Anne Arundel County Electric Vehicle Fleet Conversion

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Abstract: According to the EPA, 29% of greenhouse gas emissions were emitted by the transportation sector in 2017, due to widespread ownership of personal vehicles and the reliance of fossil-fuels as an energy source. With the IPCC stating that average global temperature increases should be limited to below 1.5°C by 2030 to avoid "catastrophic effects", Anne Arundel County, MD, has taken the deadline to determine the feasibility of a complete electric vehicle fleet conversion, supported by a sufficient charging system. An analysis of the current vehicle fleet was conducted to determine four design alternatives for the county. These include: the current fleet (do nothing), an all battery electric fleet, all plug-in hybrid electric fleet, and all hybrid electric fleet. These alternatives do not limit the county to adhere to a single alternative, rather this method highlights the clear distinction between each alternative in reducing direct tailpipe CO_2 emissions, supply chain scalability, and performance reliability. A utility function was evaluated from these attributes to determine tradeoffs between cost and utility in each design alternative.

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