Vehicular Electrification for a Sustainable ERAU Campus

Evan Jackson, Nathan Dills, Brandon Rigby

Sustainability is imperative for future human development and survival. Sustainability is defined as humans living within their current needs while also ensuring future generations can do the same. The goal of this study is to apply sustainability , and the three pillars of sustainability to achieve sustainable transportation on Embry-Riddle Aeronautical University's (ERAU) campus. In this study, the 'three-nested-dependencies' model will be used to evaluate sustainability in transportation on ERAU's campus which encompasses the three co-dependent dimensions of sustainability. To improve the sustainability of transportation on campus, we propose to electrify vehicles, including shuttle buses and fleet vehicles. Electrification of these vehicles will lead to decreased long term costs, improved air quality and human health on campus, and a decrease in ERAU's overall carbon footprint, corresponding to the economic, social, and environmental aspects of sustainability, respectively. To evaluate the efficacy of the electrification of vehicles, an analysis of the social, environmental, and economic impacts will be conducted in three scenarios, (1) current conditions, (2) increased gas-powered shuttles, and (3) all electric shuttles. Vehicle counts under these three aforementioned scenarios are acquired, and EPA moves software is used to determine the emissions and carbon footprint of these vehicles. A stakeholder analysis is conducted to highlight the aforementioned co-dependencies. This study promises to be advantageous in advancing technology on campus and thus enhancing ERAU's sustainability initiatives.