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Electric cars are coming to Europe

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At 13 years of age, this all-electric Citroen Ax is still a baby (here it is shown with the author's wife, Grazia). European electric cars didn't undergo the same destiny as the American "EV1s", ruthlessly crushed to the last one by GM's minions. Nevertheless, even in Europe, electric cars did not succeed in gaining a significant share of the market.

The fate of electric cars in the US is better known than the parallel European story thanks to the 2006 film "Who killed the electric car?" Because of this film, we know the sad story of the EV1, the first all-electric car built by General Motors. After a few years of testing, GM decided to take back all the EV1s it had produced and destroyed all of them. The last ones were crushed to oblivion in 1999. But the European story wasn't so dramatic. European electric cars built in the 1990s are still around and running, although in very small numbers. There are signs, now, that after many years of neglect, electric cars may come back to Europe.

Electric cars have a long story that starts in 19th century. However, the demise of electric propulsion for road vehicles seemed to be complete after the second world war, when a flood of cheap oil made internal combustion engines the only reasonable choice. But, in the 1990s, worries about pollution led governments and automakers to start rethinking about electric cars. In

Europe, it was mainly French automakers, Peugeot and Citroen in particular, who were interested. France seemed to be the ideal place for electric vehicles. With all their nuclear plants, the French had plenty of electric power. Even too much, and that forced them to sell power to Italy at rock-bottom prices. What better idea could there be than having a fleet of electric cars that would recharge at night exploiting low cost nuclear power? In addition, the French automotive industry had a tradition of cars that were sturdy and cheap. Vehicles such as the Citroen "2CV" and the Renault "R4" could only be conceived in a culture that had developed the concept of *rouler en bagnole* , something impossible to translate into English, but that conveys the idea of a way of riding which is relaxed and without problems.

So, in the 1990s Citroen and Peugeot started developing electric cars. I have no data on how many were built, possibly a few thousands. Peugeot also produced electric motorcycles. In most cases, production was discontinued by the end of the decade. However, the vehicles remained in the hands of their owners, unlike the ill fated American EV1's. Many of these vehicles are still around; one is the electric Citroen Ax that I bought just about a month go and that you see in the picture at the beginning of this article.

Made in 1996, this car it has been quietly running up to not long ago with its original set of nickel-cadmium batteries. It weighed a little more than 1 ton and had a range of 80-90 km. Last year, the previous owner had it refurbished with new, state of the art, lithium-polymer batteries. The car shed about 200 kg and increased its range to about 100 km.

One month of use is not much, but I think I can already give you an assessment of this car. And I can tell you that it is a great little car: perfect for suburban commuting. Simple, cheap, quiet, easy to drive. The maximum speed is 95 km/h, enough to run on highways. It is very inexpensive to refuel, it goes 100 km with one recharge that, in Italy, costs less than 2 Euros. Much less for me since I have photovoltaic panels on my roof. The limited range is not a problem, although you have to program your trips a little.

So, after some time, you start thinking that this is the way all cars should be: silent, cheap and zero emission. If you happen to be back at the wheel of an ordinary car; you feel that there is something wrong with all that noise. Also, what is that funny stick protruding out of the floor? Then, you start thinking that you are running around with 50 liters of flammable gasoline behind your back. Doesn't that make you feel uneasy? And, if you happen to give a look under the hood - eek! What is that monstrous thing in there?

Lithium Polymer batteries have surely helped making this car better, but I am sure that even with the old Ni-Cd batteries it was a good car. Yet, these electric cars of the 90s had little success in Europe. One problem, obviously, was price, more than twice that of the equivalent gasoline or diesel model. In principle, there is no reason why these cars should have been so expensive. Think of how simple they are: no cylinders, no pistons, no spark plugs, no valves, no transmission, no radiator, and so on. They have got to cost *less*, not more. I think that, here, automakers have been playing a softer version of the crushing game played by GM with the EV1.

But high prices may not the only reason for the scarce success of electric cars and perhaps not even the most important one. There is something ancestral that makes us fear the new and keep to the old ways. I can tell you that, after I had struck a deal with the previous owner for the Ax, we shook hands and for a moment I felt a sensation of absolute doom. I felt like a cartoon character who has just stepped off a cliff and has been walking on thin air for a while. I told myself "why in the world did I spend money on *that* thing? Why didn't I buy a *real* car?" By now, this sensation is mostly gone, but sometimes it reappears when I look at that curious white thing parked in my driveway. It is like, I can tell you, switching from Vista to Linux, something that I did a few months ago. Linux is cheaper, easier and faster, but the psychological impact during the first months is not unlike that of being abducted by a flying saucer and married to an alien princess.

So, there is an attitude problem with electric cars. People just don't seem to be able to understand that a car may be something that doesn't make noise, doesn't emit smoke, doesn't use fuel. Electric vehicles just aren't seen as "real". My impression is that this is the main reason behind the failure of electric cars to take a significant slice of the market, so far. That also explains the insistence on hydrogen and biofuels: inefficient and expensive as they may be, at least they are *fuels*. They are something that you refill your car with and, afterwards, you hear the familiar noise of an engine running. Even without evil automakers bent to crushing flat electric cars, these perception problems remain.

But, with peak oil arriving (or already arrived) things are changing. We are starting to realize that we can't wait any longer and we can't keep dreaming hydrogen dreams or using precious land to cultivate biofuels for inefficient thermal engines. Electric vehicles still have problems: range is limited, cost is high and lithium mineral supply may be a problem if we don't learn to recycle lithium efficiently. But it is a technology that works here and now at a reasonable cost and that can be used for this difficult transition period in which we'll have to learn to live with less fossil fuels and even with none at all. There are clear signs that these cars are coming back to Europe, at last!

Some technical data

Citroen Ax model 1996 - three doors, 4 passengers.
Weight: originally 1046 kg, now about 850 kg
Batteries: Lithium polymer made by Kokam. 120 V nominal voltage, 12 kWh storage. Recharging time ca. 6 hours from complete discharge. Rated to last approx 2000 full recharge cycles,
Engine: brushed DC. 20 kW nominal power
Max speed: 95 kMh, electronically limited
Range: ca 100 km
Price: this is a prototype, so its cost is not representative of how much a car like this one might cost once produced in large numbers. Let's say that, at present, Li-po batteries suitable for traction may cost around 1000 eur/kWh of storage, but that depends on the number purchased.

The upgrade of the Citroen Ax to Li-po batteries was performed by Riccardo Falci (aka "the wizard"), the same person who retrofitted the now mythical electric 500. I wish to thank Massimo De Carlo (aka "the wise one") and Mr. Guido Chiostri, former owner ot the Ax, who has now moved to an even better vehicle, a Fiat 600 refitted with Li-po batteries (and guess who did the job!)!).

More info on electric cars on TOD:

"Costs and environmental impacts of electric cars" by Joost van der Bulk; http://europe.theoildrum.com/node/5104

"The energy efficiency of cars", by Euan Mearns, http://europe.theoildrum.com/node/5101

"The post peak car", by Ugo Bardi and Pietro Cambi, http://www.theoildrum.com/node/3275