Electrify Your Step -- The Next Stride: Converting Foot Traffic Into Renewable Energy Using Piezoelectric Transducers

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The world's increasing demand for energy, combined with concerns over climate change, highlights the need for more sustainable energy sources. Piezoelectric energy harvesting is a renewable energy source that can generate electricity from everyday activities, such as walking. In response to this need, I designed a device that meets seven distinct design criteria to generate electricity from everyday actions. The seven design criteria are critical to ensure the device's efficiency, accessibility, and durability. First, the device must produce more electricity than the previous year's prototype when stepped on. Second, it must be able to store more power than the previous year's prototype. Third, it must be able to generate and store power in public environments. Fourth, it must be durable enough to withstand 200 pounds of force. Fifth, it must be wheelchair accessible. Sixth, it must function after water is poured on it, and finally, it must cost less than $25. After developing the prototype, it was tested and found to have surpassed all design criteria. It is over 18 times more efficient than the previous year's prototype, as it charges a 1.2v NiMH battery 480 mWh after 500 steps. In contrast, the previous year's prototype only charged the battery 26.4 mWh after 500 steps. It also demonstrated its viability in a public setting by charging a battery 624 mWh on average. Furthermore, it is durable, accessible, and cost-effective, making it a practical solution to generate electricity from everyday actions. The success of this prototype shows the vast potential of this technology as a renewable energy source. It offers a sustainable solution to meet our energy demands while reducing our reliance on non-renewable energy sources that harm the environment.

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