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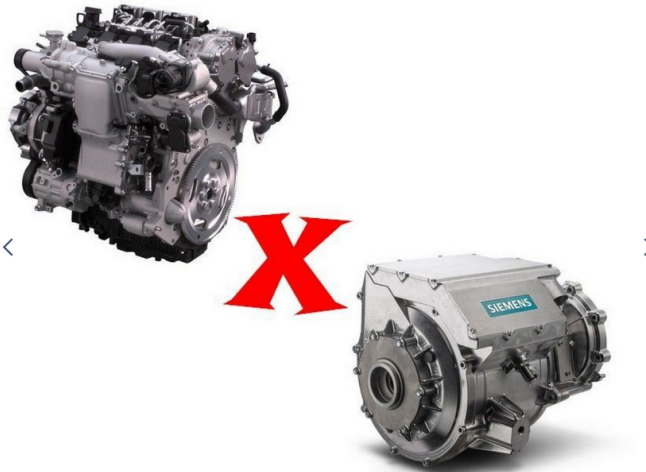
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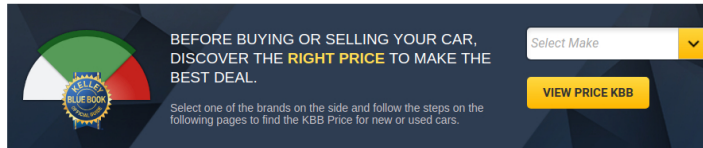
The drama of combustion engines - Why everyone already admits that the future is electric

17-10-2017 16h00 by KBB - Gustavo Henrique Ruffo

Reduced efficiency in relation to electric motors is the main factor condemning the conversion of chemical energy into motion to death



If you're a die-hard fan of engine grunts, you'll be disappointed with the latest industry insights about the future of internal combustion. Even senior executives from traditional manufacturers openly admit that the future is electric, such as **Mary Barra, CEO of GM**, and the staff of **Volvo, BMW, Mazda, Ford, Volkswagen**. And the reasons behind this are not just legal or political, with several countries and cities determined to ban the combustion engines from their streets, but also of a practical nature.



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The first, but not necessarily the most urgent one, is a public health issue. And we're not talking about carbon dioxide emissions, for which cars are wrongly blamed. If all types of transport are added, including airplanes, they will be responsible for the emission of 23% of greenhouse gases, according to the **European Environment Agency**. Cars, therefore, will have an even smaller share than this.



Their problem is the concentration in large cities, where other pollutants such as particulates, ozone, nitrogen oxides, sulfur



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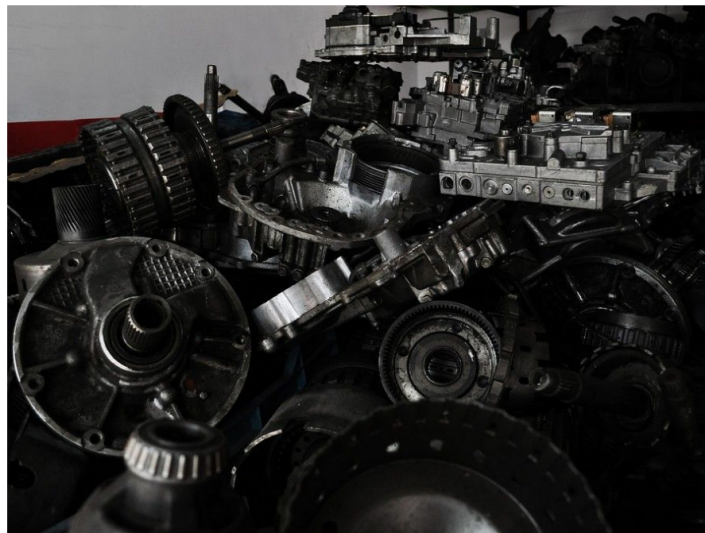
dioxide and carbon monoxide, among others, accumulate beyond reason. The bigger the city and its fleet, the worse, as the cities of more than 30 million people in China show. Not by chance the country that presses the most for the adoption of electric vehicles. We are better today than in 1850, as [this brilliant article by José Luiz Vieira for WebMotors shows](#), but it is possible to improve. With no need to take a single car out of the streets.



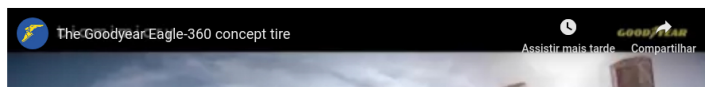
The second reason is waste. The best combustion engines currently on sale have an energy efficiency of 40%. Going straight from the shoulder, it is equivalent to saying that only £ 40 of every £ 100 (or any other currency) you pay when you fill up the tank becomes movement. The remaining £ 60 in fuel "evaporates" in the form of heat and mechanical losses. Bottom line: for every 100 whatever you spend to refuel, you would just burn 60. And we say "would" because your car engine is certainly well below this 40% efficiency. The average ranges from 18% to 20%. In fact, you are currently burning more than 80 of every 100 coins you spend in fuel. An electric motor has average efficiency of 85%. Or else, it reverses the current combustion engine ratio. And it converts a lot more energy into movement.



If that did not hurt your pockets enough, think about the current pressures for efficiency in general life. In the lesser use of resources of any type, in the recycling of materials, in avoiding food waste and so on. The present world does not like excessive spending. The leitmotiv is to have an increasingly lighter footprint in resources use.



The third reason is savings in almost everything. Electric vehicles are much less complex than those driven by combustion engines. They do not need water or oil to work. They do not have many pieces and, as João do Amaral Gurgel used to say, "a part that is not there is a part that will not break". Many electric cars do not even need gearboxes. Servicing needs are much lower, even at the current level of development of electric vehicles, which still leaves a lot of room for improvement. Especially when it comes to delivering juice to their motors.





Finally, there is the fundamental reason for the imminence of electric cars' domain: viability. And they are viable, in large extent, due to electronics. If you do not know, electric vehicles were some of the first to be proposed in the early 19th century. There are reports of an electric vehicle in 1828 and others in 1834. The first hybrid in history was the Lohner-Porsche, created in 1900. But there were no efficient means of controlling the charge of the batteries, of recovering energy or of saving it properly. It was the emergence of electronics that allowed the application of several pioneering ideas in all fields of human knowledge. **Among them are the electric vehicles, which can have a multitude of power supplies: conventional batteries, fuel cells, remote induction, flow batteries and so on.** The challenge is to set a standard.

All these evidences are driving current manufacturers to surrender. And to anticipate a paradigm shift that promises to leave nothing untouched. Not even the fact that the car has wheels and steering wheel as we know them. But the biggest change should be at the heart of the vehicles. Something that even those with more interest in the continuity of the combustion engine, with billionaire investments in its development and manufacture, are forced to admit.

How that will happen will be the subject of future reports in our new series of articles, "The Drama of the Combustion Engine." Follow it here with us at KBB!

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