STEM Project Outline:

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Title: Brilliantly Bright Solar LED Stop Signs

Description of Problem:

By designing and implementing a stop sign with a LED lighting system powered by solar energy, we hope to create a safer standard for roadways while maintaining energy efficiency and as a byproduct, protection of the environment.

Real World Problem - The nation’s roadways are the scene of countless accidents, injuries and deaths each year. In an effort to contribute to safety on the road, we propose the creation of visibility-enhancing stop signs, wired with an LED lighting system. Further, in an attempt to conserve energy, we endeavor to make these stop signs solar-powered. These stop signs will increase visibility and as a result will hopefully lessen the probability of accidents. Also, these high-visibility signs will have a special application during inclement weather, as they will aid drivers in seeing and preparing for stops and as a result will make the roads safer.

Materials Required:

1 - State-regulatory Stop Sign

1 - 4.8V Cordless Screwdriver

1 - 18V Cordless Drill

1 - Generic Hot-Knife

1- Scissors

1 - Wire Cutter

2 - 4x Plastic Battery Pack

4 - 2ct Portfolio Lithium 3.2V Solar Rechargeable Batteries

1 - Sylvania LED Mosaic Starter Kit

1 - Tri-Count Solar Panel pathlights w/ Solar Generator

1 - Polystirene sheet 8’ x 4’ x 1”

1 - 24oz can of Flex Seal (as seen on TV)

1 - 10ct 3” screws

5 - rubber insulated gloves

5 - industrial work wear safety goggles

1 - first aid kit

Risks and Safety Information: (see attached Risk Assessment sheet)

Procedure:

Step One:

Take a standard size stop-sign and drill 8 holes at each of the corners.

Step Two:

Run the LED wire light behind the stop sign using the holes as guides for the lights.

Step Three:

Cut the Polystirene sheet into the shape of the desired case dimensions. We still need to figure this part out, but that’s part of experimenting.

Step Four:

Cut out a section of the sheet for the area of the solar panel generator.

Step Five:

Connect the solar panel wire with the LED power converter using specifically voltage converters

Step Six:

Figure out a way to hook up case of Lituium Solar Rechargable Batteries as a backup power source.

Step Seven:

Drill the sheet of polystirene into our casing, containing the wires, solar batteries, LED lights, and solar panel.

Step Eight:

Apply with Flex Seal.

Future application:

Pennsylvania, and in particular, the Philadelphia area, is unfortunately prone to severe weather. During heavy storms of varying nature, most notably snowstorms, traffic lights tend to go out. As a result, the township must dispatch drivers to lift open the stop signs at intersections. These drivers may have to drive in harsh winter conditions and the probability of accidents increases. As a result, they may not get out to the stop sign, and other drivers often suffer the consequences by crashing at intersections where no stop sign has been lifted. Our ultra-luminous signs could have a wireless receiver built into the case so the sign automatically flips on when a dispatch signal (wireless signal) would be sent out from the main Penndot or other township building. These signs, providing light for drivers to see the sign, could be a major benefit to visibility during harsh storms. However, the strength of the wireless signal and the distance from the stop sign could be a determining restraint on how effective the signs will be.