



EurotaxGlass's Report

Electrification of the Automotive Industry – The European Consumer's View

Maintal
March 2011

 **eurotaxGLASS'S**
Automotive Business Intelligence

Introduction

Times are green

Times are definitely green – the return of the ‘eco carriage’ is possible. Car makers are launching more and more electric and hybrid vehicles. The media is covering these topics extensively. Governments are subsidising the industry and purchases of vehicles with alternative powertrains. Finally, the European Parliament increased regulatory pressures by demanding the car industry achieves the target of 130 g/km CO₂ by 2015 and 95g/km by 2020.

However, the real question is: Is the customer ready to buy electric vehicles? And more importantly, are they willing to pay more for them?

EurotaxGlass’s addressed this question working together with Harris Interactive. Answers were presented during the Business Intelligence Forum “*Electrification of the automotive industry - mass market or niche player?*” hosted by EurotaxGlass’s. In preparation of this conference, Harris Interactive conducted a survey to understand the consumer’s view of the electrification of the automotive industry. To that end, 5.253 consumers¹ were interviewed in France, Germany, Italy, Spain and the United Kingdom.

For more information on this whitepaper please contact:

Michael Kleber

Project Manager Consulting & the paper’s author

EurotaxSchwacke GmbH
Global Services Division
Wilhelm-Roentgen-Strasse 7
D-63477 Maintal
Phone +49 (0) 6181 405 245
Email michael.kleber@eurotaxglass.com

¹ The research was conducted using the Harris Poll Pan European Omnibus between 15th and 21st September 2010; all interviews were with adults aged 16-64; all data has been weighted and projected to the general population in the big 5 European markets

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Summary

The Findings:

1. Consumers are curious about electric and hybrid vehicles and state that they would consider buying them
2. Consumers' consideration is driven by concern for the environment
3. Consumers which are more familiar with electric vehicles show lower purchase intention
4. The stated purchase intention supports electric vehicle sales forecasts
5. Consumers expect significant savings of running cost with electric vehicles
6. Consumers are willing to pay a premium for electric vehicles
7. More consumer education is required – along with an accelerated development of this new technology

Consumers' View

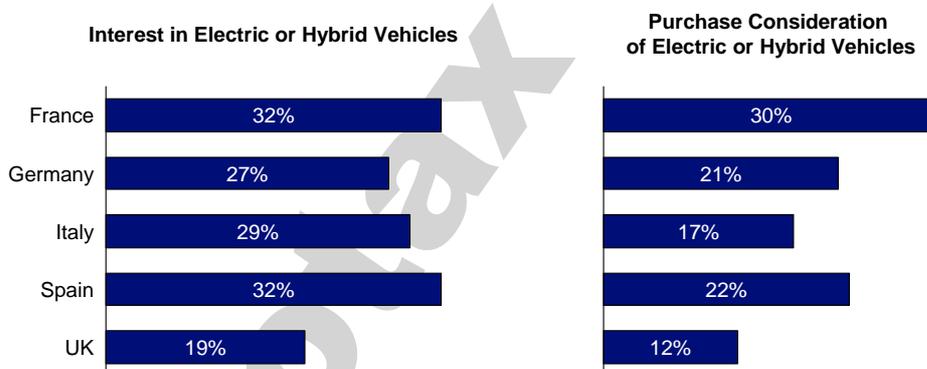
Finding 1:

Consumers are curious about electric and hybrid vehicles and state that they would consider buying them

Alternative powertrains are still a new concept for consumers, successful introductions of hybrid vehicles notwithstanding. In particular, the electric vehicle's long-term prospects are still unclear. For manufacturers, the key to success will be to understand customers and to promote a high level of acceptance for the new technology.

In our joint survey with Harris Interactive, we asked consumers across Europe about their interest in electric and hybrid vehicles as well as whether they would consider purchasing such a vehicle. To determine interest in electric and hybrid vehicles consumers were asked whether they took actions to increase their knowledge like fact finding or test drives. Purchase consideration was determined by asking consumers whether they would consider purchasing an electric or hybrid car in the near or longer term. The survey showed a great openness and curiosity from consumers towards alternatively powered vehicles (Fig. 1).

Fig. 1 – Interest in and purchase consideration of electric and hybrid vehicles:



Base: 5,253 interviews conducted in France (1,102), Germany (1,029), Italy (1,060), Spain (1,006) and UK (1,056)

Note: Question asked: "Which of the following actions have you ever undertaken in relation to electric or hybrid cars?"; participants could choose all applicable activities from a list of answers for interest ("researched facts and figures", "obtained pricing", "obtained technical info", "test drove") and purchase consideration ("considered buying in more than 2 years", "considered buying in 1-2 years")

Source: EurotaxGlass's & Harris Interactive Consumer Survey (2010)

As Fig. 1 shows, purchase consideration is particularly high in France and Spain and lowest in the United Kingdom. The high interest in Italy and Spain is offset by low conversion rates to purchase consideration. The high conversion rate of interest to purchase consideration in France (94%) is particularly striking: High conversion rates indicate that consumers who have

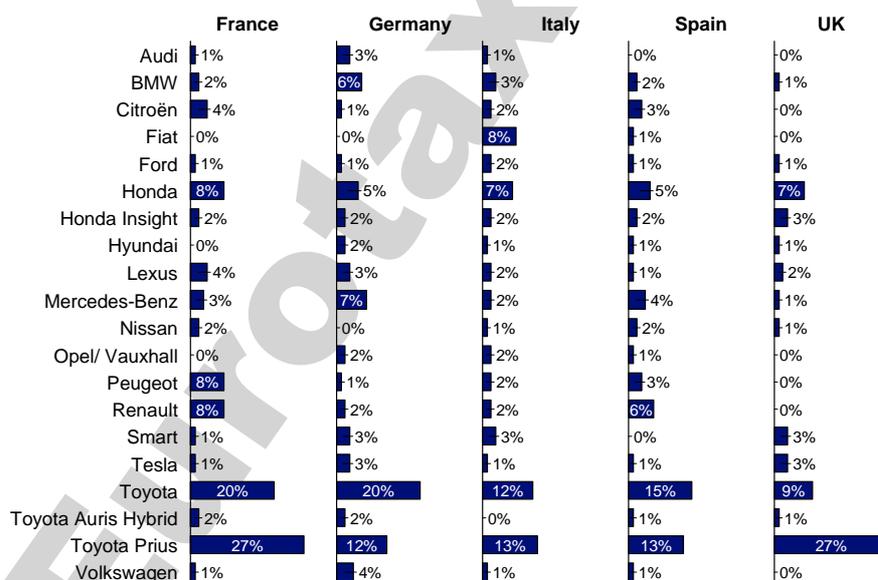
French consumers have a particularly high conversion rate of gathered information into purchase consideration.
(EurotaxGlass's, Harris Interactive)

gathered information on electric and hybrid vehicles assessed this information positively. For instance, in France 32% of consumers are interested in the vehicles and 30% would consider buying them, i.e. 94% of interested consumers advanced to the consideration stage. In spite of the significant differences in these scores between countries, which do point towards different levels of industry maturity and consumer acceptance of these new technologies, results point out one thing in particular: The openness of the consumer towards alternative powertrains is much higher than the current market shares of these powertrain types. And this is true across markets.

The interest in electric and hybrid vehicles seems to be related to vehicles already available or planned to be on the market. Fig. 2 displays those car makers and brands in the field of electric and hybrid vehicles that consumers mentioned first when asked about brands or models of electric and hybrid vehicles they know. Toyota stands out in all markets, while local champions register more strongly in their home markets. This indicates the marketing success and especially the press coverage in these markets. Unsurprisingly, Citroën, Peugeot and Renault create their highest awareness in France. Renault also fares quite well in Spain where its footprint is strong. Similarly, Fiat's products gather highest awareness in Italy in the same way that BMW's, Mercedes-Benz's and VW's models do in Germany.

Consumers are most aware of electric and hybrid vehicles of local brands – with the exception of Toyota and the Prius which stands out in all markets.
(EurotaxGlass's, Harris Interactive)

Fig. 2 – Awareness of brands of electric and hybrid vehicles:



Base: 5.253 interviews conducted in France (1.102), Germany (1.029), Italy (1.060), Spain (1.006) and UK (1.056)

Note: Question asked: "Which makes or models of electric or hybrid cars can you think of?"

Source: EurotaxGlass's & Harris Interactive Consumer Survey (2010)

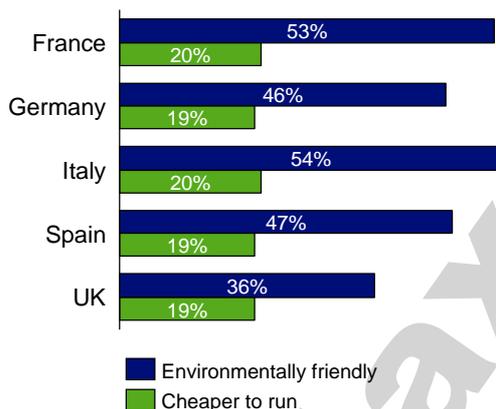
Regarding Toyota, consumers are almost equally aware of the Prius and the Toyota brand itself. This differs from country to country: In the UK, the Prius seems to be holding its own without a strong Toyota brand awareness while in Germany the Toyota brand registers more strongly than the Prius name. Honda has been able to create awareness for the Honda brand in all markets but not for the specific hybrid model, the Insight.

Finding 2:

Consumers' consideration is driven by concern for the environment

In the survey, consumers were asked for their rationale behind considering purchasing electric or hybrid vehicles. Fig. 3 shows the two top reasons consumers stated when asked for their main reasons to consider buying an electric or hybrid vehicle. "Environmentally friendly" was the top reason across all markets. "Cheaper to run" was second-most stated reason. No other reason was named by a significant share of consumers.

Fig. 3 – Most stated reasons for purchase consideration of electric or hybrid vehicles:



Base: Respondents considering to buy an electric car as their next vehicle in France (153), Germany (93), Italy (142), Spain (199) and UK (133)

Note: Question asked: "You say that you would consider buying an electric car. What are the main reasons for this?"

Source: EurotaxGlass's & Harris Interactive Consumer Survey (2010)

The initial driver for consumers to consider the purchase of an electric or hybrid vehicle is the environmental friendliness of these vehicles. Concern for the environment is a significantly stronger driver of consumer interest and stated purchase consideration than the expectation of lower running costs.

In this early stage, consideration is less driven by economical reasoning than ecological conviction.
(EurotaxGlass's, Harris Interactive)

This picture is not surprising for a market or product in a very early stage – electric vehicles are still extremely new while hybrid vehicles are commercially available for more than a decade. Depending on the market stage of a product specific unique selling propositions are of higher relevance than on the mass market of mature and established products. In the current early phase of the alternatively powered vehicle market

environmental friendliness is the unique selling proposition that attracts interest in these vehicles showing a clear prevalence over economical considerations.

The fact that 20% of consumers state lower running costs as a reason to consider buying alternatively powered vehicles poses a challenge for manufacturers. While fuel and other running costs for electric vehicles are (currently) lower, purchasing costs are significantly higher. Fig. 4 shows one result of EurotaxGlass's and BDW Automotive's joint study "Alternative Powertrain Vehicles in Europe": With the current cost structure, Electric vehicles will not reach economic viability with an annual mileage of 10.000km. To reach an economical viable annual mileage will be challenging for the average commuter as it would require an average daily mileage of about 45km for each of 220 working days. Depending on market characteristics and holding period a breakeven can be reached by about an annual mileage of about 15.000km

Annual mileage of around 10.000km does not suffice for a TCO breakeven of electric vehicles versus ICE-powered vehicles.
(EurotaxGlass's, BDW Automotive)

Below this annual mileage vehicles with an internal combustion engine (ICE) hold a total cost of ownership (TCO) advantage compared to electric vehicles due to high list prices and the comparably higher depreciation (Fig. 4). But TCO is currently not considered in the consumers' rationale for being interested in alternatively powered vehicles. Consumers could be drawn in by an incorrect perception regarding the real cost of electric vehicles.

Fig. 4 – TCO comparison of electric vs. petrol ICE vehicles (example Germany):

Costs	Mitsubishi I-MiEV	Peugeot iON	Citroën C-Zero	VW Polo 1.2 Trendline	MB C180 CGI T Avantgarde
Listprice	34.390 €	21.564 € ⁽¹⁾	35.165 €	13.540 € ⁽²⁾	35.974 €
Tax	0 €	0 €	0 €	120 €	372 €
Liability	2.241 €	2.241 €	2.241 €	2.400 €	2.241 €
Full Coverage	3.507 €	3.507 €	3.507 €	2.310 €	4.140 €
Maintenance	200 €	0 € ⁽¹⁾	220 €	200 €	1.800 €
Costs Electricity / Fuel	1.527 €	1.527 €	1.527 €	2.604 €	3.276 €
Residual Value	13.756 €	Return	14.066 €	9.247 €	21.836 €
Total Costs	28.109 €	28.839 €	28.594 €	11.926 €	25.967 €
Costs Per Kilometre	94 Cent	96 Cent	95 Cent	40 Cent	87 Cent

(1) Total leasing costs for 3 years, 599 € monthly rate for private customers, leasing rate includes maintenance costs

(2) 4-door version

Note: Comparison of three year old EVs and ICEs (forecast) with a mileage of 10.000 km per year in Germany

Source: Residual Values from EurotaxGlass's; other data from Autobild

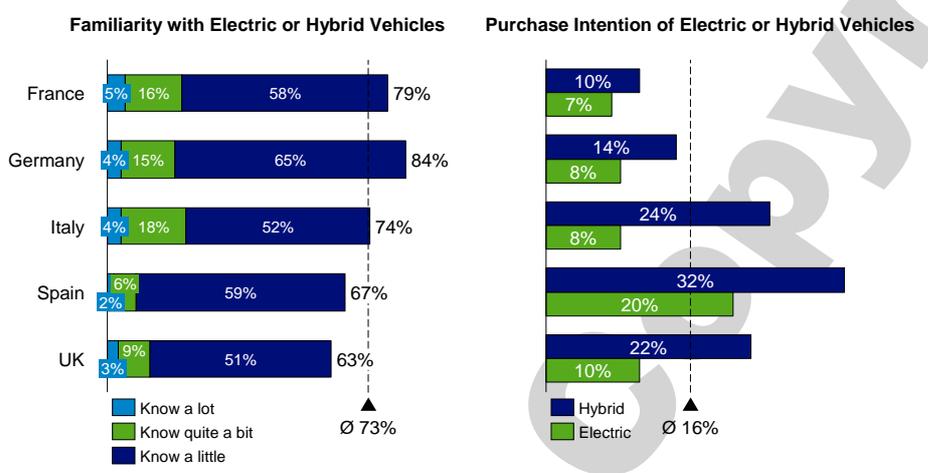
Finding 3: More educated consumers show a lower purchase intention

Consumers stated in the survey that they are interested in electric and hybrid vehicles and would consider buying such vehicles. Consumers were further asked to describe their own level of familiarity with electric and hybrid vehicles. Familiarity

measures the consumer's level of knowledge by directly asking whether respondents knew at least "a little" about electric or hybrid vehicles. Purchase intention represents the likelihood of purchasing such a car as their next vehicle and is one step closer to the actual purchase than purchase consideration.

Familiarity is highest and Germany and averages 73% across all markets (Fig. 5). The purchase intention is significantly lower for electric vehicles than it is for hybrids. This highlights the challenges that the completely new electric vehicle technology faces compared to the proven and largely established hybrid technology.

Fig. 5 – Familiarity with and purchase intention of electric and hybrid vehicles:



Base: 5.253 interviews conducted in France (1.102), Germany (1.029), Italy (1.060), Spain (1.006) and UK (1.056) Respondents with interest in electric/hybrid cars vehicle in France (509), Germany (242), Italy (435), Spain (439) and UK (281)

Note: Question asked: "Thinking about how much you know about electric and hybrid cars, which one of the following statements best applies to you?" Question asked: "How likely is it that your next car will be an electric or hybrid one?"; answer "very likely"

Source: EurotaxGlass's & Harris Interactive Consumer Survey (2010)

But even with an average familiarity level of 73%, most consumers stated that they "know a little" about electric and hybrid vehicles. Only a few consumers actually consider themselves well educated and countries with above-average familiarity display below-average purchase intentions. Yet, the more educated consumers are, the lower the likelihood of them intending to make a purchase.

In other words, once consumers gain a deeper knowledge of electric and hybrid vehicles e.g. about prices or technical specifications, they use this information to make more considered decisions. This does not fully diminish buying intention as the intention rates in France and Germany show, but leads to a decision that factors in more aspects. These could be, for instance, the suitability of an electric or hybrid vehicle for the intended use, purchasing and running costs and/or the existence or lack of government subsidies.

Increasing education about electric and hybrid vehicles moderates the consumer's purchase intention.
(EurotaxGlass's, Harris Interactive)

Finding 4:

The stated purchase intention supports sales forecasts

Based on manufacturers' launch plans and assumptions on speed of new technology adoption, we have forecasted penetration rates for electric vehicles in the Big 5 European markets in our 2010 study "Alternative Powertrain Vehicles in Europe". In our conservative adoption rate scenario for Europe we expect a market share for electric vehicles (including electric vehicles with range extenders) of about 9% of all new car sales by 2020.

Our forecasted sales for electric vehicles by 2020 seem to be compatible with the current purchase intentions determined in our survey – at least when considering that the intention shown in Fig. 5 accounts for all respondents who state that it is "very likely" that their next vehicle is an electric vehicle. Secondly, as seen in Fig. 5 purchase intentions are likely to be moderated with increasing familiarity, e.g. in Spain and to a lesser extent in the UK we expect a substantial reduction of purchase intentions, once familiarity has increased.

Electric Vehicles will account for around 1 million of new car sales units in the Big 5 European automotive markets.
(EurotaxGlass's, BDW Automotive)

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Consumers' Perception of Costs

Finding 5:

Consumers expect significant running cost savings with electric vehicles

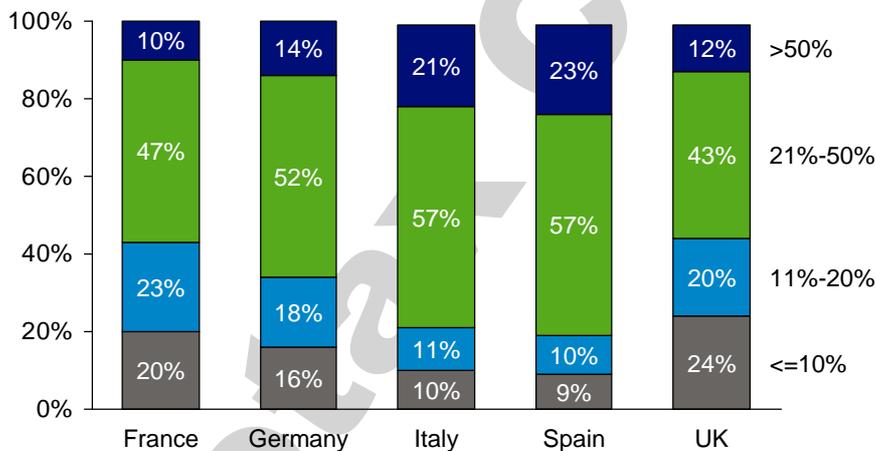
We asked consumers about their expected running cost savings as this was one of the key drivers for their interest. In this question we defined running cost excluding depreciation and focused on electric vehicles only as hybrid technologies are too diverse.

As Fig. 6 displays, a majority of consumers expect savings in running costs of between 21% and 50%. This is a realistic expectation when comparing the fuel and SMR costs of an electric vehicle to that of a petrol ICE vehicle as Fig. 4 showed. However, up to a quarter of consumers expect even higher savings.

Between 55 and 80% of consumers expect running cost savings of electric vehicles compared to ICE cars of above 20%.
(EurotaxGlass's, BDW Automotive)

Fig. 6 - Expected savings in running costs (electric vs. conventional vehicles):

Share of respondents to expect cost saving level

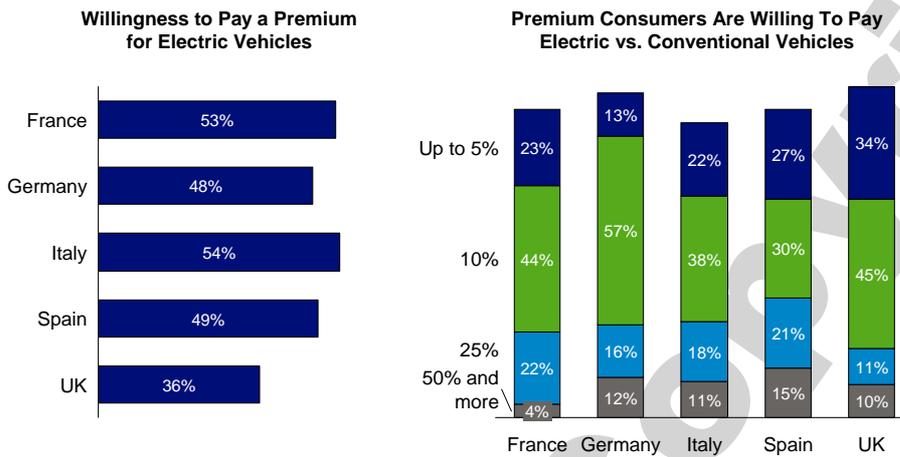


Base: All respondents likely to buy an electric car as their next vehicle in France (153), Germany (93), Italy (142), Spain (199) and UK (133)
 Note: Responses sum up to 100%; missing answers are "do not know"
 Question asked: "How much of a saving in running costs (excluding depreciation) do you expect an electric car to provide over a conventional car?"
 Source: EurotaxGlass's & Harris Interactive Consumer Survey (2010)

Finding 6:
Consumers are willing to pay a premium for electric vehicles

Consumers are willing to pay a higher price for their electric vehicle to achieve their goals of being more environmentally friendly and having significantly lower running costs. Up to about 50% of consumers intending purchase an electric vehicle stated that they are willing to pay a premium as Fig. 7 shows. This willingness is lowest in the United Kingdom.

Fig. 7 – Price premium for electric and hybrid vehicles:



Base: All respondents likely to buy an electric car as their next vehicle in France (153), Germany (93), Italy (142), Spain (199) and UK (133)
 Note: Responses sum up to 100%; missing answers are "do not know"
 Questions asked: "Would you be willing to pay a premium for an electric car compared to a "conventional" car?"; "How much more would you be willing to pay for an electric car compared to a "conventional" car?"
 Source: EurotaxGlass's & Harris Interactive Consumer Survey (2010)

The vast majority of consumers is, however, only willing to pay a premium of up to 10% compared to a conventionally powered vehicle. In most markets about 20% of consumers are willing to accept a price 25% higher than that of a conventional car. Fewer are willing to accept even higher prices. This limits the industry's options to pass the new technology's development costs and initial diseconomies of scale on to customers. As shown in Fig. 4, however, the automotive industry is currently intending to achieve significant price premiums for electric vehicles. At present, these premiums are only offset by government incentives in some markets.

About 50% of consumers state to be ready to pay a premium for an electric vehicle – but mostly just up to 10%!
 (EurotaxGlass's, Harris Interactive)

Conclusion

Finding 7:

More consumer education is required – along with an accelerated development of this new technology

Our research shows that familiarity with electric and hybrid vehicles is widespread but not very profound. Less than 20% of the consumers think that they know more than just “a little” about these vehicles. This uncertainty needs to be reduced by further educating consumers about the new technology and how much it costs.

In addition to the consumers' views on running and purchasing costs, EurotaxGlass's and BDW Automotive showed in their collaborative study “Alternative Powertrain Vehicles in Europe” that Total Cost of Ownership (TCO) will become even more important as a purchase criterion. The TCO is to a large extent driven by depreciation. This poses a central challenge for alternatively powered vehicles: Due to the (at least for now) significantly higher list prices (even with subsidies), these vehicles typically exhibit higher EUR depreciation than conventionally powered vehicles in the relevant sectors. This drives up the total cost of ownership, so that the electric vehicle currently becomes economically viable only at around 15.000km annual mileage.

Technical progress is expected to drive down costs. While this would help in closing the gap between expected and actual price premiums for electric vehicles, technical development is clouded by uncertainties – especially around battery technology. Commercialisation strategies can help to reduce consumer uncertainty. Examples for concepts in discussion or in planning by some manufacturers are leasing schemes for batteries or the electric vehicle itself as well as 6-8-year warranties on the battery quality. To support the market introduction of electric vehicles, manufacturers also need to focus on consumer education to prevent incorrect perceptions of the new technology and its cost.

Customers, leasing companies, fleet operators and manufacturers will need to cope with the technology uncertainty concerning the battery for the near future.
(Business Intelligence Forum 2010)

For more information on this whitepaper please contact:

Michael Kleber

Project Manager Consulting & the paper's author

EurotaxSchwacke GmbH
Global Services Division
Wilhelm-Roentgen-Strasse 7
D-63477 Maintal
Phone +49 (0) 6181 405 245
Email michael.kleber@eurotaxglass.com

About EurotaxGlass's:

Europe's leading provider of data, solutions and business intelligence services for the automotive industry with over 75 years experience. The company is based in Freienbach, near Zurich, Switzerland and operates in 30 countries with more than 400 employees. For more information please visit our website www.eurotaxglass.com.

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