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Are Electric Vehicles the Answer to a Future Clean Revolution?

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The adoption of electric vehicles (EVs) is increasing, since they offer several environmental benefits. People claim to be developing EVs, but where does the electricity come from? According to a report in 2016 by the French Agency for Environment and Energy Management, EVs are wrongly perceived to provide a more sustainable and environment-friendly means of transportation. The report questions whether EVs can truly present "a genuine solution to energy efficiency concerns". It asserts that "adverse environmental effects, primarily during the manufacturing phase, are comparable between EVs and internal combustion engine vehicles" [1].

The ongoing shift away from fossil fuels is likely to lead to shortages of essential metals in electric vehicle batteries, necessitating the digging of hundreds of new mines. Given that manufacturing EVs heavily relies on the extraction of rare earth minerals and lithium, it implies that all automobile batteries will eventually become hazardous waste in landfills [2]. Extraction of lithium from brines or hard rock involves significant water usage, thereby characterizing lithium mining as a water-intensive operation. It contributes to disturbing aquatic ecosystems and results in local water scarcity [3]. Moreover, it contaminates water bodies due to the seepage of chemicals and heavy metals from mining activities, negatively affecting aquatic life and human well-being [4]. Another consequence pertains to land disturbance, as mining and processing facilities encroach upon land that could serve alternative purposes, contributing to biodiversity deterioration and soil erosion [5]. The emission of dust and fume into the environment from mining operations, adversely affecting both human health and the air quality of the surrounding region, which accentuates the concern about air pollution arising from lithium mining [6].

Another important challenge with EVs is the need for charging infrastructure at public locations and residential areas. Without easy access to charging facilities, EV owners will face anxiety and inconvenience, limiting the widespread adoption of EVs [7]. Let us consider a straightforward fact: Unless an electric vehicle is being charged by a solar panel in your backyard, its carbon emissions may be higher than those of a fossil fuel-powered vehicle [8].

Our environmental problem might only have a partial answer provided by EVs. Although the

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operation of electric cars does not produce gaseous pollutants, it is essential to remember that energy production in thermal power plants can still affect the environment. EVs using electricity generated through fossil fuels like coal, oil, and natural gas, do not belong to the class of renewable energy sources.

More efforts are needed to move towards renewable energy sources for charging EVs. Developing solar and wind power technologies and increasing renewable energy infrastructure will offer a more sustainable future for EVs. By shifting towards renewable energy sources, we can ensure that EVs reduce our carbon footprint and contribute to a cleaner and greener environment. The sun's and the wind's energy are endlessly replenished and recycled. Large-scale rechargeable batteries have a lifetime of thousands of cycles and can be charged using solar or wind energy. The precious metals in batteries can be retrieved and repurposed even at the end of life. An EV is yet another, perhaps elitist, solution to the same issue.

We must consider if the rush for EV leads to a sustainable future or merely transfers the environmental burden of tailpipe emissions to power plants. The solution could be in the energy sources we choose. What will drive the electric revolution: the current use of fossil fuels or renewable energy?

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