ENG3004 – Society and the Engineer
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Assignment 2

2. 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.

In the recent years, EV have become increasingly popular around the world. More and more car brands are going to develop their own EV. However, most of the EV are using Li-ion battery as the power source. One of the important chemical insides, cobalt, are highly abundant in Democratic Republic of Congo (DRC) and harmful to human. However, EV has also greatly reduced the emission of carbon dioxide and other pollutants. This passage will discuss is EV capable to build a greener future for us, by using multiple perspectives.

Regarding professional dimension, it means the cooperate should uphold a high ethical and technical standard when they are developing the EV and the batteries. The company should also engage in Cooperate Social Responsibility (CSR). However, cobalt mines in DRC seems not ethical. There are several concerns on the use of child labour and slavery in those mines. According to Amnesty International [1], children as young as seven years old have been found working in the cobalt mine in DRC. They often need to work for long hours under dangerous conditions. Apart from that, cobalt is mined by the workers by using pickaxes and shovels. However, it is toxic for human, including touching it or breathing it [2]. This means that the workers who are mining the cobalt day by day will have severe health issues. There are much more

concerns on the cobalt mine in DRC, such as forced labour, low salaries and poor working conditions. The ethical issues on the raw materials of Li-ion battery are serious. There are some initiatives, like Responsible Minerals Initiative, to promote responsible mining and address the human right in cobalt mining industry. However, those actions may not be able to greatly improve the working environment of the miners. Companies that are demanding on cobalt for their batteries should develop new batteries for the EV, to reduce or eliminate the use of cobalt. Thus, the problems in cobalt mining industry can be diminished, and the company can run their business with CSR, to build a greener future for us.

For economic perspective, using EV is much cheaper than conventional cars. The car companies like Tesla are targeting to build a much cheaper EV for the users. One of the ways to reduce the cost is to use a cheaper battery. The wages of the workers in the cobalt mines in DRC are very low, and the GDP of DRC are relatively low, which means the cobalt price can keep a low price. Those companies who want to lower the price of their EVs to remain competitive in the EV market may tend to use the low-price Li-ion battery.

About environmental perspective, the use of EV has greatly reduced the emission of pollutants and CO_2. The air quality can be greatly improved in urban area because less gasoline cars on the roads. Although most places are still using fossil fuels to generate electricity, the combustion efficiency in the power station are much higher than the generator in the car. Moreover, more places are starting to use sustainable energy to produce electricity, which is going to make a greener future. However, the pollution from the cobalt mine and the wasted Li-ion batteries are concerned. Cobalt are toxic to living species, which may cause the destruction of habitats, water pollution, soil

erosion etc. Those may inevitably harm the ecosystem for a long time. Fortunately, those companies in the EV industry are working together on making new secondary batteries that use less or do not use cobalt at all. For example, LFP battery and LTO battery. Those batteries are cobalt-free and still efficient on EV.

On health and safety perspective, the use of EV can greatly reduce the respiratory illness of the citizen because the emission of pollutants beside the roads are greatly reduced. However, there are numerous concerns on the health and safety of the workers during the whole EV production process. For the cobalt miners, continuous uptake the cobalt may cause vomiting, asthma-like allergy, or even heart and thyroid problem. Apart from that, the manufacturing workers in the EV factory may face several safety hazards. Since the production of EVs involves heavy machineries, the workers may misuse those machines and harm themselves. Moreover, they may also face ergonomic risks, like the respective motions and awkward postures. These may cause musculoskeletal disorders for the workers.

Concerning on the legal perspective, the child labour happened in DRC cobalt mines are prohibited by International Labour Organization. The workers ages should not less than 15 years old. Moreover, the production of EV and the waste of it may harm the environment. The companies should strictly follow the laws to minimise the impact to the environment.

To conclude, the development of EV is not yet able to build a greener future for us. There are still a lot of issues that are diminishing the sustainability of EV, like the use of toxic cobalt in Li-ion battery and hindered labour rights in DRC. These issues are opposing the benefits that EV can bring to us. The EV production companies should

work together to solve those problems, such as using cobalt-free battery. This may increase the cost of the EV, but when comparing with the impacts that bring by using cobalt, this seems the best way to solve those problems simultaneously.

References

[1] Amnesty International, “Exposed: Child labour behind smart phone and electric car batteries,” *Amnesty International*, Jan. 19, 2016. [Online]. Available: https://www.amnesty.org/en/latest/news/2016/01/child-labour-behind-smart-phone-and-electric-car-batteries/

[2] G. Terry, “How 'modern-day slavery' in the Congo powers the rechargeable battery economy,” *NPR*, Feb. 1, 2023. [Online]. Available: https://www.npr.org/sections/goatsandsoda/2023/02/01/1152893248/red-cobalt-congo-drc-mining-siddharth-kara