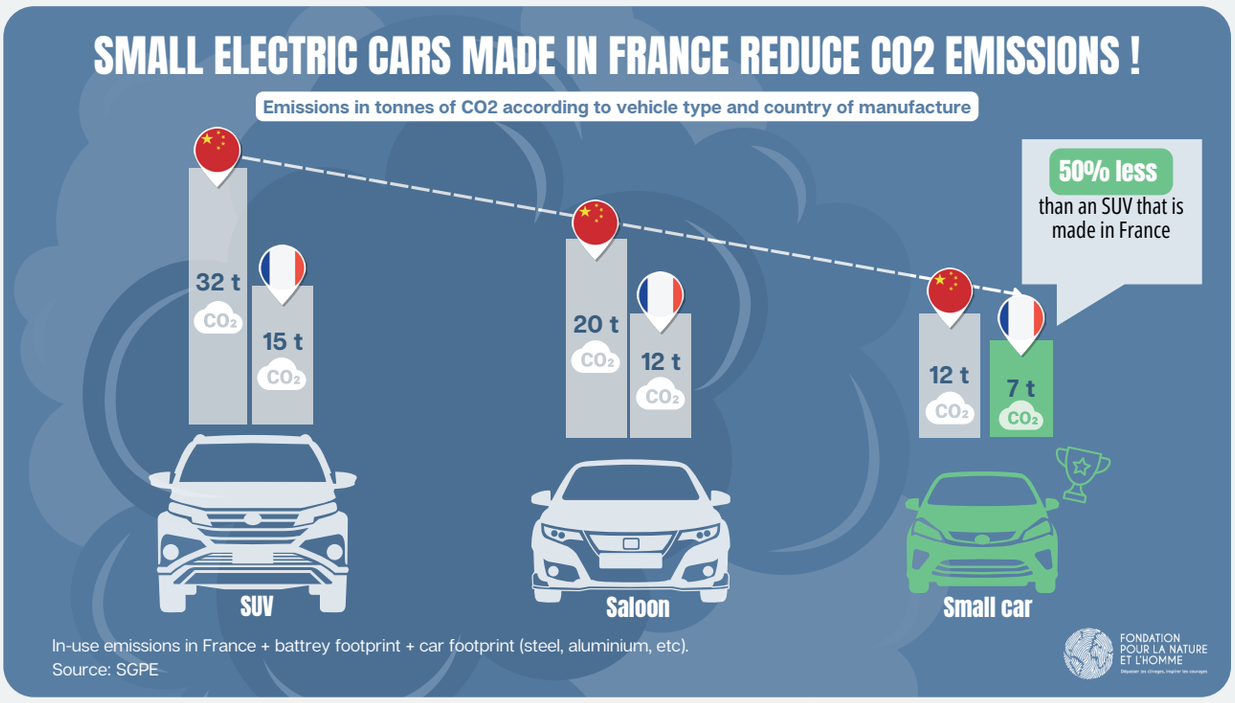
The transport sector is the leading source of national-level greenhouse gas (GHG) emissions (30% in 2022) due to its heavy reliance on fossil fuels. Road transport alone is responsible for 93% of the sector's GHG emissions, with private cars accounting for almost 50%. To date, public policies have been insufficient to bring about a reduction in GHG emissions in the transport sector. Since 1990, GHG emissions from transport have actually risen by 9%, and have remained stable since 2008.

The growth in electromobility offers the potential for CO_2 reduction because EV life cycle emissions are half that of comparable ICE vehicles, based on global average figures (IEA 2023). The French energy mix, which is largely carbon-free, improves the CO_2 gains further, with average life cycle emissions of ICE vehicles being three times greater than those of EVs. The switch to EVs[30] is therefore a major lever in the decarbonization of mobility.

According to the European Court of Auditors: "Over the last decade, emissions [in real-life conditions] have remained constant for diesel cars, while they have only marginally decreased (-4.6%) for petrol cars. Technological progress in terms of engine efficiency is outweighed by increased vehicle mass (around +10% on average) and more powerful engines (+25% on average).[31] The Court notes that "only electric vehicles (which jumped from one in every hundred new car registrations in 2018 to almost one in seven in 2022) have driven the reduction in average on-the-road CO_2 emissions witnessed in recent years."

The decarbonization associated with the electrification of vehicles should be improved as a result of the production and circulation of small vehicles, in contrast to the trend towards heavier vehicles.

In its graph, the SGPE demonstrates the importance of favouring reasonably-sized batteries to reduce a vehicle's overall carbon impact: the lighter a vehicle, the smaller its footprint. However, there is a trend towards heavier vehicles: between 2000 and 2022, average vehicle weight rose



from 1,180 kg to 1,380 kg, an increase of 17%. This increase is due to the growth in SUV sales. The market share of these models rose from 12% to 44% of new car sales between 2010 and 2022.[32]

According to the International Energy Agency (IEA), SUVs emit 20% more CO_2 on average than saloon cars. This is not only due to their extra weight (300 kg more than a saloon) but also their boxy design, which is far from the optimum aerodynamic shape, resulting in greater energy consumption and therefore higher GHG emissions. Furthermore, the woeful energy efficiency of an SUV is exacerbated by the fact that 93% of its weight can be attributed to the vehicle itself, with passengers and loads accounting for the rest.

While the ecological transition calls for lighter vehicles to offset battery weight, to limit the use of critical materials, and to reduce pressure on the electricity grid and the production of renewable energies, European carmakers have focused on the design and production of large models. As a result, only 40 small electric car models (A and B-segments) have been launched in Europe over the last six years (2018-2023), compared with 66 large electric saloon models (D and E-segments) that have reached the market.[33]

This race to produce heavier cars has led to higher vehicle prices, while the price of EVs is considered to be the main obstacle to their purchase and use.[34] Enabling everyone to have access to less carbon-intensive mobility is a real issue of social justice. For ICE vehicles, it is estimated that SUVs represent an additional annual cost of €408 for low-income households: in addition to the higher purchase price, other associated costs and maintenance bills are also higher.[35]

The same trend applies to EVs. The burden on household budgets, whether buying a new or second-hand vehicle, could slow the transition to low-carbon vehicles and keep high emitting vehicles on the road for longer. A successful road sector transition therefore goes hand in hand with affordable vehicles that are suitable for everyday journeys. This study focuses mainly on the production of electric A and B-segment vehicles (small cars), which should be a priority for manufacturers in future.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OUR OBJECTIVES

Today, we can say that regulation, particularly in Europe, has succeeded in launching the transition to EVs in the automotive market. However, there has been less success in curbing the increase in the size and sophistication of vehicles, either in terms of supply or sales. In France, where historically the car market has been marked by large proportions of A and B-segment vehicles, suitable for everyday journeys, the move to reduce the average size of EVs is not only desirable from an environmental perspective, it could also represent both a commercial opportunity for French manufacturers, which are mass market brands (as opposed to “luxury” car manufacturers), as well as an industrial opportunity: this is what we aim to demonstrate in our study, or at least to explore in more detail.

Starting from the fact that the production costs of EVs are less sensitive in proportion to labour costs, and more sensitive to energy costs, we sought to quantify these impacts and sensitivities to these parameters to see in what proportions, or under what conditions, they are levers for a return to greater competitiveness of local production in France. This is particularly the case for A and B-segment EVs, where bringing production closer to a fairly significant historical market, one that is sensitive to issues of social and industrial impact on a national scale, could be a winning strategy.

This is our fundamental hypothesis and, beyond the eminently desirable nature of this scenario, our study sets out to establish the economical realism of such a scenario. Indeed, for many years the prevailing view, mainly among carmakers, has been that manufacturing lower segment cars cannot be competitive or profitable in France. With the advent of electrification, Renault seems to have adopted the view that its previous position could change, while Stellantis continues to maintain its current course. There is therefore an urgent need to assess the real competitiveness of French production in the small EV market.

Our aim, by approaching the issue through the lens of an economist, is to provide the elements for a debate that is as well-documented as possible, so that we can move beyond posturing and look ahead to the future, which is a determining factor in an industrial strategy.

METHODOLOGY AND ASSUMPTIONS

A number of experts, including Bernard Jullien an economist specializing in the automotive industry, along with members of C-ways, an economic analysis and forecasting group, and IDDRI researchers have all contributed to this work through bibliographic research and modelling.

Discussions also took place with CFDT (a French trade union) and the European consultancy firm Syndex to test the hypotheses established by our experts, in addition to a series of 15 discussions with employees from carmakers and auto parts manufacturers (research directors, strategy directors, purchasing and purchasing strategy directors), researchers from the *Observatoire des Métiers de la Métallurgie* (Observatory of Mettalurgy), the *Ecole Polytechnique*, automotive consultants, gigafactories directors, those with experience working in China, as well as independent consultants.

The approach adopted in the study was to firstly construct the theoretical production costs[36] of a B-segment EV (small car, such as an R5, e-208, Zoe, etc.) for a plant in France, taking into account CapEx (capital expenditure), OpEx (operating expenditure), labour costs, margins and taxes throughout the supply chain, from the extraction of raw materials to the assembly of the vehicle. The conclusions drawn from the analysis are also valid for A-segment vehicles. For Chinese production, for example, transport costs are roughly the same regardless of the size of the model.

The consolidated cost price matrix obtained was then applied to the different countries studied by varying the corresponding specific cost parameters: energy prices, labour costs, subsidies, import taxes, transport costs to the European market (particularly for vehicles produced in China) and production tax rates.

We then identified and analysed the main competitiveness indicators for the four countries studied, using two sets of assumptions in each case.

- The first set corresponds to a snapshot based on a relatively basic and generic approach to the conditions present in each country if we consider only (1) the assumptions generally put forward by manufacturers concerning differences in labour costs, (2) a static approach to energy costs and production taxes (2023 situation), and (3) the financing opportunities granted to industrial projects if we adhere to the regional state aid (RSA) rules accepted by the European Union.
- A second set of assumptions corresponds to (1) a more detailed analysis of regional conditions in terms of labour costs, (2) a more dynamic analysis (looking ahead to 2027-2030) of energy costs and taxes applied, and (3) a more detailed view of the reality of funding and subsidies granted to recent projects in France and elsewhere, when all levers are combined (several boundaries and mechanisms are possible), leading to a more nuanced and realistic picture of the differences in leeway across Europe.

Following an analysis of these consolidated results from the different countries, we detail the tools and public policies that must be implemented to reduce the differences in competitiveness, and address the ecosystemic dimensions aimed at establishing long-term competitiveness.

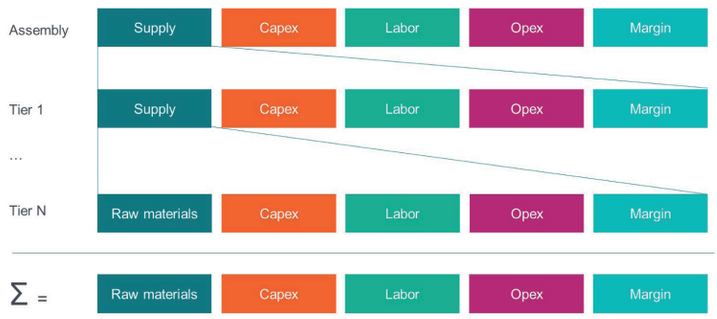
Methodology: Stage 1

Construction of the production costs matrix

In this first stage, a cost breakdown of all vehicle components is carried out, and then all stages in the supplier chain are consolidated in the form of a matrix for the entire assembled vehicle. For vehicles assembled in China, customs and logistics costs for transport to Europe are added.

The price of raw materials fluctuates widely and has a major impact on production costs. However, in this study we assume that these costs remain constant, as they do not differentiate between the relative competitiveness of production in different countries. This assumption could be questioned in the case of Chinese producers, who may benefit from supply agreements outside of the global raw materials market for some critical materials or metals. We have taken this into account for the steel and lithium used in vehicle manufacture.

Methodology for cost breakdown per component



Vehicles components

1	Battery
2	Electric motor
3	Power electronics (power inverter, DC/DC, charger)
4	Body and doors
5	Chassis and suspension (wheels, shock absorbers, suspension)
6	Seats
7	Interior (door panels, dashboards, …)
8	Low voltage electronics (screens, computers, sensors, radar, cameras, …)
9	Electric cables (wiring)
10	Thermal system (air conditionning, heating)

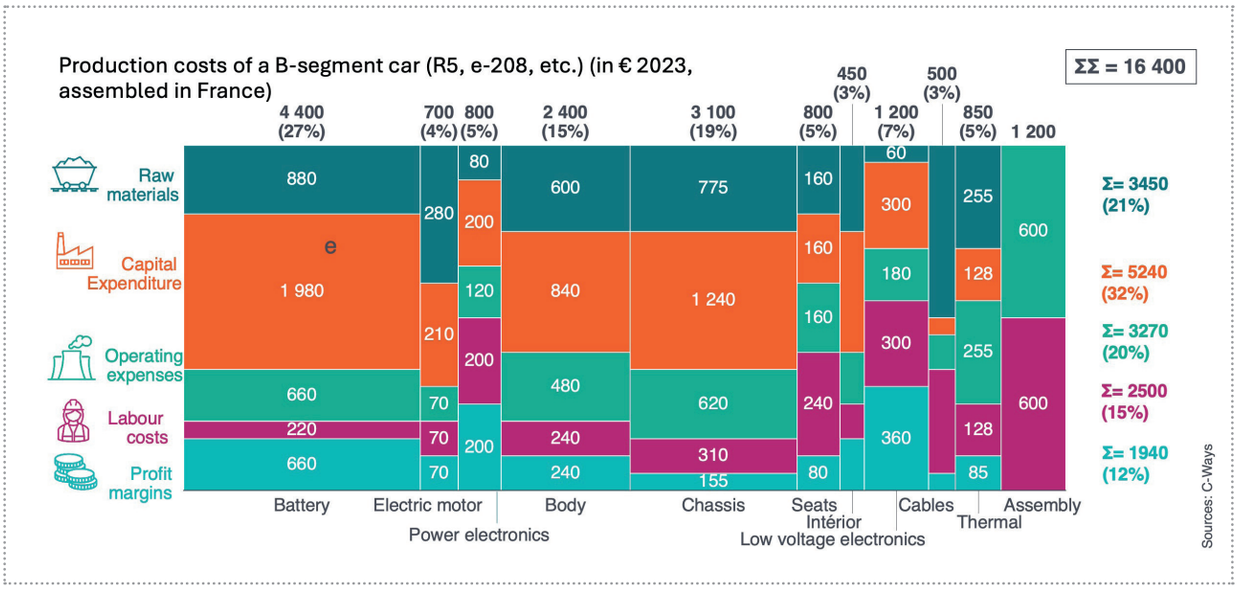
Underlying assumptions:

- Raw materials cost the same in all countries (with the exception of China for steel and lithium, resulting in an advantage of €2 to €3 per kWH of battery for China due to lithium).
- CapEx, or capital expenditure (i.e. mainly buildings and machinery), excluding batteries, is mainly influenced by legacy, i.e. the ability to re-use a region's existing industrial assets, which are present in the four countries studied.
- OpEx, or operating expenses, are divided into two categories: energy, which accounts for around 50%, and rent, maintenance, other consumables and indirect labour.
- Profit margins are not differentiated according to country.
- Trade with China involves customs duties estimated at 10% and additional logistics costs estimated at €1,000 per vehicle. For trade with Slovakia or Spain, logistics costs are estimated at €200 for intra-European outbound truck transport.

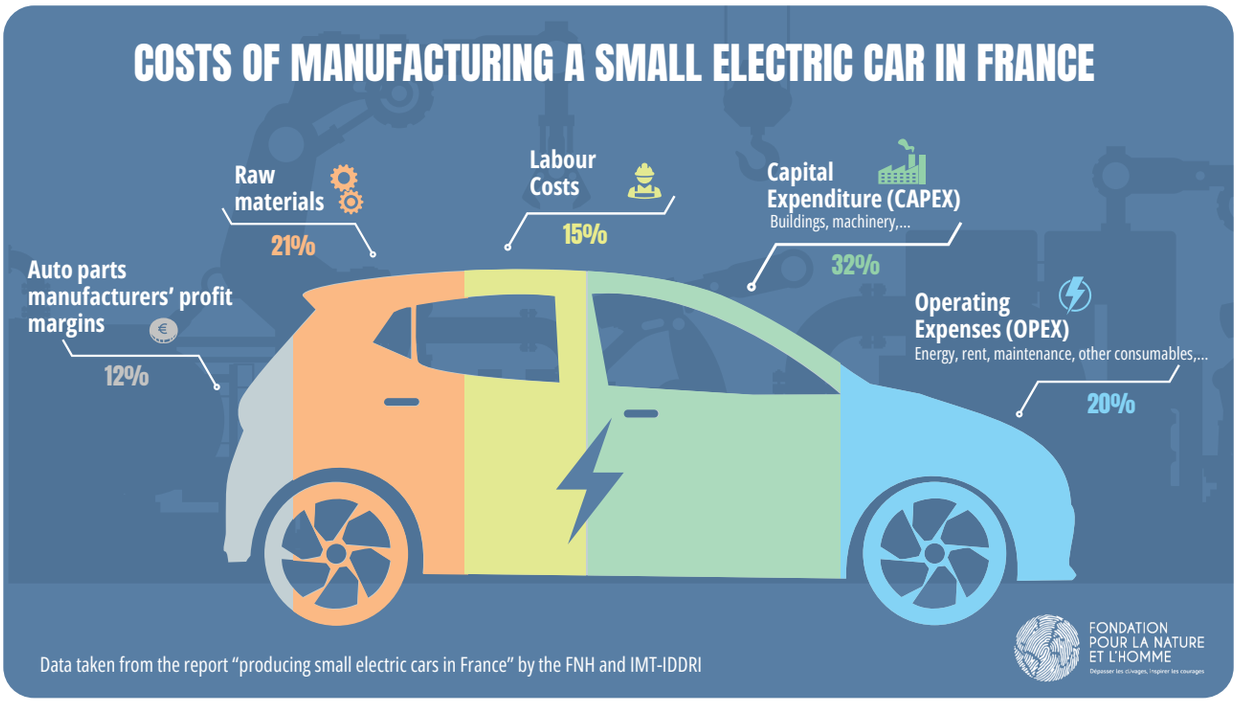
To construct the matrix, we considered that:

- Production of body in white, chassis, bumpers, seats, interior and thermal management system are all located close to the assembly plant.
- Electric motor, power electronics, low-voltage electronics and cables can be offshored.
- The battery is separate, economically offshore-able, but strategically located almost always close to the assembly plant.

For a typical B-segment vehicle manufactured in France (with the assumptions described above), the cost price matrix is as follows:



Modelling the matrix: *C-ways has produced this matrix based on their many years of expertise, bringing together knowledge on economic data from carmakers and auto parts manufacturers. It is founded on work carried out to calculate the price of an EV according to the vehicle's components,[37] specifying the breakdown of costs that contribute to the final price,[38] in order to adapt it to a B-segment vehicle.*



This reference matrix is used as a point of comparison in simulations between countries. In particular, we consider that:

- the following components are produced in French plants: batteries, electric motors, power electronics, body and doors, chassis, seats, interior and thermal (energy 2023, before tax, average labour cost in France for the automotive sector).
- the remaining components are imported (at the same cost for all manufacturing countries - Morocco for wiring harnesses, Taiwan for high added-value low-power electronics (chips), China for low added-value low-power electronics (screens, etc.)).

On the vertical axes, the matrix distinguishes the parts of the vehicle and determines the corresponding costs according to the location of production. Horizontally, the matrix distinguishes between cost items, enabling the identification of competitive factors that are described and discussed below.

The matrix shows that the cost price of an EV is mainly determined by CapEx (30%), OpEx (20%), raw materials (20%) and, to a lesser extent, labour (15%). It should be noted that these proportions are very different from those for an ICE vehicle, where labour accounts for a much larger proportion. For this reason, the arguments put forward over the last two decades, which have put French production sites into competition with foreign plants on the basis of labour costs, become much less valid when it comes to EV production.

Methodology: Stage 2

Identifying the main variables structuring the relative competitiveness of countries in 2023 and up to 2030

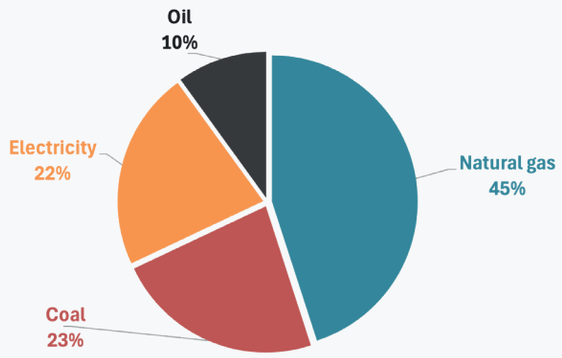
Assumptions were made during this stage regarding changes in the key foundations of competitiveness for each country.

We isolated four decisive levers that can be differentiated for each country:

1. Labour costs represent 15% of production costs (around €2,500 for a B-segment vehicle). This is often singled out as the determining factor for offshoring, based on the assumption that wages in France are too high and reduce the country's competitiveness.[39]
2. Investment subsidies, which apply both to batteries and to manufacturing machinery (but not to existing plants, which account for 50% of CapEx). These subsidies account for 19% of production costs, which is calculated in our reference matrix (i.e. €3,125 for a B-segment vehicle).
3. Energy prices, which represent 50% of all operating expenses linked to local assembly, have an impact on 10% of the production costs in our reference matrix (€1,635 for a B-segment vehicle).
4. Production taxes, the basis of which being the added value, which represents around 25% of sales revenue in France, and apply to around 33% of production costs. In France, these taxes currently represent 2.1% of production costs.

Focus on the energy mix in the automotive industry

- Following the ceasing of Russian gas imports, Europe has needed to source gas from the global market, thereby losing its competitive advantage over China.
- The oil price is derived from a globalized market and is therefore the same for all countries ($100/bbl in 2022 compared with $83/bbl in 2023).
- For coal, European prices are the same (around $80/t), while China benefits from an inexpensive local market that is around 50% cheaper (around $40/t).

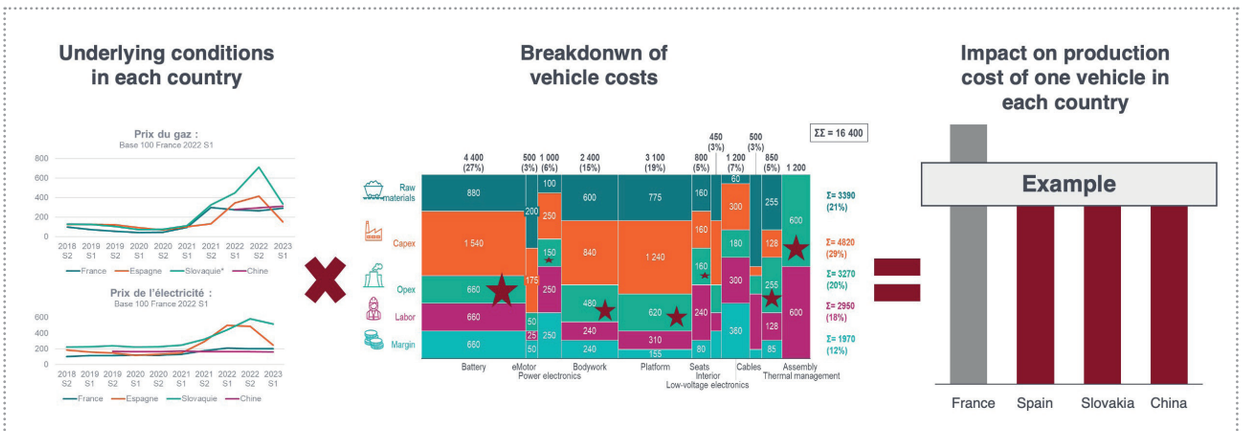


Sources : EuroStat, Energy Institute Review of World Energy, Honda research paper, entretiens C-WAYS

Methodology: Stage 3

Analysis of the impact on a country's production costs for each of the structuring variables

The production costs are established and compared for an EV produced in the four countries considered, today and at the end of the time scale considered (between 2028 and 2030), in respect to each of the four structuring variables on which we tested the sensitivities of temporal and regional development scenarios.



Why choose China, Spain or Slovakia?

China: controlling the entire electricity value chain

Chinese-based manufacturers benefit from very substantial subsidies. They have developed advanced technological expertise and industrial capacities that far exceed the needs of the domestic market. The Chinese car industry has established itself as a giant in the EV field as a result of these incentives. AlixPartners estimates that China gave subsidies amounting to $57 billion for EVs between 2016 and 2022.

In 2023, the Chinese brand BYD sold more vehicles worldwide than Tesla, which until then had been the leader in the EV market. China benefits from its fast-growing domestic market (with EV sales rising by 11% in 2023), on top of which these cars are also attracting interest abroad.

China has built up an EV ecosystem by supporting the entire supply chain, and since the early 2000s the country has increased its relevance in the refining of strategic ores and metals. It is now the world leader in this field. The EV battery sector is a perfect example of the country's importance, given that China processes 80% of the metals used in these technologies worldwide.[40]

For these reasons, the threat of offshoring production to a country with low labour costs looms large, because French and European carmakers may be tempted to locate their vehicle production to China and thus benefit from the local value chain. This trend is already underway, for example with the relocation of the Dacia Spring production to China.

Spain, Europe's second-largest manufacturer

The 2008-2010 financial crisis caused massive unemployment in Spain that led to a widening competitiveness gap that has marginalized French production sites and contributed to the continuation, and acceleration, of the trend to offshore B-segment vehicle production outside of France.

As a result, many French car models are now produced in Spain: the Peugeot 208 and e-208 in Zaragoza, the Peugeot 2008 in Vigo, the Renault Captur in Valladolid, etc. Competition between Spanish and French production sites has been a "tradition" between the two French groups for many years, but since the crisis it has clearly worked to the disadvantage of French sites due to "wage moderation" and the generosity of central and regional public authorities. The result has been significant "volume effects" and a sharp contrast between one side of the Pyrenees, where virtuous circles of growth prevail, and the other which is trapped in a vicious cycle of decline. Spain is now maximizing its efforts to ensure that electrification does not impact this dynamic. The cities of Vigo, Zaragoza and Villaverde are benefiting from this momentum, and the next e-208 will be produced in Spain from 2026.

Slovakia, the world's largest carmaker per capita

Slovakia, a symbol of Eastern Europe offshoring, is now the world's largest carmaker per capita (184 cars per 1,000 inhabitants). Together with the neighbouring Czech Republic, Slovakia forms a very powerful and dynamic cluster where Skoda has been joined by PSA, Toyota and Hyundai. In Slovakia, this industry accounts for over 42% of the country's total exports. The number of employees continues to rise, bringing the total number of direct jobs to 176,000.

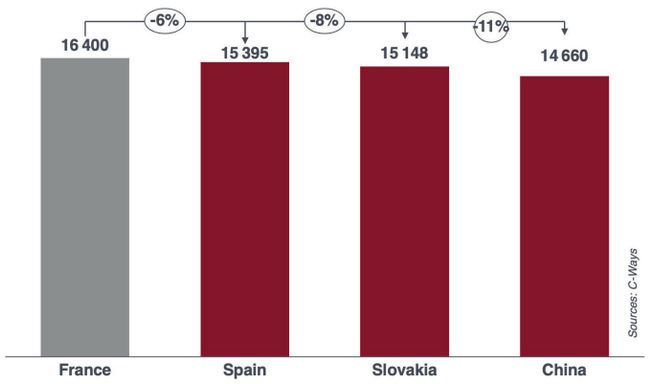
In 2006, PSA (now Stellantis) inaugurated the Trnava plant, which is dedicated to the production of small vehicles. Trnava became the production site for the Citroën C3, leading to the closure of the Aulnay factory in France, with the production of the Peugeot 207 and then the 208 also moving here subsequently. At present, the move to electrification has not threatened the Slovakian plant: the production of the Peugeot E-208 and then the Citroën E-C3 at Trnava demonstrates that the carmaker's assembly lines can be converted to suit electric and lightweight models. The future e-208 will leave Slovakia, to be produced not in France but in Spain.

INITIAL RESULTS: AN UNFAVOURABLE PICTURE FOR FRANCE

The initial simulation was based on a relatively basic and generic approach to the conditions in each country, taking into account only (1) the assumptions generally put forward by manufacturers concerning labour cost differentials, (2) a static approach to energy costs and production taxes (2023 situation) and (3) the financing opportunities granted to industrial projects under the regional state aid (RSA) rules approved by the European Union.

By comparing the production costs obtained for each country, the initial assumptions used highlight a relatively large competitive gap, with France lagging behind the other countries studied. We consider that a competitiveness gap of 6% or more could justify offshoring from France.

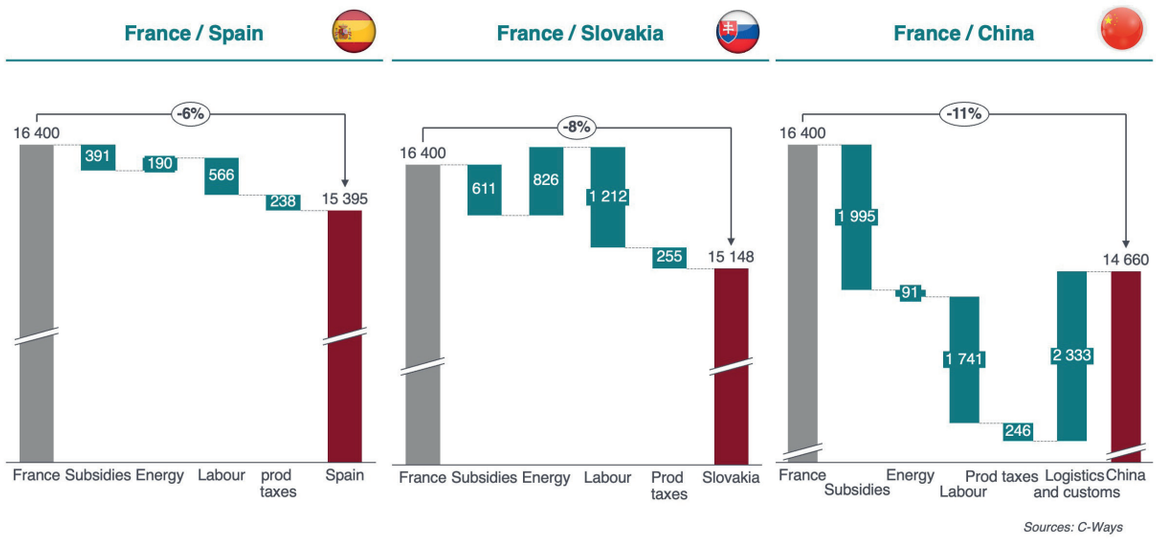
Theoretical production costs of A – B segment vehicle with the basic set of ssumptions (€, outbound logistics et customs cost included)



Assumptions:

- *Labour cost: national wage averages for the automotive sector*
- *Energy prices: average electricity and gas prices per country in S1 2023*
- *Investment subsidies based solely on RSA rules for the various European countries*
- *Production taxes as currently applied in Europe, which are zero in China*

Among the structural variables, it is labour costs and subsidies in particular that disadvantage French sites. Whereas energy is actually a positive factor for French competitiveness (see graph below):



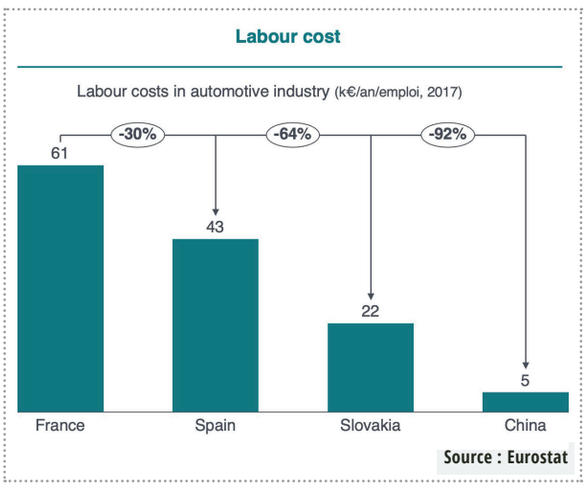
In light of the initial results, which reflect only a static and generic approach to the relative situation of countries, we sought to adjust the assumptions with regard to the previously identified four underlying factors to obtain a forward-looking vision for 2028-2030 that is as close as possible to the actual situation, and as objective as possible.

IMPACT OF THE FOUR LEVERS ON COMPETITIVENESS

ANALYSIS OF LABOUR COST ASSUMPTIONS AND THEIR IMPACT ON THE PRODUCTION COSTS IN THE COUNTRIES STUDIED

To analyse labour cost parameters, we used 2017 Eurostat data to have stable figures for a year that was not impacted by the Covid pandemic. For China, we used manufacturing industry salaries in the Beijing region, which are higher than in the rest of China, which is poorer.

Initially, for the calculations presented in the previous exercise, we took official Eurostat statistics into account on the average cost of a manufacturing industry employee in the countries studied (carmakers often refer to these figures to illustrate the competitive disadvantage of France in terms of labour costs). The result is a difference of around 45% compared to Spain, and 60% compared to Slovakia.[41] To be less simplistic, we used average statistical data for all job types in the sector. These figures show a cost differential in France of 30% compared to Spain, 64% compared to Slovakia, and over 90% compared to China (see graph below).



To consider a more representative situation, a more detailed analysis of labour costs was undertaken, taking into account regional disparities and the reality of different employment frameworks.

Firstly, we differentiated between salaries paid by carmakers and those paid by auto parts manufacturers. In France and Germany, salaries paid by auto parts manufacturers are very close to those of carmakers. But the difference is more significant in Spain, where auto parts manufacturer salaries are €3,000 below average, while those at carmakers are €4,800 higher than average. This difference is even greater in Slovakia, where carmaker salaries are more than one and a half times greater than those of auto parts manufacturers.

Differences in labour costs between carmakers and auto parts manufacturers :

Source : Eurostat

	Carmakers *(euros)*	Auto parts manufacturers *(euros)*
France	52 793	49 563
Spain	45 464	38 180
Slovakia	43 666	27 277

Carmaker / auto parts manufacturer ratio in each country :

	Carmakers *(euros)*	Auto parts manufacturers *(euros)*
France	1,00	1,00
Spain	0,86	0,77
Slovakia	0,83	0,55

Furthermore, Eurostat automotive industry data includes salaries in engineering centres, which are much higher than those in factories, and are not directly included in production costs. Regional statistics make it possible to isolate the real salaries of factory workers, thereby avoiding "head office effects" and the salaries of general management, which have a significant impact on the average.

For the updated simulation, we chose the following reference car production regions:

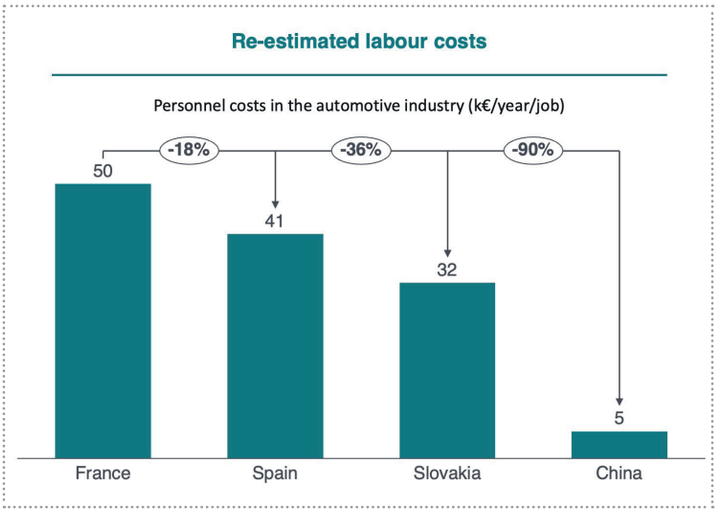
- Hauts-de-France in France: automotive sector salaries in the Hauts-de-France and Grand Est regions of France are much closer to equivalent salaries in Spain than to Île-de-France salaries, which are almost twice as high.
- Castilla y Leon in Spain: due to the location of assembly plants in Palencia and Valladolid. Salary levels here are slightly lower than the national level, and fairly similar to the Vigo and Madrid regions.
- Bratislava in Slovakia: where the Trnava plant is located and where wage costs are higher than the rest of Slovakia.

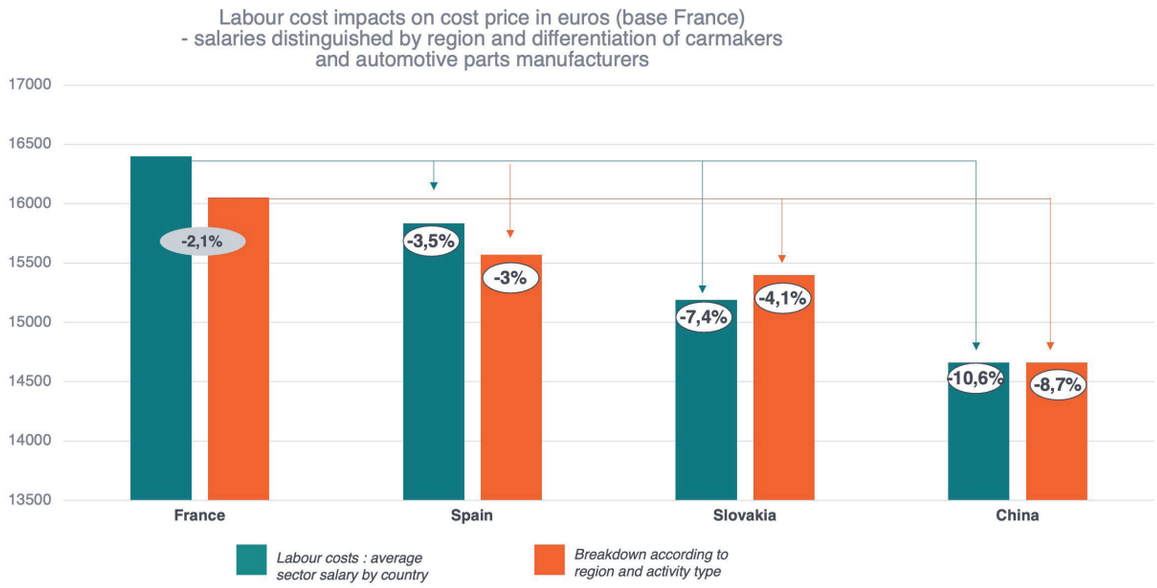
Countries / Factories	Regions	Salaries (k€/an)	Deviation for average (base 100)
France		**45**	
	Île de France	68	153
	Franche-Comté	42	94
	Hauts de France	**36**	**80**
	Grand Est	37	84
Spain		**37**	
	Catalogne	50	135
Vigo	Galicia	31	84
Sarragosse	Aragón	26	69
Villaverde	Comunidad de Madrid	34	90
Palencia Valladolid	**Castilla y León**	**32**	**86**
Slovakia		**19**	
Trnava	**Bratislavský kraj**	**24**	**125**

The updated figures result in a halving of the cost gap compared with the sector's average national statistics, without the previously considered differentiation.

As a result, the use of factory worker salaries and the rebalancing of the auto parts manufacturer/carmaker mix generates a more optimistic picture of France:

- Spain is 18% lower (instead of 30% lower)
- Slovakia is 36% lower (instead of 64% lower)



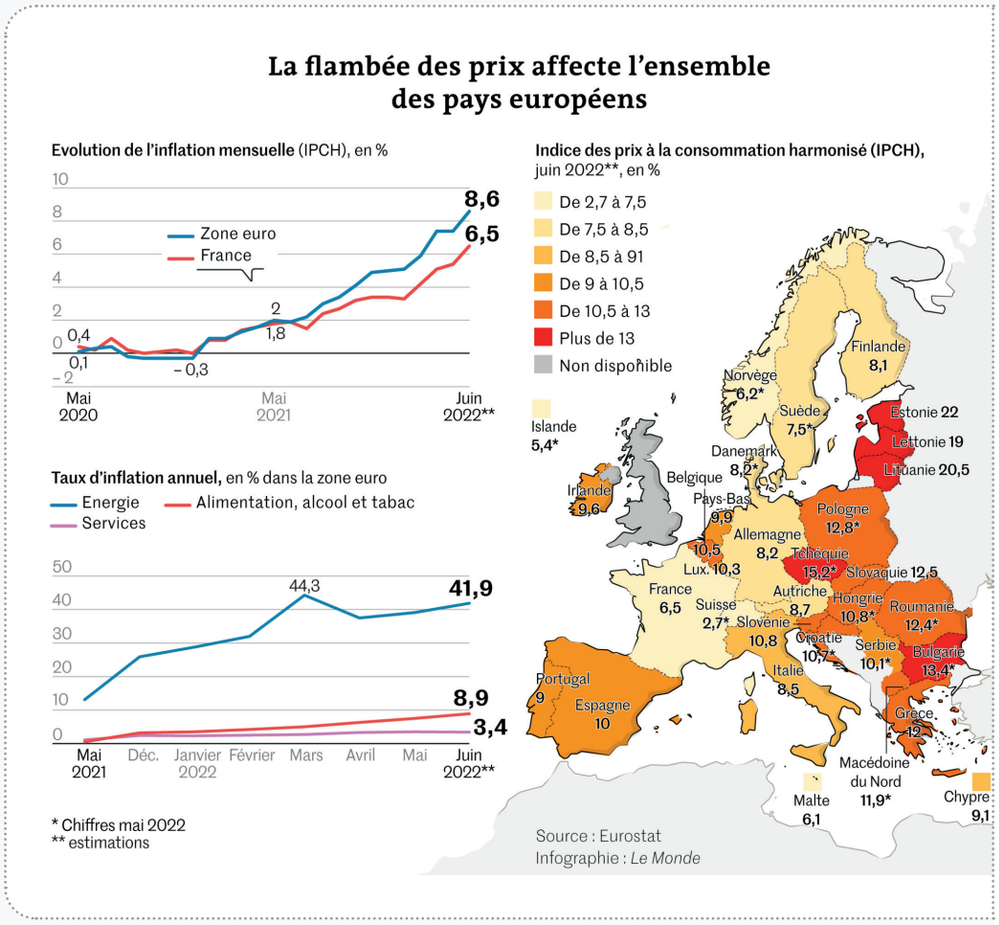


The green column (France) represents the production costs of a B-segment vehicle made in France, established using the reference matrix. The other green columns represent the equivalent production costs in the other countries, obtained by adjusting only the labour cost in the matrix (for local added values) and by considering the national averages for the sector's employees (Eurostat 2017). The orange columns show the recalculated simulation where regional labour costs are taken into account, as well as the distinction between the employees of carmakers and those of auto parts manufacturers. As a result, production costs in the France reference matrix fall by 2.1% and the competitiveness gap between France and Spain, considering only the labour cost parameter, falls from 3.5% to 3% in the new simulation.

Is it wishful thinking to imagine labour cost reductions, or is there real potential in this area that can be utilized without damaging the purchasing power of French employees in the sector and the state budget?

A first observation is that, contrary to many preconceived ideas and statements, a reduction in labour costs in France would not have a decisive effect on the studied sector's competitiveness. In fact, with wages accounting for no more than 15% of the production cost of an EV, they are less of a key factor for competitiveness than ever before. A 5% reduction in labour costs would have an impact of 0.6 percentage points on French competitiveness for the production of a B-segment vehicle. While this is not negligible, it is still relatively small compared with the gaps observed. Pressure on salaries (with social repercussions) or to reduce charges through tax privileged zones (with a cost for the state budget) is difficult to justify for such marginal gains.

On the other hand, it seems reasonable to consider that the labour cost gap that is currently disadvantageous for France will narrow almost inevitably in future:



Firstly, we are exiting a period (2021-2022 and 2023) of high inflation in Europe and the rest of the world, from which France has suffered less than other countries (see figure below). This difference will have an impact on salaries in the years ahead: index-linked incomes or wage negotiations could help to make French sites more competitive without affecting the purchasing power of employees in the sector. Some have compared what has happened in France in this respect to a form of devaluation under fixed exchange rates.[42]

Secondly, the investment dynamism in Slovakia and, to a lesser extent, in Spain may, as elsewhere, be accompanied by a tighter situation in terms of skills recruitment and wage demands, especially in countries where the sector is taking on such importance, such as in Slovakia.

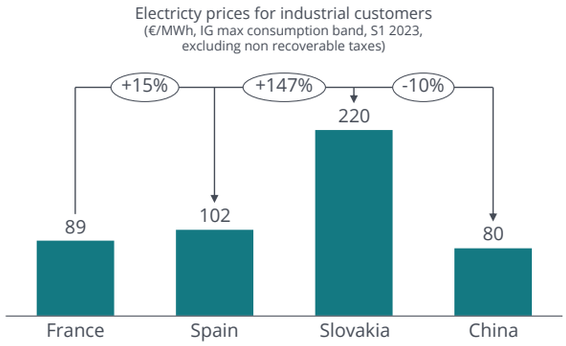
These will be fairly natural adjustments from an economic perspective, which French actors (both economic and political) can harness if they plan ahead and train staff in the new technologies and new requirements, drawing on the sector's already highly qualified historical base in France.

ENERGY PRICE CHANGES

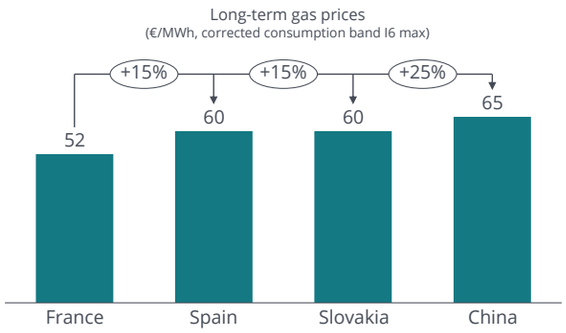
"Energy costs are twice as low in China and three times lower in the United States than in Europe" Luca De Meo.

For electricity, our first calculation (presented below) was based on the prices charged to the largest industrial consumers of electricity (Eurostat source: IG - over 150 GWh) and gas (Eurostat source: I6 - over 4,000 TJ). As the energy component of the gas price is still highly volatile, we have assumed a price of €50/MWh for all countries, in line with the world LNG price.

ELECTRICITY



GAZ



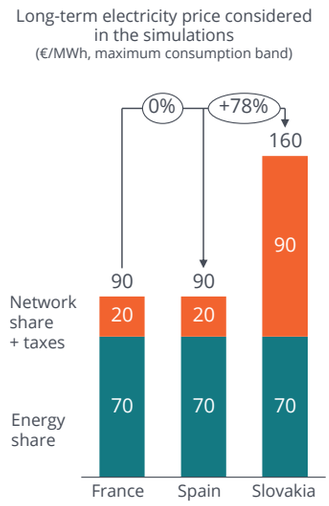
In the first half of 2023, France had a competitive advantage in Europe of between 15% and 150% for electricity. This difference was mainly due to the taxes applied by the various Member States, which heavily penalized Slovakia. For gas, France also had an advantage of between 15% and 25%.

A dynamic analysis up to 2030 shows that France will have to make major efforts to maintain its electricity competitiveness compare with Spain, which benefits from a strong renewable energy mix and its relative isolation on the European network:

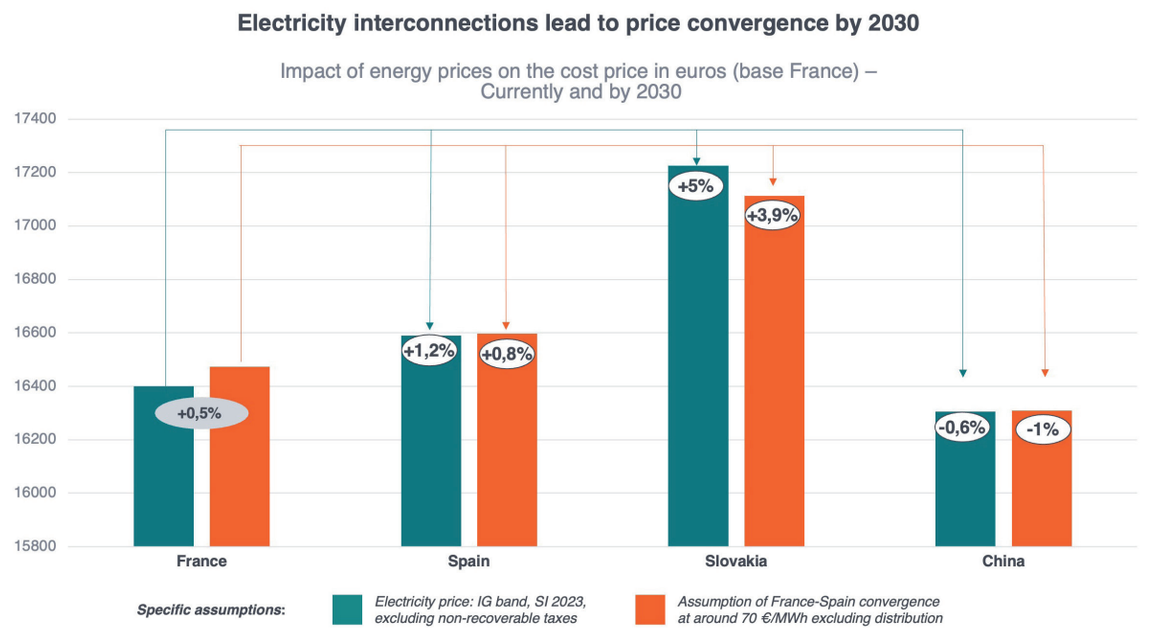
- Regarding taxes and the electricity network in Spain, taxes (~12%) are being revised to encourage electrification, and are likely to be reduced to 5%. Whereas renewable energies could face a 50% increase in network costs (€10 to €15/MWh).
- We assumed that Slovakia retains the same tax structure.
- For the energy aspect, market prices in France are based on five-year nuclear power contracts estimated at €70/kWh. It is assumed that in Slovakia, as in most of continental Europe, prices converge towards the same value of €70/MWh due to interconnections. In Spain, however, forward contracts are closer to €50/kWh due to a high proportion of renewables in the energy mix, a robust framework for long-term renewable energy contracts (PPA renewables), and a degree of insulation from the European market. Nevertheless, we can assume that the growing interconnections planned with France will push the Spanish price towards €70/MWh.

As a result, by adjusting to the long-term electricity prices (PPA) for industry, and by applying an almost identical network share and taxes to France and Spain by 2030, these two countries will eventually converge towards similar competitiveness on the price of electricity. Slovakia, however, is affected by high taxes which will result in an energy price that is 78% higher.

ELECTRICITY



The comparison, with everything else being equal, between the figures accounted for during the first simulation (IG S1 2023 range) and the prospective hypotheses described above is presented in the figure below:



The green column on the left for France represents the production cost of a B-segment vehicle in France, established using the reference matrix. The other green columns represent the equivalent production costs in other countries, with only the cost of energy (for local added value) modified in the matrix, and with the S1 2023 figures (Eurostat) used for the latter. The orange columns correspond to the updated simulation which takes into account the change in energy costs that we can anticipate according to the above-mentioned assumptions (alignment of supply costs but tax differences). Thus, the production costs in the France reference matrix increase by 0.5% and the competitiveness advantage between France and Spain is reduced (the values taken for the energy price in China remain unchanged in the two simulations, but as costs in France increase, the differential between the two countries increases).

With the end of the ARENH (Regulated Access to Historic Nuclear Energy) mechanism, which guaranteed competitive prices for French industry, discussions and negotiations are underway at the government level, involving electricity producers/distributors and companies that are particularly energy-intensive, on the possibilities of guaranteeing stable and competitive price mechanisms for the delivery of decarbonized electricity. Various contractual mechanisms have been envisaged (PPA, Contract for Difference, long-term, etc.), but these options must also factor in the parallel need to finance the development of new renewable or nuclear capacity to meet the needs of the transition. Our analysis shows that energy accounts for around 10% of a vehicle's cost price in our reference matrix, and that a price differential of €10/MWh would result in an additional competitiveness gain of around 0.35 percentage points.

Access to cheap low-carbon energy plays a role in direct competitiveness, while also having a major impact on the carbon footprint of EV or battery production (up to 30% including the electricity consumed by auto parts suppliers (tier 1 and 2).

In future, environmental ratings (such as the type used in France to indicate the eligibility of EVs to receive an ecological grant) are likely to play a major role in all labelling schemes, whether fiscal or regulatory. These measures will increase the competitiveness of French production, given that it will remain much less carbon-intensive than elsewhere in Europe and the world. In this respect, the delegated act in the recently introduced battery regulations, which defines a method for calculating the carbon footprint of EV batteries, is a step in the right direction: it only accounts for direct carbon-free production at the manufacturing location or, failing that, the average national-level carbon intensity of electricity.

Luca de Meo, Renault's CEO, noted that "China is thought to be handing out increasingly large subsidies to its manufacturers at an ever increasing pace"[43] and "since passing the Inflation Reduction Act (IRA) in August 2022, the United States has injected €387 billion into its economy, primarily in the form of tax credits." He points the finger at the lack of support for the industry from the EU and European states. Within the EU, regional aid has created a framework of increased subsidies for Eastern European countries, which could explain part of their attractiveness over the last decade in the allocation and location of vehicle models by manufacturers.

However, many opportunities for financing European industrial projects exist and are being implemented. We have measured their impact on our reformulated cost structure.

The European Union's regulations on state aid impose identical constraints on all Member States. Article 107 of the TFEU (Treaty on the Functioning of the European Union) prohibits "state aid" except in certain limited cases provided for in the same article and set out in the regulatory framework in force (in particular Regulation No. 651/2014 on aid exempt from notification).

State aid can therefore be granted within two frameworks:

- a framework exempt from notification (which implies compliance with the European regulations in force) which is identical for all Member States.
- a framework for notification to the European Commission (in which state aid is "notified" to the European Commission before it is granted).

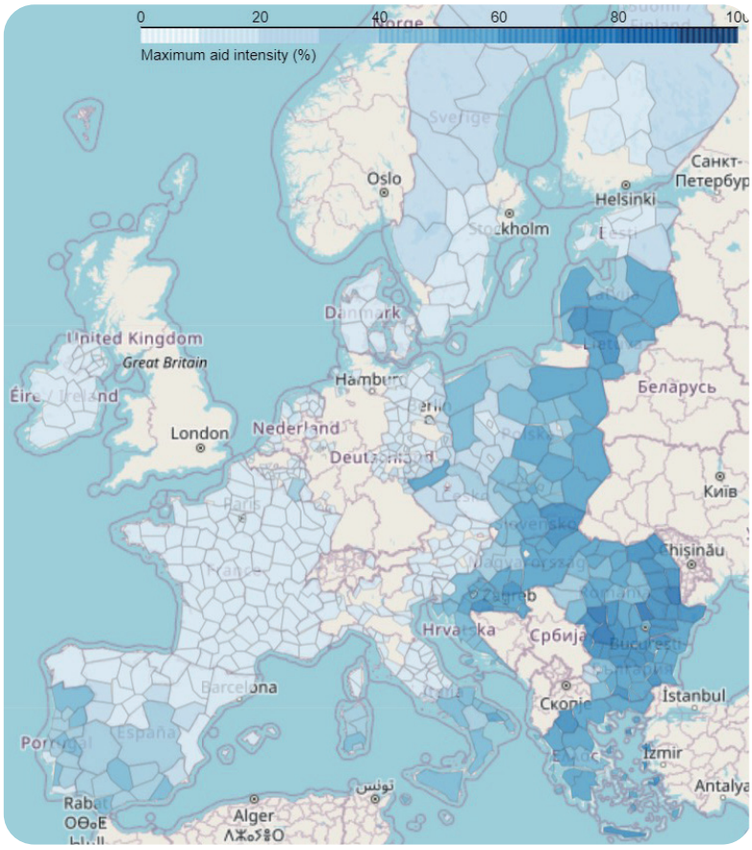
Regional aid, which can be granted either without notification or within the framework of notification, is an exception to this rule, as it introduces variable rates of aid depending on the region of the EU.

Regional aid

Under the General Block Exemption Regulation [1], Member States may grant regional aid under different rules depending on whether a project is located in zone a or c of the regional aid map.

A comparison of the maps shows that Spain and Slovakia can grant higher amounts of aid under regional aid alone. This disparity was introduced by the European Commission to promote "cohesion" at the European level and, in its view, re-establish a balance between areas with varying degrees of economic development.

REGIONAL STATE AID MAP 2022-2027



Under this scheme, French subsidies are capped at 10% for most regions outside the French overseas departments and territories, while some Spanish regions are entitled to 25% subsidies and many Slovakian regions receive a maximum of 35%.

These subsidies seem to clearly favour Spain and Slovakia, to the detriment of France.

But the scope of RSA is limited. The regional aid granted by Spain and Slovakia remains capped for all projects. This cap is based on a discount that limits aid (EU regulation no. 651/2014, article 2, point 20) once a project exceeds €50 million in costs, applicable to all Member States (only the percentage of aid changes).

Permitted rates of aid for large companies (exempt from notification) according to region:

	Continental France	Continental Spain	Slovakia
Zone a (intensities)	-	30 à 50 %	30 à 60 %
Zone c (intensities)	10 à 15 %	15 à 25 %	-

Applicable aid amounts (exempt from notification) according to aid intensity (all states):

AID INTENSITY for large companies by zone	Notification threshold (Amount in euros above which aid is subject to notification)
10 %	8 250 000
15 %	12 375 000
20 %	16 500 000
25 %	20 625 000
30 %	24 750 000
40 %	33 000 000
50 %	41 250 000
60 %	49 000 000

As part of notification to the European Commission, the maximum aid ceilings are raised in relation to the exemption framework, but they are also capped with the application of a discount in the calculation of the aid, the formula (point 2.2.3 of the European Commission's Guidelines on national state aid) being identical for all Member States (with the exception of the aid percentages, which always remain variable).

European law on state aid not notified to the European Commission does not allow a flat-rate percentage of aid to be applied indefinitely to major investment projects, even to those carried out in zone a in Spain and Slovakia. This ceiling limits the deviation from the principle of equality between Member States permitted by regional aid.

Thus, although France is disadvantaged by lower regional aid percentages in terms of CapEx, this disadvantage does not structurally prevent France from supporting major projects to the same extent as Spain and Slovakia, bearing in mind that these states are limited in their national budgets.

However, RSA does not reflect the reality of the efforts made by Member States to support the automotive industry.

Representative rate of aid to gigafactories

Outside RSA, French aid applies to batteries, but also to EV production. Important Projects of Common European Interest (IPCEIs) are the best-known example. The European Commission has allowed initial relaxations of state aid restrictions in areas deemed strategic.

The gigafactory projects of the Automotive Cells Company (ACC), Verkor and Prologium feature major product and process innovations, and receive support from the French authorities on the legal basis of IPCEIs and/or the European framework for research, development and innovation (RDI) aid, and have an average aid/CapEx ratio of over 30% (public data):

- ACC in France: €846 million in aid for a CapEx of around €3 billion = 28% [44]
- Verkor: €659 million in aid for a CapEx of around €1.9 billion = 35% [45]
- Prologium: €1.5 billion in aid for a CapEx of around €5.2 billion = 29% [46]

All gigafactory battery projects in France have been subject to individual aid notification to the European Commission: under the IPCEI on batteries (ACC) and under the European framework for RDI aid (Verkor, Prologium). Indeed, all known aid requires a European Union Member State to notify the aid to the European Commission to ensure that it is lawful and that fair competition conditions are respected within the single market.

French support for gigafactories

The French National Battery Strategy[47] consolidates the action taken by the French authorities to support the emergence of a competitive battery industry along a continuum from research/innovation to industrialization. The mobilized support mechanisms are not limited to (i) the battery cells produced by gigafactories, but to numerous components located upstream and downstream of the value chain; (ii) the industrialization phase, but also including projects from fundamental research through to industrialization, notably through various calls for projects. Indeed, support for research and development is key to ensuring continuous improvement in the performance of batteries, their components and related industrial processes, as well as reducing their carbon and environmental footprint.

The aid schemes used to support these projects are mainly R&D aid, environmental aid, RSA and aid for small and medium-sized enterprises (SMEs).

Lastly, from 2024, the green industry investment tax credit[48] will encourage the establishment of industrial projects by supporting up to 25% of CapEx[49] and €200m per company located in an RSA zone (20% up to €150m for companies outside an RSA zone, with higher ceilings and rates for SMEs).

Support for EV production

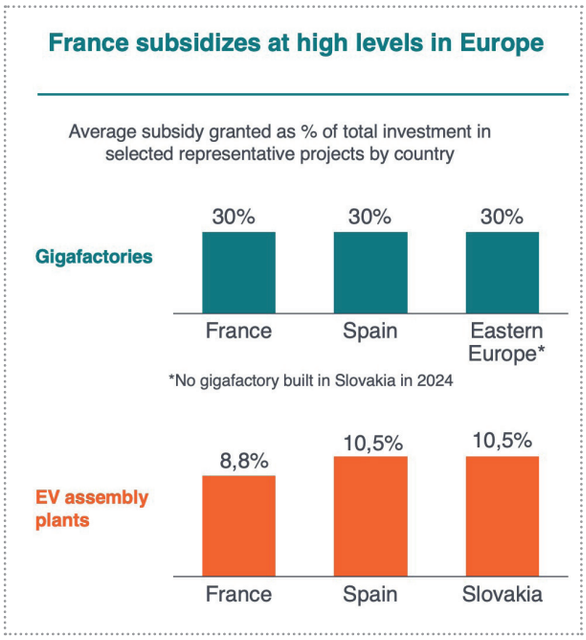
An analysis of the statements and notifications over the last four years relating to projects to establish or locate models in France and Europe suggests that the total amount of possible aid for the development and launch of an EV in France is between 25% and 30%.

This includes a whole range of different aid types that can be combined in different ways:

- Aid for the complete development (R&D) of an EV
- Aid for greening production sites[50]
- Aid for training staff to enable the switch to electric technology

This exempted RDI scheme enables the subsidizing of not only fixed-cost expenditure but also expenditure over and above CapEx, R&D, and training, without being restricted by the RSA maximum, as the regulatory framework is not the same.

Comparison between France, Spain and Slovakia

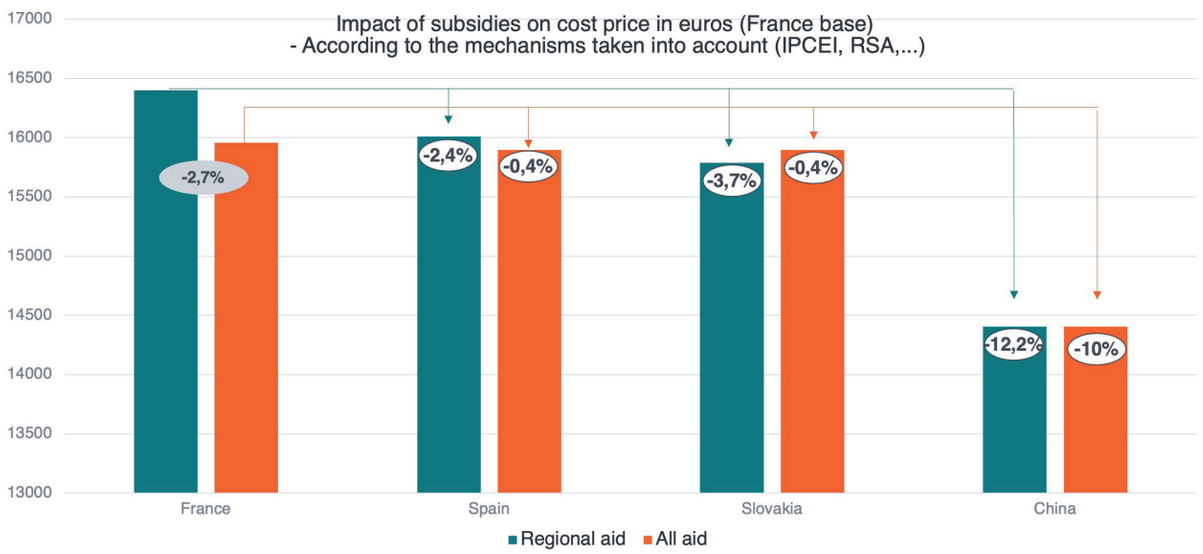


Assumptions made for the new simulation of the impact on the state or regional aid level:

- For gigafactories, the amounts of aid granted to representative projects in each country show that their level is similar and that France subsidizes gigafactories as much as its neighbours. The states involved in IPCEIs can rely on a representative rate of aid, between 28% and 35%, for the first innovative gigafactories. We have therefore assumed that France, Spain and Slovakia subsidize at a similar rate of 30%.
- Regarding EV assembly plants, due to other mechanisms that include support for investment expenditure as well as R&D and training, France is slightly behind Spain and Slovakia. We have considered the following aid rates: 25% for France, 30% for Spain and 30% for Slovakia. Given that these subsidy rates have been applied only to car manufacturing plants, or more precisely to CapEx by these manufacturers outside their plants, as the buildings are already in existence under the legacy system, these rates are 8.5% for France and 10.5% for Spain and Slovakia, based on the CapEx presented in the reference matrix.

Regarding China, the situation is somewhat opaque and probably very unfavourable for France and Europe. We have assumed that all CapEx is subsidized at a rate of around 40%.

Overall, due to the amounts allocated via IPCEI and state aid earmarked for investment, R&D and training, France is close to the subsidy levels applied in other European countries



The competitiveness gap between France and Spain, considering only the subsidy parameter, falls from 2.4% to 0.4% in the new simulation.

Initially (shown in green), we measured the levels of authorized regional aid. In our second simulation (shown in orange) we considered all the possible levers implemented in past or current projects. By taking all types of aid into account, it was possible to consider:

- *The reality of efforts made by Member States to support the automotive industry.*
- *All legal/regulatory and fiscal levers available to Member States to support major automotive projects.*

Policies to support investment or project development (R&D, training, etc.) are a highly differentiating factor in terms of competitiveness.

The IRA in the United States, with its very generous CapEx subsidies and highly competitive OpEx (long-term cost of decarbonized energy), and the opaque Chinese support system at all regional levels, are the most complicated challenges facing European industry.

However, the competitiveness challenges raised by subsidy systems are not structural: they are part of a political framework and of bilateral negotiations, or within the WTO, on the reciprocity, balance and fairness of trade and industrial rules.

In terms of intra-European competitiveness, we observed that France has used, and is continuing to use as much as possible, the necessary levers to make sites in France attractive for projects relating to the automotive and HGV sectors.

We have gathered information, both public (notification at the European level, press statements, etc.) and from interviews, that has enabled us to draw up a fairly balanced picture of subsidy possibilities on the one hand, and current practices in various European countries on the other. Our modelling indicates that it is not this criterion that causes French sites to lose the majority of their competitiveness.

However, the very limited possibilities offered by the EU and the fact that subsidies remain a matter of choice which are based solely on the resources of each Member State, generates (1) a certain lack of fairness linked to the very different budgetary and debt

resources of Member States, (2) a certain amount of competition between States, which is likely to produce industrial redundancy or a lack of prioritization with regard to the strategic challenges of completing the European supply chain.

PRODUCTION TAXES

During a visit to Sandouville in Normandy to present the reindustrialization roadmap for France, Bruno Le Maire, the French Minister for the Economy, stated that this development was the result of "cuts in production taxes" and that the intention was to "continue cutting production taxes in France."

Production taxes include taxes on salaries, property taxes (CFE, Company Property Tax) and value-added taxes (CVAE, Company Value Added Tax), which are added to the "technical" production costs of the automotive industry. In 2021, France has taken steps to reduce its taxes, which are among the highest in Europe, but this reduction will not be 100% effective until 2027. Indeed, the government has cut its annual revenue by €10.6 billion - through a reduction in CFE (€1.5 billion), the property tax on built-up properties (€1.8 billion) and the halving of the CVAE (€7.3 billion). The remainder was due to be abolished in 2023 and 2024, bringing the value of tax cuts close to €20 billion, even though the government recently decided to stagger these cuts - which are still promised by the end of the five-year period.[51]

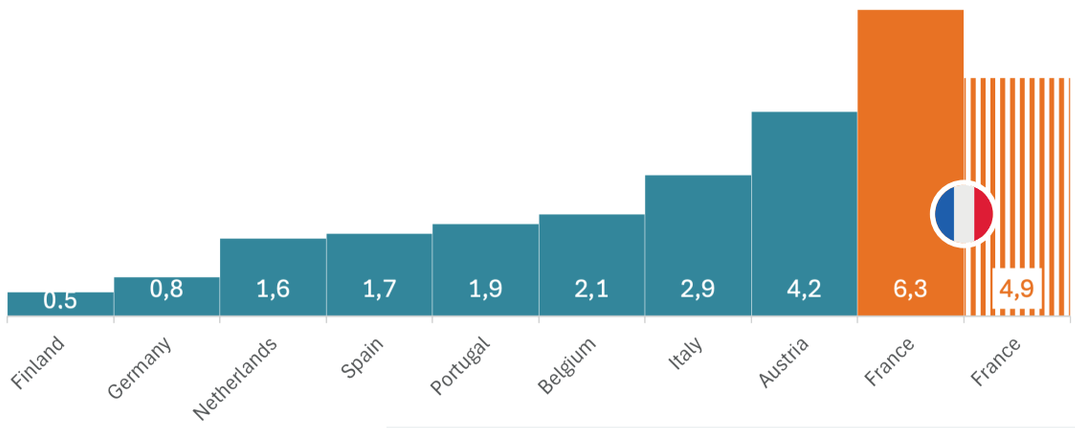
Production taxes as a % of company value added in 2019, following production tax cuts in 2021 and the announced abolition of the CVAE by 2027:

The tax base is value added, which represents around 25% of turnover, or around 33% of the production costs estimated by the reference matrix. For China, we have assumed that these costs are zero. Elsewhere, the differences taken into account depend on the localized value added tax base.

According to our calculations, the path defined by France leading to the abolition of the CVAE in 2027 will result in a 0.4 percentage point catch-up in competitiveness compared with its European competitors.

Lower production taxes increase the competitiveness of French companies, particularly those in the development and investment phases (innovative processes, for example), when profits are generally low or zero. But this tax reduction on production facilities can also be offset by increased tax revenues on profits or dividends, for example, so as to limit the impact on investment, innovation and employment.[52] On the other hand, an additional 10% cut in production taxes would have a positive impact of 0.2 percentage points on French competitiveness, which is relatively small compared with the substantial budgetary effort this would require from the French State.[53]

PRODUCTION TAXES AS A % OF COMPANY VALUE ADDED IN 2019, FOLLOWING PRODUCTION TAX CUTS IN 2021 AND THE ANNOUNCED ABOLITION OF THE CVAE BY 2027:



Source : Eurostat, comptabilité nationale - Champ des sociétés financières et non financières


ZE.

consolidated results

PRODUCTION COST GAPS RECALCULATED FOR 2028-2030

According to Stellantis CEO Carlos Tavares, "The competitive cost structure of the Chinese model enables them to send vehicles to Europe with a 25% cost advantage." [54]

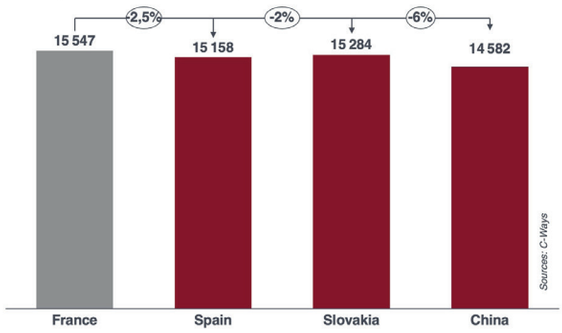
By adjusting the four structural variables to account for all the new assumptions and data for the 2028-2030 timeframe, and by incorporating the constraints specific to Chinese production, such as transcontinental transport costs and current customs duties, the theoretical production costs for a small EV have been recalculated to give a more detailed and realistic picture of the order of magnitude of the differences in manufacturing costs (for vehicles made available for sale in Europe). The results show a situation where the differences are much less marked than in the first simulation: France is only 2% to 3% behind other European countries, and 6% behind China.

Breakdown of competitiveness gains and losses according to the four levers and including logistics and customs duties:

According to this model the competitiveness gap reduces to just 2.5% with Spain, 2% with Slovakia, and 6% with China. These differences raise questions about offshoring plans, and even the possibility of locating a significant part of the supply or assembly chain in France. To do this, however, it is necessary to assess the significance and importance of the observed differences in production costs. These factors are explained and illustrated below.

By 2030, using more accurate and prospective assumptions, according to our simulations, France is only 2.5 points ahead of its competitors in Europe and 6% ahead of China

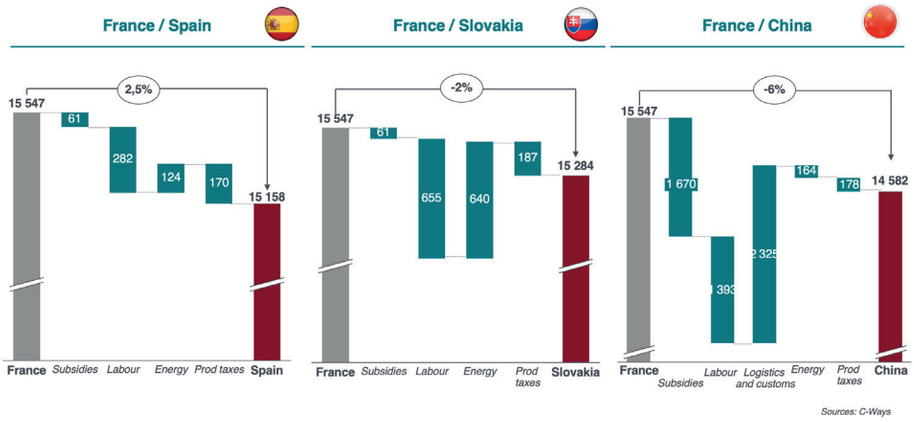
Theoretical production costs for a B-segment vehicle by country in 2030 (€, including outbound logistics)



Assumptions:

- **Labour cost:** fine-tuned using labour per region to focus on « blue collar » salaries and taking into acount annual working hours & company typology
- **Energy prices:** See previous work – 2030 outlook (convergence france and Spain)
- **Investment subsidies on current practices** concerning gigafactories and EV assembly plants
  - RSA
  - IPCEI
  - R&D&I exempted
  - Assembly aid (R&D, greening, formation…)
- **Reduced production taxes** as envisaged in futures years (abolition of CVAE)

France will ultimately reduce its competitiveness gap by 2027/2030



WHAT ARE THE RESULTS IN TERMS OF COMPETITIVENESS AND PROFITABILITY?

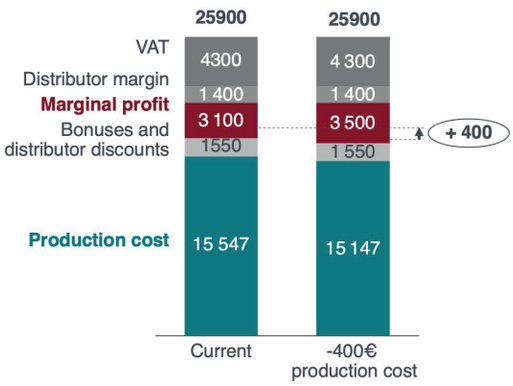
To measure the extent to which production cost gaps can justify offshoring a model's production outside of France, we analysed several industrial and commercial strategies.

With a gap of €400, corresponding to 2.5% of the production costs for a B-segment vehicle (i.e. the difference between France and Spain), a carmaker can either:[55]

- increase its profits by 13% to increase its margins (see example 1 below);
- reduce its retail price to make the product more attractive than competing models (see example 2 below).

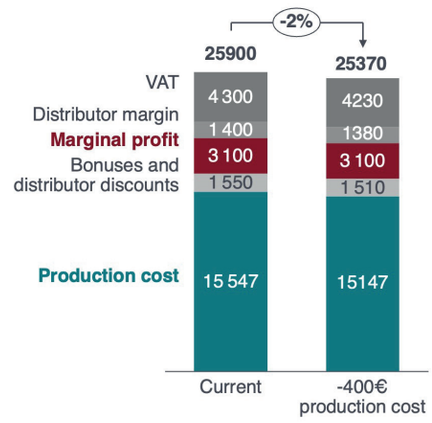
Example 1–increase profits by €400 (13% increase)

Retail price of B-segment vehicle (€TTC, France)



Example 2 – decrease retail price by €500 (-2% decrease)

Retail price of B-segment vehicle (€TTC, France)



Sources: C-Ways

To assess these sales strategies and the extent to which a difference in competitiveness can affect the market launch of products, we measured the price dispersion of a range of B-segment models in Spain and Germany.

	GERMANY	SPAIN
Average (€)	22 828	19 633
standard deviation (€)	1 876	2 339
Ratio (%)	5 %	7 %

➤ Models considered: Clio, C3, 208, Fabia, Ibiza, Polo, Mazda 2, i20, Corsa, Colt, Fiesta.

➤ Ratio when the models furthest from the standard deviation (e.g. C3 or Polo) are removed.

The average standard deviation of list or transaction prices for competing models within a country's market (recalculated to exclude models outside the standard deviation) is around 6%. For a mass-market carmaker, a competitive gap of 6% would potentially place it outside the core market. This is the case for the gap with China, which is therefore sufficient to explain offshoring, and for which we need to examine the specific tools that can protect the industry in Europe and France.

However, a competitiveness gap of 2.5% or 3% corresponds to half the standard deviation within the market of a single country, and less than a quarter if we consider several countries. In this case, we can assume that the success of the model is mainly due to other parameters: style and design, brand awareness, being "Made in France" or the environmental footprint of production, etc.

These consolidated results indicate that the gap with other European countries (2% with Slovakia and 2.5% with Spain) is not the reason for offshoring, but rather that they are the result of short-term (commercial) corporate strategies aimed at maximizing profit margins with the least effort, i.e. without working on the productivity of installed industrial capacity.

THE SPECIAL CASE OF PRODUCTION IN CHINA

China is potentially disqualified on environmental grounds or through reinforced mechanisms to protect the European market…

Historically, Asian imports (Japanese and Korean) have been mainly concentrated in the C and D-segments due to high logistics costs, the need to amortize investments and the cost of adapting to the EU's safety standards. A simple calculation and an analysis of the prices offered by the Chinese brands BYD and MG on the European market show that while the competitive gap is currently around 6% (including transport and customs) for A and B-segment cars, it would be around double that for C and D-segments, allowing for increased profit margins.

China is following the same pathway of exporting C and D-segment vehicles to Europe (very few Chinese A and B-segment cars are currently available on the European market). Until now, China has reserved its small vehicles for the Asian market, where fewer regulations mean higher profit margins in a large market.[56] Indeed, exporting to European countries would mean cutting back on low margins, given the costs of complying with standards and logistics,[57] which are virtually independent of vehicle size.

For these reasons it seems that Chinese manufacturers prefer to establish assembly plants in Europe for small vehicles, as shown by the BYD plant in Hungary: globalization rules in the automotive industry do not seem to change significantly with electrification; when volumes grow significantly and moving to smaller sizes becomes necessary, then exporting products from the other side of the world becomes marginal and most of the vehicles sold have to be assembled locally.[58]

Among the models offered by European carmakers, only the manufacturing of the Dacia Spring has been offshored to China. This production, initially for the Chinese market, has in fact struggled to find a demand in its country of production, and thus opportunistic exports into the European market began in 2021 to help meet the regulatory pathway of the CAFE standards (Corporate Average Fuel Economy - which imposes a maximum average emission level for vehicles registered in a year), making the Dacia Spring the cheapest electric model sold on the French market.

There has been no "Chinese invasion" of the small car market in 2024. However, it is necessary to use the available tools to protect against production being offshored to China, given China's favourable competitive position and the production overcapacity that currently characterizes the Chinese industrial base.

Several tools are available to encourage the establishment of the full or partial production of vehicles that are ultimately sold in Europe: customs duties, import bans, quotas, social or environmental criteria. For maximum effectiveness a selection of these measures can be envisaged without favouring one in particular, but with a clear understanding of the objectives and impacts sought. It must be remembered that these measures must be implemented within a negotiated framework (and not as part of a trade war involving retaliatory measures and counter-measures) thus enabling the proposal of a clear and predictable framework of new rules for both trade and industrial cooperation with Europe's partners. It is the long-term visibility of these rules that will secure investment decisions in Europe and make them acceptable to our non-European partners. In the view of the authors, the preferable measures are those that consist of defining the framework of Europe's demanding social and environmental agenda (a type of regulation - or taxation - based on an environmental or social rating).

A few ideas of this nature are presented below.

THE VALORIZATION OF VEHICLE ENVIRONMENTAL FOOTPRINT IN FRANCE AND THROUGHOUT EUROPE

According to our simulations, the competitive gap between France and China by 2030 will continue to be at least 6% for small cars and even higher for family vehicles. China's comparative advantages will be partly offset by additional logistics costs and customs duties that add to the production cost of vehicles to be marketed in Europe.

The first lever to restore the attractiveness of models produced in Europe, particularly in France, in comparison to cars that are not manufactured according to the same conditions or environmental requirements, is to highlight the environmental impact of vehicle and battery production.

Indeed, while the total life cycle carbon footprint of an EV is significantly lower per kilometre travelled than that of an ICE vehicle, it is nevertheless almost double for a small electric car if we focus on production

alone. Decarbonizing mobility therefore also depends on our ability to reduce the carbon footprint of the supply chain as much as possible (from the material extraction to vehicle assembly - all activities that our reference matrix takes into account).

The levers and strategies for decarbonizing the manufacture of a vehicle model are varied: first and foremost they include the ability to control the quantity of materials used (from this perspective, even for small cars, the size and power of the battery is critical). Increasing the proportion of recycled materials used in new vehicles also makes a major difference (the carbon footprint of materials derived from recycling is around half that generated by virgin materials derived from mining or, in the case of plastics, from crude oil). Finally, locating most of the production stages in countries or sites with higher proportions of low-carbon energy will also be decisive. On this latter issue Europe has a head start and, within Europe, France is one of the countries with the highest rates of carbon-free electricity.

Environmental ratings are the most appropriate tool for identifying and promoting the relative environmental performance of different vehicle production systems, through the use of labelling, taxes and regulatory tools. Such a tool has already been implemented in France in 2023, with fairly significant and immediate effects, because environmental performance is now a criterion for whether an ecological grant is awarded for the purchase or leasing of a new EV. It is also a criterion for a vehicle's potential eligibility for the social leasing scheme.

In France, the *bonus écologique* (ecological grant) is a subsidy for the purchase of EVs. Since October 2023, this aid has been conditional on the vehicle's environmental rating (eco-score). To be eligible, a producer must demonstrate that a car has a limited environmental impact during the production, assembly and transport stages.

In summary, the eco-score accounts for:

- the carbon footprint generated by the production of the steel, aluminium and other materials used in the manufacture and assembly of the vehicle,
- the production of the battery,
- intermediate processing and assembly,
- the distance transported from the assembly site to the distribution site in France, also giving consideration to the means of transport used (ship, train, lorry, etc.).

The allocation of this €4,000 grant, which can rise to €7,000 for those on lower incomes, has a significant impact on the cost to households, particularly for entry-level electric cars (costing under €30,000), which have a very high price elasticity.

The French government, via ADEME, has drawn up a list of models eligible for the ecological grant on the basis of their environmental impact.[59] This mechanism automatically excludes vehicles produced in China, which are ineligible due to their total production footprint and the fact that they are transported by ship. These vehicles are now on sale in France at higher prices than vehicles produced in Europe. For example, the Dacia Spring, produced in China and the cheapest electric car on the French market, no longer qualifies for the ecological grant.

Brand — *model*	**A-segment** — *Dacia Spring 45* — 26,8 kWh / 975 kg 14 kWh / 100 km		**B-segment** — *Renault Zoe R110* — 52 kWh / 1,502 kg 17.2 kWh / 100 km		**C-segment** — *Renault Megane e-tech* — 60 kWh / 1,624 kg 15.5 kWh / 100 km	
Country of production	EU	China	EU	China	EU	China
Eco-score (eligible for grant if >60	80	55	80	37	80	5

Models that receive the eco-score are shown in green.

In the table above, the environmental rating as defined by ADEME has been estimated for different vehicles marketed in France, depending on whether they are produced in France or China. Whatever the model, an ecological grant would not be awarded if it was produced in China.

Brand — *model*	**Renault** — *R5* —	**Dacia** — *Spring* — (Renault group)	**Peugeot** — *e-208* — (Stellantis)	**Citroen** — *E-C3* — (Stellantis)	**Leapmotor** — *T03* —	**BYD** – *Dolphin* –
Place of production	France	Chine	Slovénie/ Espagne (2024)	Slovaquie	Chine	Chine
Price	25 000	20 000 (2023)	34 000	23 300	26 000 (2023)	34 000
Price after €4,000 eco-score 2024 grant	21 000	18 900 (2024)	30 000	19 300	23 500 (2024)	34 000

Models that receive the eco-score are shown in green.

The €4,000 awarded as part of the ecological grant more than offsets the cost price advantage of vehicles produced in China, since in comparison the estimated 6% difference in production cost competitiveness corresponds to a capacity to lower the selling price by €800 in our example.

The prices of the Dacia Spring and Leapmotor T03 (which no longer benefit from the ecological grant following the introduction of the eco-score) have been lowered to remain competitive in terms of price. These price cuts, of €1,600 and €2,500 respectively, could drastically reduce the profit margins achieved on these models.

For these reasons we support the eco-score principle at the European level, and its use in other public policy instruments (company car tax, greening quotas for company car fleets, public fleets, Eurovignettes). The Mobility in Transition Institute recently put forward a joint proposal on this subject.[60]

THE CHALLENGE OF EUROPEAN-LEVEL CARBON FINANCING OR CARBON FINANCIALIZATION TOOLS: RESPONDING TO CHINESE SUBSIDIES AND THE IRA

Faced with the scale of subsidies provided by the Chinese government and in response to the US Inflation Reduction Act (IRA), which provides $369 billion (€348 billion) for green industry in the US, the EU has gradually become aware and convinced that the European Green Deal, its ambitious legislation to combat global warming, must be accompanied by equally proactive action on the industrial side to compete with the massive subsidies granted to companies and industrial protection measures in competitor countries.

Integrating carbon costs, or how to put a price on carbon

The carbon tax applies the "polluter pays" principle by making private actors internalize the negative externality of greenhouse gas (GHG) emissions. The inclusion of the carbon cost is an additional factor in the competitiveness of European countries with respect to China. Several carbon financialization tools have been implemented at the national level (e.g. Sweden's carbon tax) or at the European level with the Emissions Trading Scheme (ETS). From 2026, when the Carbon Border Adjustment Mechanism (CBAM) comes into

force, importers will also have to declare the quantity of emissions embedded in some primary products such as steel, fertilizers, electricity and hydrogen.

The CBAM has a threefold objective:

- To prevent the offshoring of greenhouse gas-emitting production, known as "carbon leakage";
- To generate revenue: the tool could be worth up to €10 billion a year for the EU budget, which is particularly needed to finance the post-Covid recovery plan;
- Lastly, the EU hopes to encourage producers in third countries to reduce emissions.

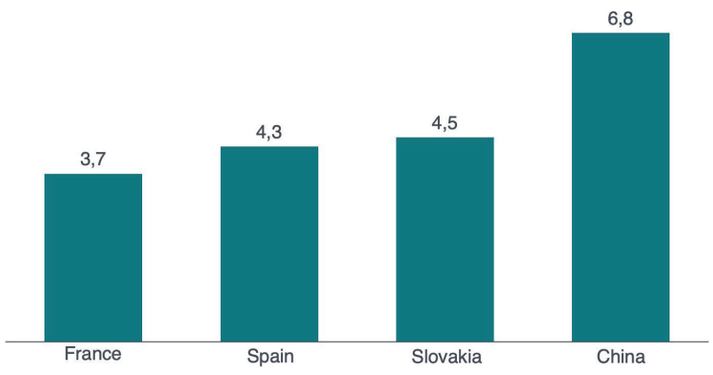
We have considered a scenario in which the price of a tonne of carbon is valued at €100, and we have measured the impact on French competitiveness (see graph below):

The negative impact for China is estimated at €302, which represents significant leverage on Chinese production if this impact is financialized. For Spain and Slovakia, the estimated differences of €58 and €72 respectively would be reduced if a differentiating valuation and calculation mechanism was introduced (this is not the case with the current eco-score, for example, which to date is based on European averages for the production of materials in the EU).

Assumptions

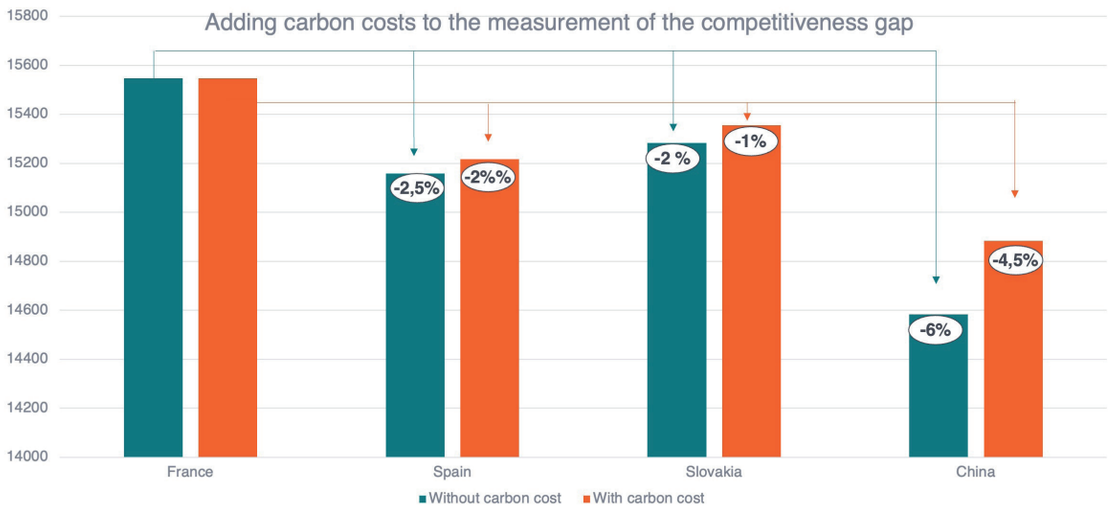
- Energy proportions used to make a car
  - 4,8MWh electricity
  - 6,3MWh gas
  - 0,78t coal
- Carbon content of each energy type
  - Gas: 230gCO2/kWh
  - Coal: 2,5tCO2/t
  - Electricity:
    - France: 70gCO2/kWh
    - Spain: 190gCO2/kWh
    - Slovakia: 220gCO2/kWh
    - China: 700gCO2/kWh

tCO2 per vehicle (manufacturing, excluding logistics)



Delta cost compared to France in € at €100/tCO2	58€	72€	302€

Incorporating the carbon cost will make France more compeitive compared to China (1,5 percentage points for €100 per tonne), and to a lesser extent to other european countries



Using customs duties to protect the European market

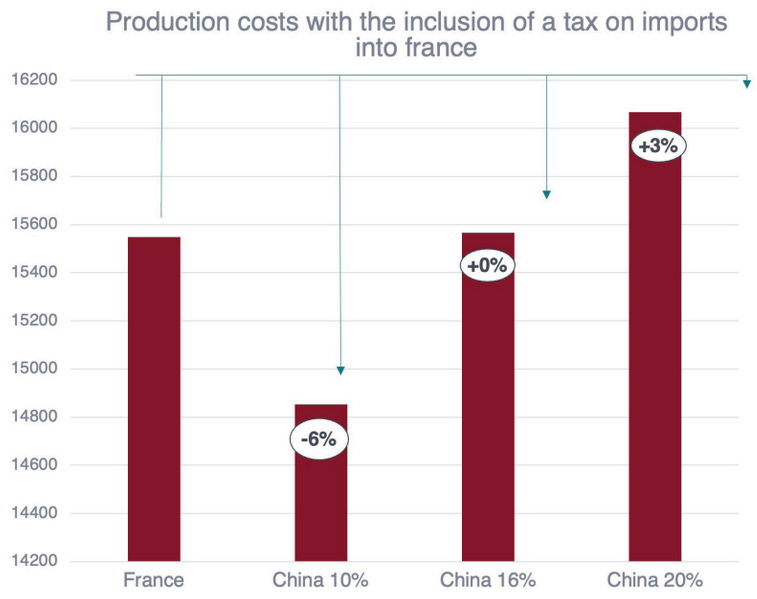
In addition to tools aimed at financializing the carbon footprint, the protection of the domestic market can be done through measures with a clear preference for local production, following the example of the measures implemented in the United States with regard to Chinese production.

Simulation 1

Increasing customs duties for vehicles

The United States recently announced a major increase in customs duties from 27.5% to 100% on imports of Chinese vehicles into the country. Batteries will also be affected.

In the EU, customs duties currently stand at 10% for a vehicle imported from Asia, but this could soon be increased. Since 6 March 2023, the European Commission has made Chinese EVs subject to registration, prior to the imposition of any additional customs duties, which would be justified by the amount of subsidies received by Chinese EVs exported to Europe.



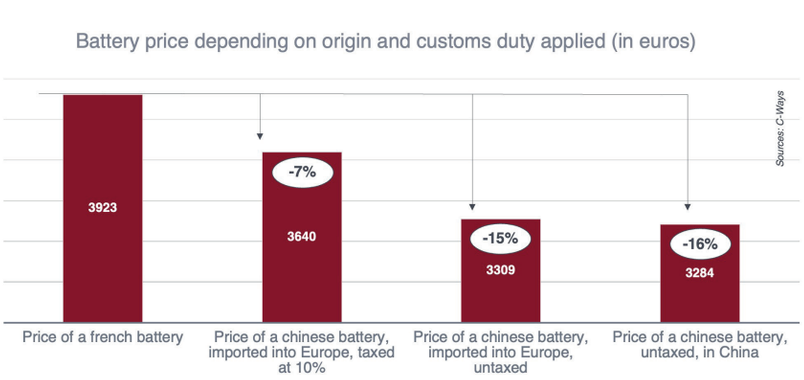
In our 2030 scenario, China, with a 10% tariff, has a six percentage point advantage in terms of production costs, which can be offset by raising the import tax to a minimum of 16%. In a scenario where customs duties are doubled to 20%, the competitive advantage is reversed in favour of France by three percentage points.

Simulation 2

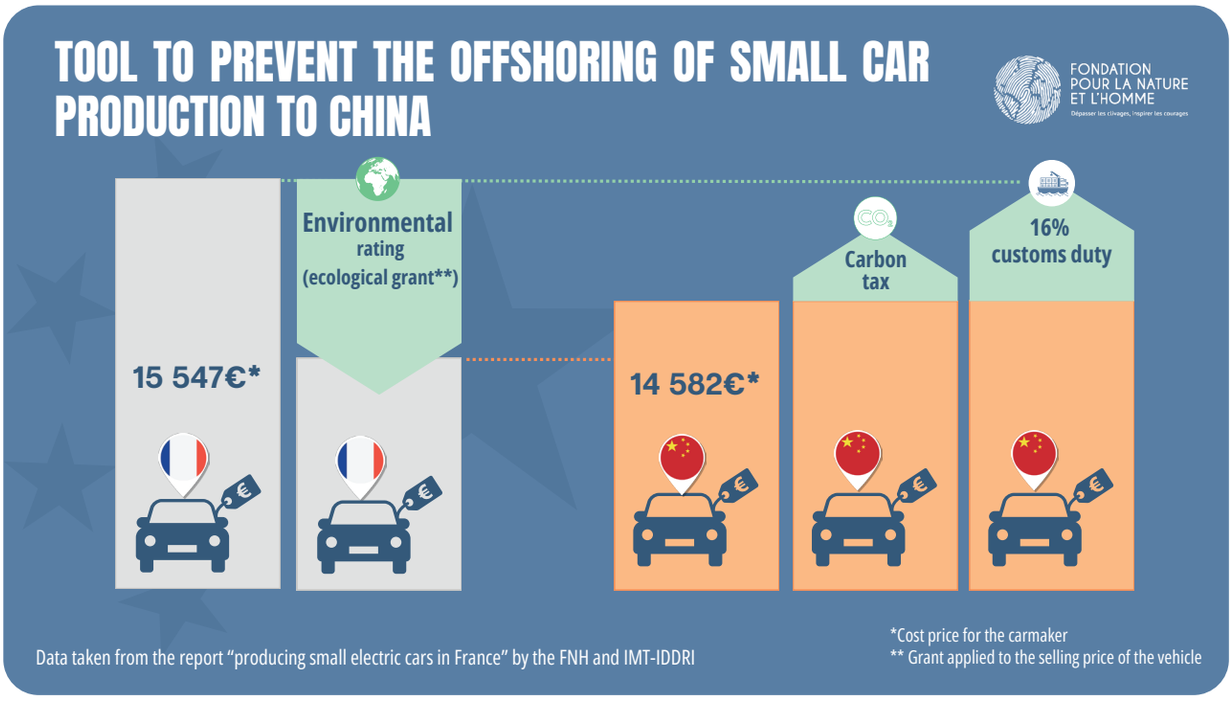
Introducing an import tax on batteries

An alternative solution to increasing taxation on vehicle imports would be to introduce a tax on batteries for vehicles assembled in Europe (currently 0% customs duty).

Today, the difference in cost between an imported Chinese battery and a French battery is around 15%, or €600.



Introducing a 10% tax on batteries would eliminate half of the price difference between a Made in France battery and one imported from China. In other words, the difference would be reduced to around €300.



Taking these factors together, we can see that the A and B-segment market can benefit from preference mechanisms that can go so far as to disqualify production that is entirely imported from China.

To succeed in the European market and be competitive, Chinese carmakers may instead opt to relocate their production to Europe, as BYD's plan to open an assembly plant in Hungary seems to demonstrate.

The European Union is currently developing tools to combat social and environmental dumping. In the view of the authors, it is important to ensure that these tools are designed to:

- be a part of a sustainable framework that affirms a long-term agenda for the EU that can secure investment or location decisions within Europe, and in France in particular.
- be comprehensible or negotiable with partner countries so that Europe's expectations and industrial ambitions are clearly expressed. Industrial collaborations with non-European countries should be encouraged for the same reasons, if they fill gaps or meet needs that are unavailable in Europe (i.e. the parts of the production chains that are not, or are only marginally, located/controlled in Europe), provided that the defined social and environmental criteria are respected, and that these industrial partnerships do not result in the offshoring of pre-existing resources in Europe. For example, the location of extraction and processing facilities for raw materials that are critical to the transition can just as easily be established in Europe as outside of Europe, with a fair distribution of added value.
- avoid trade wars involving retaliatory measures and countermeasures that could lead to higher prices for the products or technologies needed for the transition, or could weaken the European transition ecosystem by depriving it of access to certain key technologies or raw materials.

RESTORING CONDITIONS FOR LONG-TERM COMPETITIVENESS IN FRANCE

Beyond the relatively mechanical and static exercise of analysing the current (or five-year) production costs of the different countries studied, we need to go further by analysing the mechanisms that have led to the situation in which the French automotive industry currently finds itself, thereby enabling us to identify key avenues or measures for restoring a positive dynamic towards solid long-term competitiveness.

MANAGING OFFSHORING MECHANISMS THROUGH SCALE EFFECTS

In its July 2020 note,[61] the *Conseil d'Analyse Economique* (Council of Economic Analysis, CAE) highlighted the continual decline in employment between 2000 and 2018, amounting to a fall of 36%, against a backdrop of multiple cases of offshoring and high sensitivity to production costs. The report noted that the loss of competitiveness "is more visible for the production sites of French carmakers in France, compared to French carmakers producing vehicles abroad, and foreign carmakers producing in France. This fall in production has in turn amplified the decline in competitiveness through scale effects…"

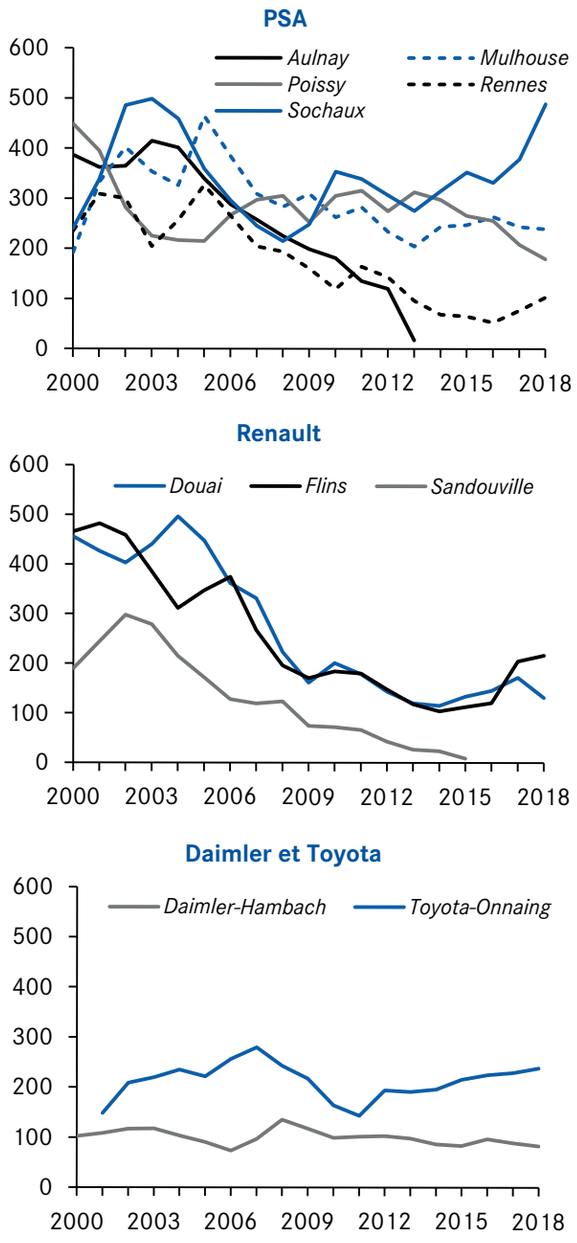
The CAE recommended encouraging car industry clusters in the north and east of France and "not trying to prevent the spatial reallocation of car production from historic sites outside of these clusters."

The CAE also advocated a cost-push shock. Modelling by the CAE estimated that a 1% increase in relative costs at a plant equated to an 8% reduction in the probability that the site would be chosen for a model's production.

Differences between carmakers

However, work on the comparison of the economic data with the statistics supplied by IHS have highlighted the differences in the pathways of French assembly plants:

CHANGE IN FRENCH CAR PRODUCTION (BY PLANT, BY CARMAKER), IN THOUSANDS



Figures for passenger cars only (excluding light commercial vehicles). The vertical axis corresponds to thousands of passenger cars.

Source: IHS-Markit.

The authors commented: "We observed a major difference between the massive fall in production by the two French groups, compared with the relative stability of the two foreign companies that have invested in France. In our model, this difference between the French carmakers (PSA and particularly for Renault-Nissan) and foreign carmakers (Daimler and Toyota) can only be explained by the fact that unit labour costs in Renault-Nissan's French plants are higher than in Daimler and Toyota's French plants.

This difference can be partly explained by the age of manufacturing sites: new plants are generally more efficient and better equipped than older ones. It can also be explained by the strong heterogeneity between the strategies of the companies.

- Indeed, **when Renault decided to offshore production of the Twingo, and later the Clio, Toyota decided to make use of the "Made in France" label and started producing the Yaris in France.**
- The massive decline in car production in France is linked to a strong trend towards offshoring that began in the early 2000s.

Highlighting the differences between what happened in the French plant at Onnaing in comparison to Flins, Douai, Poissy and Rennes seems to indicate that cost reductions are downstream of the location choice, rather than upstream: the report's authors stated that the "strong trend towards offshoring" generates the cost differentials that are supposed to explain it.

From the statement that "France can be a competitive production site, but French carmakers who produce in France have a competitiveness problem", it is tempting to conclude that Toyota has done everything right to ensure that Onnaing is competitive, while Renault and PSA have been less successful in this regard, leading to problems at their French plants.

On this issue the CAE report is quite explicit, offering the following analysis:

"Automotive sector competitiveness in each country can be broken down into two major factors:

- *low unit labour costs (wages divided by output),*
- *economies of scale, which reduce costs and are directly linked to the size of the national industry.*

These economies of scale are empirically well documented in the manufacturing sector: the productivity of individual plants increases (production costs fall) when nearby production increases. This is due to several types of localized spillovers that have been identified in the economic literature, such as more efficient sharing of intermediate goods, equipment and local infrastructure; more efficient local labour markets and training; and localized technological externalities where the clustering of companies encourages the emergence of new knowledge and innovations."

The report then indicated that the second contributing factor, which had been very positive in China, Spain and Slovakia, had been rather negative in the case of France, because the compensation of additional unit costs by the large size of the national industry was becoming less perceptible.

The report states that:

"The remaining competitive advantage for France is based on the size of its production base, which enables economies of scale to reduce costs. The countries that benefit more than France from this source of competitiveness are the United States, Korea, Germany and Japan. ***This source of competitiveness is fragile and declining because production in France has decreased: as production decreases, the interplay of economies of scale means that costs increase, further reducing the competitiveness of France.****"*

Following this line of reasoning, it is in the view of the authors that production cost differentials that we found to be detrimental to France are relatively limited and largely offset by a "size effect" that a French site could regain through the switch to electrification by reshoring a major part of B-segment vehicle assembly that was offshored 20 years ago. To give an indicative figure, in 2019 Head and Mayer provided an empirical estimate of scale effects which considered that, for the automotive industry, a 10% increase in national production reduced costs by around 0.33%: if we start from the 2020 situation prior to the Covid pandemic, production for passenger cars was around 1.4 million. **If the production of two or three B-segment models were reshored to France, an additional production of 700,000 vehicles could be expected, and if estimates are correct then the related reduction in costs would then be in the order of 1.6%, extrapolating the conclusions of Head and Mayer**.

VOLUME EFFECTS AND CONSISTENCY OF ALLOCATION

The attractiveness of France for automotive production is also negatively affected by insufficient agglomeration effects provided by production in France. External economies of scale are in fact the main determining factor for the competitive deficit of France compared with Germany, Japan and the United States.[62]

Social science research focusing on the car industry, on both business models and national models, has converged to show the existence of very powerful volume and agglomeration effects, the search for and permanence of which explain most of the geopolitics of the car industry. For example, in the Japanese and Korean cases, the search for sustainable solutions to the development of very large exports (to the US in particular) reflects the search to achieve a "minimum optimal size" which neither the national industry nor individual firms could achieve due to the relative limitations of the domestic market. In another area, in relation to Europe and how opportunities offered by the EU have been perceived and managed by countries and the companies of manufacturing countries, the work of GERPISA (International Automobile Network) has shown that Germany and France have diverged fairly widely since the EU's first enlargement.

Comparisons have shown that, like the VW Group which acquired Seat and then Skoda, thereby diversifying its range so that it could grow, German manufacturers have managed expansion as an additional activity, and the plants they have developed or taken over have not been put into competition with existing German sites, but have been complementary to enable the supply of associated volumes. Conversely, for French manufacturers, their Spanish and Eastern European plants competed with and, in effect, weakened their already established sites. At the same time, there was a clear trend towards disintegration, allowing suppliers to compete with each other, and the two movements combined to ensure that a culture of lowering costs through competition was embedded into management practices. Initiated with the EU's first enlargement, this culture went hand in hand with strong growth in the volumes sold by French brands in Europe until the 2000s, and did not prevent growth in French production.

From the 2000s onwards, despite the EU's second enlargement,[63] growth slowed down and inter-site competition led to a massive offshoring movement, the emergence of a loss-making commercial situation and the gradual departure of A-segment and then B-segment models to new Member States, and then to Turkey and Morocco. With the 2008-2010 financial crisis, the situation in Spain and massive unemployment led to a widening gap in competitiveness, fuelled by competition agreements and efforts by public authorities which redoubled the phenomenon, leading to the marginalization of the French sites in the industrial organization of the two manufacturers and to the process of B-segment vehicles being relocated away from the French plants.[64] Against this backdrop, the volume and cluster effects were reversed: while present in the Czech Republic, Slovakia and Spain, they ceased in France. This led to French sites weakening as they shrunk.

Similarly, in this situation of shrinkage, Tier 1 and especially Tier 2 and 3 auto parts manufacturers were subjected to very strong pressure on prices, even though they no longer produced the volumes. During the 2009 General Assembly on the Automotive Industry, French auto parts manufacturers highlighted these problems and the practices that required them to weaken their French sites by developing competitive sites in order to be chosen for programmes relating to French sites.

Initiating a positive volume shock

A "positive volume shock" is a virtuous circle that enables the improvement of the industrial competitiveness of a sector by establishing mutual trust among the actors involved, based on the long-term coherence of the industrial policy in place.

It is often initiated by "direct" measures to support competitiveness. However, the direct impact of these measures is less than the gains in competitiveness generated by the shock itself:

- **on capital expenditure**: the volumes involved make it possible to improve the utilization rate of legacy CapEx (particularly buildings, which account for around 50% of CapEx) and thus reduce their depreciation.
- **on operating expense**: confidence in future volumes prompts manufacturers to modernize their plants and to train workers, thus lowering production costs. This also encourages their suppliers (local auto parts manufacturers or suppliers of utilities and services) to invest in more productive solutions.

This type of shock is of benefit to the entire industrial sector through the cluster effect. Since 2000, France has experienced the exact opposite, with a fall in volumes, a loss of confidence and underinvestment by suppliers and equipment manufacturers, leading to higher costs and a loss of competitiveness.

THE BENEFITS OF PROXIMITY TO THE VALUE CHAIN AND THE MARKET

Synergy between design and manufacture

Although French carmakers seem to have learned how to supply the French market with A and B-segment vehicles from Slovakia, Morocco, Spain and Turkey quite efficiently, the work carried out on various innovative automotive projects has highlighted the virtues of co-locating the factories of manufacturers and, suppliers, together with design centres and the marketing and sales operations responsible for handling the finished product.

In a way, for French carmakers, the design teams have always been immersed in the main target market, which has been the French market. These teams have seen the factories move further away, but for a long time they have kept a part, even if it is only a small part, of the assembly capacity nearby.

To date, it would not be accurate to say that the total decoupling of design and manufacturing has been a real problem for the models produced by French carmakers. The issue is whether this will continue to be the case for the launch of new electric models produced from new dedicated platforms. From this perspective, Renault opted for proximity for the Zoe and Kangoo electric models, which facilitated industrialization and adjustments during mass production. The company made the same organizational choices for the R5 and 4L models, the strategic importance of which is well known. These are not models that used previously existing platforms able to produce an “electric variant”, as is the case for Twingo and the 208, 2008 and C3. Instead these models rely on specific platforms and batteries, the modules of which come from neighbouring gigafactories. Stellantis has postponed for a few years the launch of models for which a specific platform will be used, and for now is adhering to a “multi-energy” strategy, which means that factories in Trnava, Vigo and Zaragoza are assembling electric and ICE versions of the C3, 2008, Corsa and the 208 on the same production lines.

From this perspective, we can ask, in the case of Stellantis, whether the design of vehicles intended for assembly in Spain or Italy would benefit from being relocated outside France, to the heart of the industrial ecosystem that will support these models. From this point of view, the absence of Spanish design centres may ensure that French design teams working on vehicles intended primarily for France have a certain degree of continuity. The same cannot be said of Italy, where it might be considered that the Fiat teams are in a position to take over a large part of the work currently carried out by the French teams for the Citroën, Peugeot and DS Automobiles brands.

However, costs and the quality of products can only be controlled if factories are available and design teams are able to understand their characteristics and constraints. With innovative projects, such as the B-segment EV projects we see today that will continue for many years to come, proximity is either necessary or at least beneficial.

Positioning manufacturing close to the market

In markets marked by major commercial uncertainties and the need to respond by rapidly adjusting their offer, carmakers are very attentive to “time to market” and, in this context, shortening manufacturing, transport and delivery times is crucial. For this reason, there is little point in importing vehicles from the other side of the world unless the cost advantages are such that they outweigh the need to deliver within reasonable timescales and to adjust to competitors’ offers and promotions. For B-segment vehicles, supply is extremely abundant and competition is exacerbated. The ability to attract customers is relatively weak, and for these reasons there is a need to be more responsive than in other segments.

In this context, when 35% to 55% of sales are made in France, it may be a good idea to use French factories to shorten the time to market. Sales staff would then be able to ascertain how far along the production line are the vehicles with very precise specifications that their clients have ordered. On the other hand, if customers prioritize fast delivery times, they would be able to find out what cars have already been - or are soon going to be - produced. Given that none of the vehicles in these segments - apart from Toyota models - are currently assembled in French factories, having to explain to a customer that his or her car has not yet been put into production in a Turkish, Slovakian or Moroccan factory is not necessarily desirable. Whereas if the factory is in France, this traceability could be an additional selling point, as well as being “Made in France”.

For EVs, at both commercial and manufacturing levels, the risks of unanticipated difficulties are increased by the newness of the product, and the fact that, in the case of innovative products, customer expectations are not well identified because they will be revealed by the supply. In this context, having a production facility

located close to the main market can be a key competitive advantage, in this market and others.

The volume shock that would be created by localizing key B-segment models would enable a seismic shift to take place.

Encouraging carmakers to adopt a new industrial strategy, using Toyota as an example

Toyota, the world's leading carmaker in terms of vehicle sales, provides an interesting counter-example at its French plant. It shows that it is possible to build long-term competitiveness in a high-wage country like France, based on the company's solid commitment to the site to which it entrusts the assembly of large numbers of vehicles, and in which it invests regularly: a virtuous circle is established, linking production volumes, investment and competitiveness gains. Toyota assembled all of its Yaris models in France that were destined for Europe until the end of 2021, thereby ensuring that its Onnaing site had a stable and even growing volume of vehicles, which enabled ongoing investment and performance improvements that validated this strategy. The termination of the agreement between Toyota and PSA for the joint production of their A-segment vehicles (108, C1, Aygo) at the Czech site of Kolin led to the cessation of this production and the takeover of the entire site by Toyota, with the Yaris production starting there in November 2021. As a result, the Onnaing site was able to welcome the new Yaris Cross in April 2021, thereby increasing its volumes.

For R. Delaunay, Director of Toyota's Onnaing site: "The Onnaing site in France is more competitive than the Kolin site in the Czech Republic." Delaunay, who used to manage the Douai plant, considers there to be two keys underlying this performance, which French manufacturers should take into account:

- Toyota did not put the Onnaing site out to tender and assured its managers, employees and the local region that they would be entrusted to assemble most of the B-segment vehicles that Toyota would sell in Europe,
- Toyota has almost systematically retained the same suppliers, sharing this relative assurance of long-term production volumeswith them.

The results are clear: productivity is constantly improving and confidence is high throughout the supply chain. Long-term commitment results in a highly performing ecosystem that justifies the commitment: cost reductions are more likely to be found downstream of the location choice, rather than upstream. Conversely, the "offshoring trend" is justified by its proponents by the cost differentials it generates. As soon as a site is negatively affected by competition it results in an underutilization of capacity, overstaffing, a lack of recruitment and workforce ageing, underinvestment by equipment suppliers and sub-contractors: the deterioration in a site's performance according to its internal benchmark makes it less likely to be chosen to produce a model, etc. This is the culture that has plagued most French sites for the past 20 years, which is why electrification could be an opportunity for change.

BENEFITS OF AN INDUSTRIAL RESHORING POLICY: STABILIZING JOBS AND RESTORING TRADE BALANCE

Switching to electric by replacing internal combustion engines, gearboxes, exhausts and fuel tanks with a battery-motor system, significantly reduces the labour input of the vehicles produced, with all other factors being equal. However, given the trend in production and staff numbers over the last 20 years, it appears likely that French industry has no more to fear from electrification than it had from European integration as orchestrated and used by French carmakers.

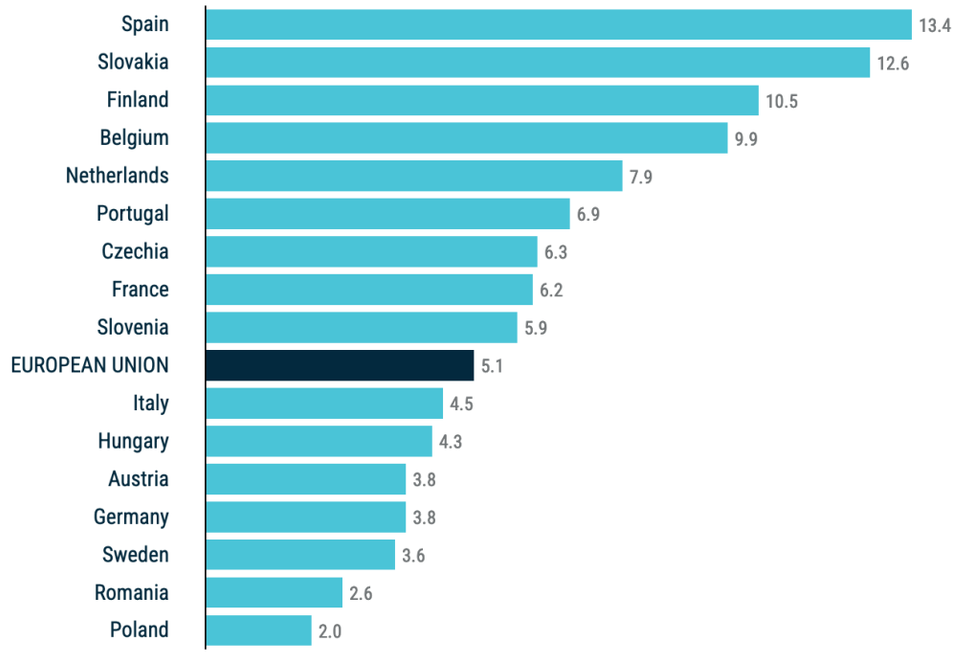
It is possible to reach the despairing conclusion that electrification will complete the destruction of automotive employment in France, which offshoring had begun, and that France will no longer be one of Europe's major car producers. We can also deduce from this that if electrification is used as a lever for reshoring, then the damaging effects associated with technological change could be offset if the above-mentioned volume shock was achieved. France would then have good grounds, in addition to reasons linked to ecology, to support the plan to electrify all vehicles sold by 2035, since the prospect would no longer be intimidating, but instead both socially and industrially desirable. Our focus is clearly on this second perspective.

To this end, we can analyse the French production of light vehicles in 2023, which was around 1.4 million, including 1.1 million French brands, for total employment in the automotive industry (car construction and parts suppliers) of just over 200,000 employees. This employment includes jobs in factories, company headquarters and design centres.

As shown in the graph, the fact that the French ratio is half that of the Spanish and Slovakian equivalents is a clear indication that the majority of French jobs are not in production, as our work on comparative labour costs has already suggested.

VEHICLE PRODUCTION PER DIRECT AUTOMOTIVE MANUFACTURING EMPLOYEE

By country / 2021



We set out to determine the extent to which localizing production in France could offset the loss of direct jobs associated with the transformation from ICE vehicles to EV assembly lines. To do this, we used our matrix to calculate the FTEs that could be financed by manufacturing a vehicle in France, based on the labour costs identified. Having done this for the EV (see table below), we assumed that, excluding the powertrain, the jobs associated with assembling an ICE vehicle and an EV in France are comparable: since, for 1,000 EVs, we arrive at 37 FTEs, 6.5 of which are linked to powertrains (battery, motor and power electronics), the "excluding powertrain" figure is 30.5 jobs. The FNH - CFDT study in 2021 calculated 21.6 jobs for 1,000 diesel powertrains and 15.7 for petrol. We assumed 20 FTEs for an ICE powertrain, i.e. 13.5 more than the electric equivalent, and considered that 1,000 ICE vehicles generate 50.5 direct FTEs.

	For 1,000 cars		For 250,000 cars	
	Carmaker jobs	Auto parts manufacturer jobs	Carmaker jobs	Auto parts manufacturer jobs
Battery				
Engine	1,3	-	331	-
Power elec	-	0,8	-	202
Cody	4,5	-	1 137	-
Chassis	3,8	2,2	947	555
Seats	-	4,8	-	1 211
Interior	-	0,9	-	227
Low Volt Elec	-	-	-	-
Cables	-		-	-
Thermal	-	2,6	-	646
Assembly	11,4	-	2 841	-
Jobs	21,0	15,8	5 256	3 950
TOTAL	**37**		**9 206**	

On the basis of an annual production of 1.3 million vehicles, we estimate the number of jobs directly linked to assembly at nearly 70,000, on the basis that we only consider here the direct jobs in car and equipment manufacturing,65 and do not include tertiary jobs such as those linked to design, to activities at the Group's head offices or to bodywork.

Loss of jobs when switching from ICE to EV

	ICE vehicle emplomentindex		EV employment index
1,000 vehicles	51	-28%	36,8
1,300,000 vehicles	66 300		47 800

In terms of the employment index per 1,000 vehicles, an assembly line for 250,000 EVs would generate around 9,200 direct jobs (carmaker and auto parts manufacturer; see table above), compared with 12,700 for ICE vehicles (i.e. EVs create 28% fewer jobs).

Based on these assumptions, with the switching of French production lines to EVs, the number of jobs would fall from 66,000 to 47,500, representing a loss of 18,500 jobs.

Faced with these foreseeable losses resulting from the switch from ICE vehicles to EVs, which have a lower employment intensity, we can assess the level of industrial reshoring that would compensate for this, by increasing production volumes of A and B-segment vehicles, without losing any jobs: since 1,000 EVs assembled in France represents 36.8 jobs, to regain the 18,500 jobs losses resulting from the switch to EVs would require an additional 502,717 vehicles to be made. This corresponds to two or three B-segment

productions: in 2023, European sales of the Sandero were 234,000 (second in the sales charts) while Yaris Cross sales reached 176,000 (eighth).

For this reason, in line with the French government's target of producing two million EVs by 2030,[66] the authors of this study support the production reshoring of a further 700,000 A and B-segment vehicles, bringing the number of cars produced in France to two million by 2030 and (based on our assumptions) boosting industrial employment in the sector. It should be noted that the job gains associated with these very significant increases in production volumes are modest, however this is partly because of the lower employment intensity, which means the differences in competitiveness that we have calculated appear to be so limited.

Jobs created by relocating 700,000 EV (B-segment)

	Number of jobs
1,300,000 EVs produced in France	47 800
700,000 EVs reshored to france	25 800
Total	**73 600**

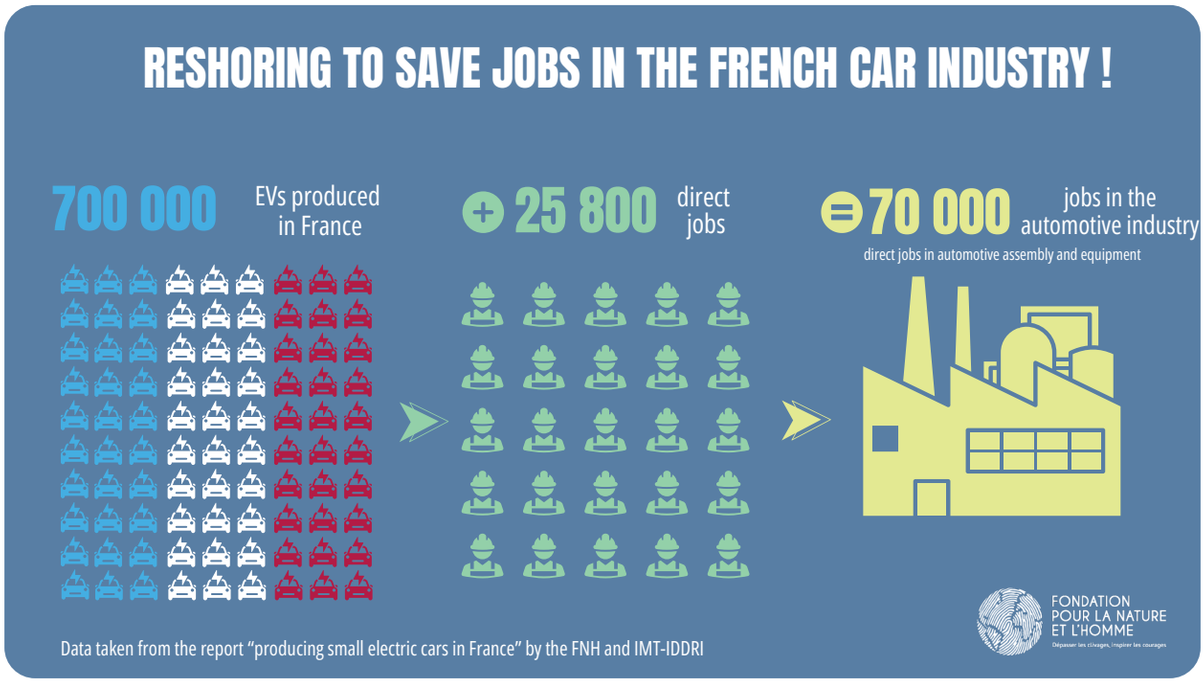
Other industries are developing around the electrical value chain for the installation and maintenance of charging stations, as well as recycling, which is estimated to have the potential to create 9,000 jobs by 2035.[67]

Beyond the essential question of jobs, the reshoring of small EVs would make it possible to reduce the trade deficit of France and preserve its technological sovereignty.

The French foreign trade deficit in the automotive sector regularly reaches new lows.[68] The trade balance for automotive products turned into a deficit from 2008 onwards, reaching €10 billion in 2018. The automotive trade deficit has continued to deteriorate, reaching €23 billion in 2023, or more than 20% of the French trade deficit.

This deterioration in the trade balance for cars is primarily due to EVs, with imports rising three times faster than exports over the period 2017-2023.[69] Thus, net imports of new EVs accounted for 72% of new EV registrations in the first half of 2023.

At a pre-tax vehicle price of €20,000, the reshoring of 700,000 vehicles would reduce the trade deficit by €14 billion. Keeping production in France and securing the long-term location of engineering, and therefore of the technological expertise associated with battery-powered vehicles, is a major challenge for the battery industry and for the automotive sector. This is particularly crucial given that the switch to EVs is a major lever in the decarbonization of transport.



roadmap

This analysis provides a clearer understanding of the issues surrounding the competitiveness and location of automotive production in France and Europe. It shows how electrification, with the new cost structures it implies, can be a source of opportunity.

The economic data, obtained through an analysis of the sensitivity of manufacturing costs to key competitiveness factors, shows that, once fine-tuned and projected over time, the competitiveness gap between French sites and their European competitors amounts to only a few percentage points (between 2% and 3% by 2027-2030). This gap can be further reduced by volume effects or access to decarbonized energy that is sustainably competitive. This is particularly true for vehicles in A and B-segments, which represent the priority in terms of supply to enable a more inclusive transition to EVs that is more respectful of planetary boundaries.

A comparative analysis of the sales prices of comparable models (A and B-segments) on the European market shows that the differences are much smaller than the standard deviation of prices in the various Member States, and therefore do not in themselves justify reshoring production facilities outside France. For vehicles produced in China, there are a number of commercial and fiscal levers available to offset all or part of the competitive differential measured (between 6% and 10%). Customs duties can play a role, and we show that an increase from 10% to 16% can close the competitiveness gap for the vehicles studied. Taxation or regulation aimed at internalizing negative externalities would enable the discrimination between vehicles according to their environmental footprint or performance. The example of a Europe-wide eco-score would favour European production, and French production in particular. In the view of the authors, this proposal is a priority, given that it would provide a framework for investment and co-investment in Europe aimed at environmental excellence. It would strengthen and complete the European industrial ecosystem, which is still lacking or lagging behind in certain stages of the battery production chain.

A historical analysis of the industrial strategies implemented by European actors over the last 20 years clearly shows that the main lever for restoring and improving competitiveness in a country like France lies in the anticipation, consistency and knock-on effects of production allocations and investments to consolidate a high-performance ecosystem over time.

The socio-economic conclusions in terms of the number of jobs created or preserved, as well as the induced balance of trade or budgetary effects, demonstrate the value for the French State (or the European authorities) in investing in the development of this industrial sector which is undergoing major change. To achieve this, there are two complementary areas of action: direct support for new plants, and support over time for recurrent demand targeted at small vehicles with high environmental performance, to enable economic actors to invest strategically.

Our main recommendations to the French government, Europe, the regions and to economic actors relate to these different areas of intervention. Coordination and collaboration between these geographical levels and private and public actors are essential.

Recommendation 1

Redefine the rules governing trade and industrial cooperation with certain non-European countries, particularly China

Europe is the only level capable of conducting policy and global negotiations on these issues with other regions of the world, and it must define the social and environmental agenda that will provide a lasting framework for trade relations and industrial cooperation with the rest of the world.

A central issue is the fair distribution and localization of the added value created. Europe must define trade rules with countries that have strong industries and investment resources, such as China, that are in line with its economic interests (principle of reciprocity, strategic autonomy) and its environmental commitments.

Integrate the environmental footprint and financialize the carbon performance of vehicle and battery production, and define regulatory targets

Similarly to France, Europe must commit to developing standard, shared tools for assessing environmental performance in production: **setting up a Europe-wide eco-score, taking into account the carbon cost** associated with the definition of progress trajectories and valuation levers that are stable over time (via labelling, differentiated taxation or regulation). The authors believe that Europe's environmental and social agenda, particularly in terms of the industrial transition, must continue to be clarified and explained in such a way as to make domestic production more attractive and, consequently, to facilitate decisions on investment or on production allocation in Europe for future models.

Use environmental conditionality clauses (including eco-score) to steer public procurement or private fleet purchases towards French and European production

The stakes are high: public procurement70 accounts for 10% to 20% of GDP in EU Member States. The French Green Industry Law, adopted in October 2023, took a first step in this direction through the creation of a label that enables the integration of environmental criteria into public procurement.

For company fleets, the aim is to impose quotas for zero-emission vehicles to implement when renewing fleets that exceed a certain size (over 100 vehicles, for example, in France under the Mobility Orientation Law (LOM), which still lacks a penalty system to be truly effective).

Leverage customs duties and restrict the export of strategic waste

Raising import taxes on EVs to between 15% and 17% (compared with 10% today and 27.5% in the United States) to encourage local production and reduce the competitive gap on imported products that benefit from subsidy or aid schemes that do not apply in Europe.

Customs duties could also be considered for batteries used in vehicles assembled in Europe (currently 0% duty).

Finally, to consolidate the activity of recycling and refining critical metals and to encourage the sustainable establishment of this upstream segment of the battery industry (currently only present in a fragmented way in Europe), targeted measures to **restrict the export of strategic waste** to support a European circular economy should be envisaged, such as an "export ban" on active materials from battery recycling or waste from European gigafactories.

Recommendation 2

Support industrial transformation as part of a coordinated transition project

Prevent intra-European competition from replacing global competition, which is synonymous with dumping and offshoring between European countries and overcapacity

Europe-wide planning should be implemented to coordinate national reindustrialization strategies. This planning should aim to create synergies, avoid redundancies and overcapacities, to maximize the sector's industrial legacy and to establish a complete industrial ecosystem on a European scale. It should also reinforce the territorialization of public policies to improve the productive specialization of regions. This clustering effect could be supported by European funding outside of the state aid permitted by the European framework. The aim would be to create synergies to strengthen the French industrial transition project, based on the idea of an "Airbus for small electric cars" in Europe. The Airbus reference relates to how this world-leading company, which has its main offices in France, has benefited from the simultaneous leverage of scale effects and State aid (in a coordinated manner, and not in a scattered way or in competition across Europe, as is currently the case).

Maintain a competitive price for decarbonized electricity

Long-term electricity supply contracts for industry, with guaranteed prices for five years should be promoted. These contracts, which should be linked to decarbonized energies, will enable industrial customers to secure their electricity supply costs, giving them greater visibility for investment. They are also an opportunity to accelerate the development of renewable energies in the French electricity mix. Lastly, this would be a way to guarantee more efficient production in France and Europe in terms of the ecological footprint, and therefore the production of a more valuable product on the European market.

Redeploying tax on profits

The impact of production taxes, as a percentage of a company's added value, objectively demonstrates that France imposes a fairly high level of taxation on added value. The trend is for these taxes to fall, with the announced abolition of the CVAE (company added value contribution) in 2027. To avoid tax losses, **an increase in the taxation of profits (corporation tax) would be favourable** and more consistent than a tax on added value that can penalize investment and innovation by not allowing time for companies to become profitable.

Protect Europe's nascent battery industry by completing the ecosystem, both upstream and downstream:

Anticipate and support R&D, innovation and training to develop technological and industrial expertise for the entire battery ecosystem (and not only gigafactories). While 70% of these operations are carried out in China for all global production, the supply chains for cathode active materials (CAM), pCAM (CAM precursors), refining and recycling are the new challenges for a competitive industrial ecosystem in Europe. It is a question of autonomy, but also of R&D proximity and the optimization of synergies with a view to creating material loops (an objective supported by battery regulations).

Secure faster and easier access to capital for gigafactories and upstream (refining, mining, CAM) or downstream (recycling) projects:

- Make the granting of direct aid (state aid, the French Public Investment Bank, or the European Investment Bank) conditional on a firm commitment from the customers of actors within the new ecosystem: a commitment to maintain a stable level of capital involvement, off-take agreements or medium-term allocation commitments (battery models). Around three-quarters of the announced capacity has yet to be financed.
- Creating building leasing systems should be proposed to de-risk projects. Gigafactory buildings represent up to 60% of initial capital.

Recommendation 3

Redirect supply and demand towards A and B-segments in France

The trend towards SUVization runs counter to the decarbonization of transport. The strategic choices initially made by manufacturers have shifted the EV offer towards C, D and E-segments. This trend must be reversed if we are to move towards a more inclusive transition that consumes fewer raw materials. The conditions at this moment are suitable for bringing smaller vehicles onto the market, which also offer reasonable margins for manufacturers.

Set a clear course and plan for the medium and long term

- The government should strengthen its expression of support for the location, production and consumption of small cars through the work of the *Secrétariat général à la planification écologique* (Secretary General for Ecological Planning, SGPE) and budgetary guidelines.
- A conference for the automotive sector should be organized, based on the recently adopted industry contract. Such an assembly would take stock of the sector's situation and identify priorities for supporting the industry over the next five years. This conference should bring together the industry's economic actors, civil society and local actors who are involved in both industrial policy and urban or transport policy.

Consolidate demand for A and B-segment EVs on the French market

- A weight penalty should be applied to EVs and a gradual weight reduction pathway should be defined. A pathway of this nature currently exists, but it only applies to ICE vehicles.
- The weight criterion should be lowered to 1,800 kg when calculating the number of vehicles eligible for the ecological grant, to bring an end to the subsidizing of models that consume too much energy. The current weight criterion for vehicles eligible for the grant is 2.4 tonnes, which is not very restrictive.
- A progressive eco-score that supports A and B-segment cars produced in France and Europe should be introduced (with the inclusion of a weight criterion), thereby strengthening the consistency between the score and the amount granted.

The environmental rating should be extended to other tax policy instruments,

such as the tax on the use of vehicles for economic purposes (French tax on company vehicles, TVS) to have an impact on company car fleets, which account for half of all new passenger car registrations in France annually.

Make social leasing a tool that is not only inclusive but also an industrial policy lever

The social leasing mechanism is largely financed by the State budget, which is therefore entitled to determine the conditions for vehicle eligibility. The aid mechanism and the negotiated amounts make it possible to discuss the margins of each of the actors involved. Aimed at low-income households, the scheme is largely designed to provide access to small cars.

Our systemic vision of decarbonizing mobility. *Implementing measures to promote car alternatives and a modal shift to decarbonize our transport systems*

To reduce the carbon footprint of transport, the FNH and the IMT stress the importance of activating several levers:

- Reducing distances travelled and number of journeys (reducing the number of trips, shortening distances, creating multifunctionality);
- Encouraging a modal shift and the development of car alternatives;
- Decarbonizing through the electrification of transport and the reduction of vehicle weight.

The FNH and the IMT are committed to decarbonizing our transport systems, with a number of measures designed to encourage a modal shift and support alternatives to private vehicles:

- Voting for an investment budget of €3.3 billion annually between now and 2030, which is needed to enable all citizens to benefit from safe cycle path networks for their daily lives and leisure activities.[71]
- Ensuring that the investment promised as part of the rail plan, announced in 2023 by the then Prime Minister of France, Elisabeth Borne, is implemented. And to provide financial support for the development of the 13 SERM networks, the cost of which is estimated at between €700 million and €1 billion per network.
- Make roads a mode of public transport: develop high-frequency express coaches to link urban centres with suburban or rural areas, and incorporate car-sharing as a public transport solution to enable its development throughout regions.
- Support the development and structuring of an intermediate vehicle sector. This will facilitate the transition to electric mobility, which is particularly well suited to light vehicles.[72] Such vehicles are financially more accessible and more environmentally friendly, their light weight reduces other positive externalities such as emissions linked to the wearing of brakes and tyres, which are major factors in air pollution.
- Uncap the mobility payment to help develop public transport in all areas and create a solidarity mechanism in the form of a national or regional fund to equalize mobility payments, ensuing that local authorities, which currently cannot access the payments, can also benefit.
- Make the sustainable mobility package compulsory to promote alternatives to private cars.
- Introduce a regional climate ticket to improve access to everyday transport and ensure fair and transparent pricing.

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Recognized as a non-profit, non-partisan and secular organization, the Fondation pour la Nature et l'Homme has been working since 1990 to ensure that ecological solutions become the norm in our lives, without leaving anyone behind. By putting people at the heart of its actions, it removes the economic, political, psychological and social obstacles that stand in the way of this vision, which is the only choice for the future.

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The Institut mobilités en transition (IMT) is an offshoot of IDDRI (Institute of Sustainable Development and International Relations), dedicated to the transition of the mobility and transport sector. Its ambition is to objectify the environmental, social, industrial and political issues at stake, in order to facilitate the operational implementation of the transition required by the climate emergency and defined by the French and European regulatory framework.

As both a platform for dialogue and a place for producing analyses and recommendations, IMT-IDDRI aims to clarify the understanding of public decision-makers and facilitate dialogue between actors. The work is based on multi-stakeholder consultation, within a platform that brings together actors from different backgrounds to exchange views in a safe environment, on the expertise of a team of cross-disciplinary researchers, and on an exhaustive database of the French road fleet. At the same time, IMT-IDDRI is working on a number of specific themes through various French and international collaborations.

https://institut-mobilites-en-transition.org

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