



Post peak vehicles: 10,000 km on batteries

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Ugo Bardi's electric scooter, here driven by Ms. Donata Bardi, aka "the mad scientist's daughter"

After three years of use, I have just passed the 10,000 km mark on my electric scooter, or about 6,000 miles. Not bad for a small scooter of this kind. I have always been thinking that electric vehicles are an answer to peak oil; not the definitive answer, of course, but at least a way to maintain some mobility on roads in the years that will come. Electric vehicles are a technology that exists and that works. So, for the past few years I have been testing the idea in practice.

So, let me give you some data about this experience. First of all, about the scooter itself. It is the "Lepton" model made in Italy by a company named "Oxygen". It has a rated power of 1500 W, maximum speed (electronically regulated) of 45 km/h and a nominal range of 40 km. It is not on sale any more for private users, although it is still manufactured in a version for commercial transportation. Now you can find equivalent Chinese scooters that sell for about 2000 Euros. I think that the Lepton is much better than this new generation; but, in general, these small motorcycles are very similar in terms of performance and construction.

I have used the Lepton consistently for commuting from home to office. About 30 km round trip on hilly roads. According to the measurements I performed, the "mileage" of the scooter is of about 3kWh per 100 km. At the present prices of electricity in Italy, that is less than one eurocent per km. For me, it is actually zero, since I have photovoltaic panels on my roof that

produce more than enough to recharge my scooter. In comparison, an equivalent gasoline powered scooter may need 3-4 liters of gasoline to run for 100 km. A liter of gasoline is about 10 kWh, so that the conventional vehicle is about 10 times less efficient than the electric one (!). Also, about ten times more expensive.

Those are, of course, just the raw energy costs. Battery replacement costs are higher. In my case, I used NiZn batteries, rather than the traditional lead acid ones. The experience has been moderately positive. NiZn batteries are lighter than lead ones and charge in about 1/3 of the time. However, after 10,000 km, the batteries show clear signs of fatigue and need to be replaced. Right now, I can't make the whole 30 km round trip from home to office on a single charge. I have to recharge at a public charge point that - fortunately - exists at a few hundred meters from my office. Users of lead batteries report longer battery lives, although some had bad experiences, too. In terms of cost, if I had to buy now a set of lead batteries I should pay something like 500 euros. That would correspond to 5 eurocents per km. But I am moving to lithium batteries, more expensive, but should really be a quantum jump in terms of range and reliability.

There are other cost advantages of my electric motorcycle. I can pay about half of the regular insurance cost because of a special contract that some companies offer to electric vehicles. Then, for five years I don't have to pay government vehicle taxes. In addition, the maintenance of an electric vehicle is really minimal. In 10,000 km the only maintenance I had to do was to lubricate the start button. These things are really sturdy.

But the idea of using electric vehicles is not so much to save money (although you can). The idea is to see if it is possible to move on roads without using oil derived fuels. Of course, an electric vehicle alone is not enough. If you want to be free from carbon based fuels, you also need PV panels or other sources of renewable energy to recharge your vehicle. But it is possible to do that with currently existing technology and PV panels are not beyond the means of someone who lives with the salary of a government employee, as I do. Think how things would change if a significant fraction of the currently running vehicles were battery powered. The next fuel shortage would not hit us so hard as we expect it will.

Unfortunately, I am also disappointed by my experience in the sense that I found very few followers. Over three years, I showed my scooter on my Italian blog, I took it to meetings and conferences, at ASPO-5 in 2006 in Pisa I used the little red thing everyday and all those attending saw it. But only my nephew and one of my coworkers actually followed my example.

All right, I understand that it has a short range, but if it is enough to go from home to work and back, does it matter? And, yes, I know that it takes a long time to recharge it. But if you plan ahead, what is the problem? Sure, I know that you can't use it to go visit your aunt who lives in another city; but is it really so crucial? Yes, it is a little more expensive, but in the long run, you save money. And if it doesn't make any noise it doesn't mean that it doesn't run.

But there is nothing to do. Most people just can't believe that an electric vehicle is a "real" vehicle. They much prefer to dream about hydrogen vehicles that, after all, are supposed to have a proper "fuel" and may even produce the appropriate noise. It is an entrenched attitude that seems to make us believe that if it doesn't burn, it is not really energy.

Well, what can I say? Here is a picture of the odometer that proves that I ran 10000 km with a vehicle without burning anything. It can be done. Try it.



Give also a look to our retrofitted Fiat 500, [the post peak car](#). You can see it also at the [the eurozev site](#)



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