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Design of a Decision Support Tool for Developing EV Fleet Transition

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Abstract: Increasing societal pressure has led to legislative changes to accelerate electric vehicle adoption. Baltimore County has begun investigating how to plan for and implement a fleet transition to minimize CO_2 emissions within budget constraints. A decision support tool (DST) was developed to enable fleet managers to determine the utility and total cost of ownership (TCO) of vehicles. The DST evaluates utility using an analytical hierarchy process based on seven vehicle attributes: comfort, fuel availability, performance, pollution reduction, reliability, safety, and size. Pairwise comparison is used to determine the attribute weights. Argonne National Laboratory's AFLEET tool was used to calculate TCO. A case study for a fleet of 21 vehicles for the Department of Public Works (DPW) was conducted. Replacing all 21 sedans in the DPW passenger transport fleet with electric vehicles would cost an additional $135,618 (17%) over the ICE fleet but reduce CO_2 emissions by 70% in 6 years.

Keywords: Decision Support Tool, Electric Vehicles, Baltimore County