A Portable Low-Cost Device Employing Recycled Synchronous Electric Motors to Generate Renewable Electricity

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Lacking reliable access to electricity is a major issue that impacts the lives of nearly 1.3 billion people around the globe. Without electricity, many individuals and communities cannot use pivotal electrical equipment and most importantly do not have access to lighting. Thus, it was the objective of this engineering project to create a cost-effective, efficient and portable device that would have the capability of providing a reliable source of electricity, while keeping renewability and cost-efficiency in perspective. To achieve this goal, recycled synchronous electric motors were utilized in a novel way in conjunction with 3D-engineered modules, electronic components, and a main aluminum profile support structure to design a functional and efficient device that would be able to transport loads while producing sufficient quantities of sustainable electricity through the simultaneously created rotation of the device's wheels. Subsequently, it was determined that the device can produce more than sufficient quantities of electricity for personal electronics as well as provide up to 3.36 hours of continuous lighting through its integrated lighting mechanism on a full charge. In addition, the device's integrated AC outlet and USB port alone were capable of providing up to 120V of power and 3.024W for 2 hours, respectively. It was concluded that the device is fully functional and is able to generate the electricity needed to power personal electronics as well as act as a reliable lighting source. Through the application of this portable and cost-effective design, the device can be used universally as a reliable electricity source for communities and individuals alike.