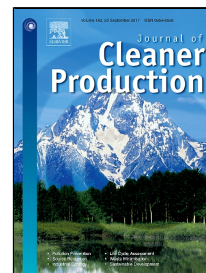


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# Life Cycle Assessment of microtubular Solid Oxide Fuel Cell based Auxiliary Power Unit systems for recreational vehicles

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## Abstract

This paper investigates the potential environmental impacts of an auxiliary power unit (APU) system, based on microtubular solid oxide fuel cell (mSOFC) fed by liquefied propane gas (LPG), built to provide energy to the leisure battery of a recreational vehicle (RV). In addition, a comparison between the proposed APU system and a conventional system is presented. The work presents an analysis of the different environmental impacts regarding the proposed design and manufacturing method. The Life Cycle Assessment (LCA) methodology following ISO 14040-44 approach has been adopted for the analysis as it enables a holistic view of the environmental behaviour of the studied system. LCA is a methodology to assess each and every impact associated along the whole value chain of a process or product. This assessment based on the entire life cycle of the system, from the raw materials production to the final disposal has been performed. For this purpose, an extensive data collection focusing on resources consumption (energy and materials) and emissions has been executed to ensure that all the life cycle stages are properly characterized. The results disclose that the production of the APU system is the main source of the environmental impacts. Specifically, for Global

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