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Do the Costs of Electric Cars Outweigh the Benefits

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Electronics 1

Do the Costs of Electric Cars Outweigh the Benefits

As electric vehicles have become more popular over the years and new technology is advancing to make them more efficient. It has come into question on whether or not the environmental and economic costs outweigh the benefits of having the vehicle?

Introduction

In our modern society climate change has been an issue that is affecting most industries. Due to this growing concern there is currently a major push for renewable energy. When turning to renewable energy one thing to note is that electrical cars are going to be the future of automotive transportation when compared to fossil fuel power vehicles in the years to come. With this ideal in mind though we have to ask ourselves are electric cars really that environmentally friendly when it comes to cost and the resources to make them. Are electric cars ready to handle this growing need or are there much needed improvements in sustainability and cost needed before we can safely switch over to this supposedly more environmentally friendly alternative.

How do they work

The most notable electric cars in today's markets are battery electric vehicles(BEV). This type of electric car utilizes an all-electric drive train that is powered by multiple batteries which needs to be recharged solely from a electricity supply after around 62 miles or 100km.(7)These cars offer zero tailpipe emissions since they require no forms of fossil fuel energy.

Economic Costs

Over the last 20 years we have made very substantial progress on the economics of electric vehicles. We can see that we are on the right track although electric vehicles are not cost effective for the general public compared to conventional fuel vehicles. In table 1 below we can see that there is a 15,207.86\$ difference in favor of conventional fuel vehicles in terms of total cost. If we want electric vehicles to be more common in the general public then we need to make them cheaper compared to conventional cars. One contributing factor in the expenses of electric vehicles are the car batteries there which make up 11,807.36\$ difference between the costs of the batteries themselves and since most electric car batteries are made from a lithium ion material(3). Lithium itself is a driving force for that price. Unfortunately a driving force in the high prices of batteries have to do with the perceived global lithium shortage. This has crippled the electric car business until we can find other methods for the batteries that do not hinder cost or efficacy.

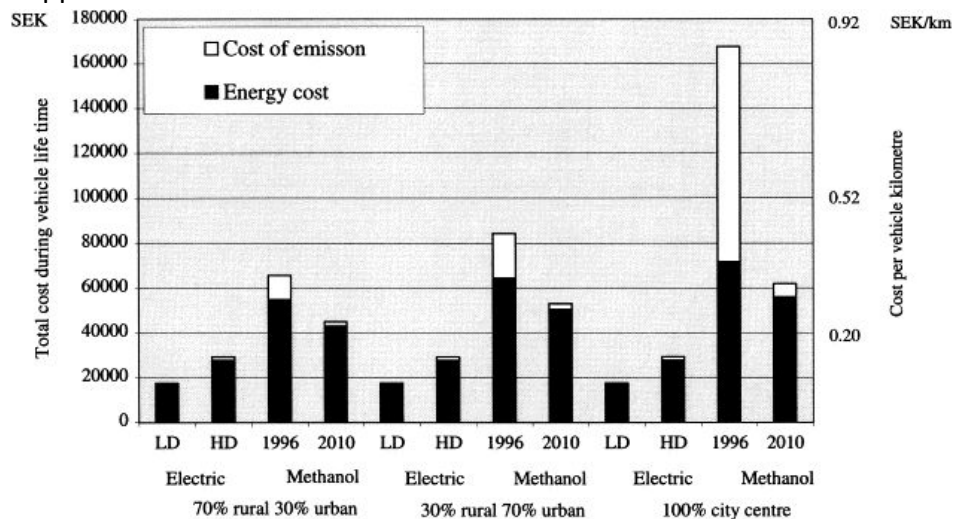
(In €/ \$)	Fuel car	Electric car (BEV)	Difference
Purchase cost	\$14,158.92	\$23,598.2	\$-9,439.28
Battery cost	-/-	\$11,807.36	\$+11,807.36
Fuel or electricity cost	\$8,994.45	\$2,886.06	\$-6,108.39\$

Total cost	\$23,153.37	\$38,291	\$+15,207.86
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Table 1: Discussing the costs in € and \$ of fuel vs electric cars in 2012 (1)

Environmental Costs

We know that electric vehicles are the preferred method of reducing CO2 emissions. This is rightfully so since “A recent study calculated that, if the entire 2009 passenger car fleet were replaced by equal shares of three currently-available battery electric vehicles (Think City, REVA G-Wiz i and Tesla Roadster), then the CO2 emissions would be reduced by 51% in the UK, 60% in the USA, and 91% in France”(7). With this in mind though there are a lot more factors at play when discussing the environmental cost of these vehicles. For example, are we getting our electricity from renewable sources? Does the environmental costs of material outweigh the benefits of electric vehicles as a whole? In the last paragraph I started to discuss the shortage of lithium that is needed to make the car batteries. This does cause a major environmental concern since lithium is not a renewable resource just like fossil fuels. With most of the electric vehicle industry relying on this resource what will happen when it runs out.



Graph 1: Compares the cost of emission and energy in electric and methanol vehicles (5)

LD-low electricity demand
HD- high electricity demand
Sweden (5)

Conclusion

Studies have shown that mobile transportation causes 80 percent of nitrogen oxide and 44 percent of carbon dioxide emissions in just Sweden alone. With the CO2 numbers exponentially increasing over recent years there has been a significant call to action for change. When talking about the future of electric cars it is important to understand that if we are going to switch to a more environmentally friendly option that it should actually be more environmentally friendly and still cost effective for consumers. We need to be able to look at the pros and cons of all of our options and make the best decision for our situation. Hopefully as time goes on and we switch to more sustainable sources of energy we will have the improved technology to face these problems ever growing problems.

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