Smart Self-Sustaining Lighting System

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In this second phase research the problem was: Will the design and construction of a real-scale smart lighting system be functional when used under the actual conditions of highways and tunnels? The hypothesis established that: If a real - scale smart lighting system is designed and built, it will be functional under the real conditions of highways and tunnels. Passing cars can produce a wind flow that is more constant than natural wind. This system includes a turbine that takes advantage of the wind speed generated by passing cars in highways and tunnels. Field studies were carried out to determine the optimum size of the turbine and to determine the best location of the turbine, at different distances and heights from the highway outer lanes, for greater efficiency. The energy needed to be generated by the turbine to turn on the LED light pole was determined. The real-scale smart lighting system proved to be effective. This self-sustaining smart system will guarantee the illumination in highways at a low cost and without environmental contamination due to fossil fuels used to generate energy. This system also can recognize a moving car from other objects or a wind breeze. Therefore, it can control when to turn on and off the LED light bulb. This contributes to reduce energy consumption and light pollution. The effectiveness of the construction and functioning of the smart self-sustaining lighting system was evidenced in the highway and in the tunnel, as stated in the hypothesis. Therefore, the hypothesis was accepted.

Awards Won:

Fourth Award of $500

Arconic Foundation: Sustainable Urban Design, First Award of $2,500