ENG3004 Assignment 2

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Is electric vehicles (EV) paving the way to a greener future? Each EV Li-ion battery needs 15kg of cobalt and over two third of the world’s cobalt are mined in the Democratic Republic of the Congo. According to this report, 40,000 Congolese children work in the cobalt mining every day. If spent battery ends up in a landfill, its cells can release problematic toxins, including heavy metals. And recycling the battery can be a hazardous business.

Electric vehicles are a hot topic and trend these days, as they have the potential to solve the environmental problems caused by traditional motor vehicles. However, are electric vehicles really paving the way to a green future? We will need to answer this question by analyzing the following perspectives: environmental, health and safety, economic, professional and legal.

As we all know, Electric vehicles offer a significant advantage over traditional motor vehicles as they are environmentally friendly. They align with the current trend of living green, which is why they are becoming a popular alternative. The reason behind their eco-friendliness is that they do not rely on burning fuels for power; instead, they use electricity to charge their batteries. Using batteries to provide energy for the car can avoid burning fuels that emit harmful pollutants. This eliminates the emission of harmful pollutants like carbon monoxide and nitrogen oxides that contribute to air pollution and global warming. Furthermore, electric vehicles produce zero emissions by charging the battery to operate. It can also be generated from renewable sources like solar and wind to have a lower carbon footprint. By using renewable sources to provide power, it can reduce reliance on fossil fuels. The damage to the environment can be reduced due to the lessening in the extraction and refining of the fuels. Besides, electric vehicles can have a better energy consumption than normal motor engines. Electric motors can convert over 90% of the batteries to mechanical energy which is 70% higher than gasoline engines. Using an electric engine can prevent the energy lost to the environment during combustion which makes the energy more efficiently. With the aerodynamics and the design of the vehicles like using lightweight materials as the frame and regenerative braking to convert kinetic energy to electric energy for the battery able to further enhance the efficiency of the energy.

From the perspective of human health and safety, as I mentioned earlier, EVs produce zero tailpipe emissions which reduces the harmful pollutants emitted by burning fuels. There are multiple types of pollutants emitted during combustion and each of them can have different effects on the human body. Carbon monoxide is the most toxic gas and it may increase the risks of heart disease and other components may also increase the risk of getting cancer [1]. Therefore, using electric energy to power vehicles can prevent air pollution during combustion. In addition, the abandonment of getting power from burning fuel can also lower the risk of fire or explosion. EVs also have a lower center of gravity due to the large battery pack underneath, making car rollover less likely [2]. Despite the advantages, the batteries of EVs pose safety hazards. Lithium-ion, commonly used in EVs, can be flammable under high temperatures or when damaged or exposed. It can also release problematic toxins which may hurt people. This also means that the disposal of the end-up battery needs to be careful otherwise it may damage the cobalt mining workers or recycling company workers.

Electric vehicles offer several economic advantages for various parties. In the view of the user of EVs, the operation cost of EVs is significantly lower than those of traditional vehicles. The main power resource of electric vehicles is electricity which is cheaper and has a more stable price than gasoline or diesel. Additionally, EVs contain fewer components which also reduces the maintenance cost of the car. Customers that bought electric vehicles can even get tax incentives from their government in many countries according to the "Global EV Outlook 2020" [3]. It can provide financial incentives for drivers to buy electric vehicles instead of normal ones. The rise of EVs also creates new business opportunities in the development of batteries, technologies of vehicles, charging stations, or even some after-sales services like maintenance of the vehicles.  For vehicle manufacturers, it opens up more possibilities and new designs for EVs. Even so, for oil-exporting countries, the rise up of EVs will lower the use and export of oil thereby lowering their income on oil exportation. Nevertheless, the economic benefits still outweigh the disadvantages.

Global warming and air pollution are serious issues that governments worldwide are concerned about. One of the main reasons that caused global warming is the emission of fossil fuel cars. Fossil fuel combustion is the largest contributor to the greenhouse effect [4]. With the rise in the standard of living, vehicle usage has also increased. It is essential to develop new types of vehicles to stop the increase of fossil fuel cars and their emissions. The design of electric vehicles has created a brand new future for vehicles in an environmentally friendly way. Therefore, engineers have done a good job and have been socially responsible in their profession to solve the global warming issue. Even though EVs can reduce damage to the environment, there are still inadequacies, such as safety problems or the lifetime of the batteries. In the future, engineers can keep on developing the batteries for a longer lifetime and reduce the security risks to refine EVs. Apart from electric vehicles, they can develop more energy sources for vehicles like solar energy, and wind energy to provide more options to power the car.

Electric vehicles are gaining popularity in several countries due to their zero-emission capabilities. Many countries have implemented policies and laws to encourage the adoption of EVs. For example, Norway aims to end the sale of new gasoline and diesel-powered cars by 2025 to stop the increase in fossil fuel cars. China has also set a goal for EVs to make up 20% of new cars by 2025. Serval countries have also set up economic incentives for consumers to buy EVs like tax reductions, free parking, etc. Therefore, electric vehicles are able to cooperate with the law to achieve the goal of reducing the emission of greenhouse gases. As mentioned before, safety risks may arise during the disposal of batteries. In this situation, countries may need to establish laws to protect those handling battery disposal and ensure its safe management.

Overall, electric vehicles have the potential to pave the way to a greener future as they offer a solution to the environmental problem caused by motor vehicles. The design of electric vehicles has created a brand-new future for vehicles in an environmentally friendly way, but there are still inadequacies such as safety concerns and the need for improved battery technology. Despite these challenges, electric vehicles have the potential to become the future of transportation.

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