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From: Abigail Starks
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A Different Look at Energy Harvesting Roadways

Over fifty percent of the United States energy comes from coal and petroleum based fuels. Powering a nation in which the average person uses the amount of energy in 15,370 lbs of coal or 165,033 sticks of dynamite in a year is not sustainable. When thinking of a solution, the well-known renewable energy source that most likely comes to mind is solar power.

Solar panels are an impervious surface. Impervious surfaces already take up 32,868.61 square miles of roads, parking lots, driveways, and more. These surfaces displace rainwater to surrounding areas and have great impacts on the water table and soil quality. Utilizing already cleared land rather than clearing more would be beneficial to the environment, as solar fields require large amounts of cleared land.

In 2009 The Brusaws presented the idea of Solar Roadways to the world and it quickly went viral with a successful indiegogo campaign and a \$10,000 grant from the U.S. Department of Transportation. Many people have heard of solar roadways, but what if you could also collect the energy from your car rolling down the street?

Piezoelectric technologies have the capability to collect energy from mechanical movements such as the vibration of machines running or the pressure of a car passing over a road. With solar roadways shade, high traffic, and nighttime prevent energy collection. With the incorporation of piezoelectric technology roads could be collecting energy more efficiently.

The piezo-phototronic effect, makes adding piezoelectric technology even more desirable. When thin film nanowire piezoelectric technology is used in combination with solar photovoltaic cells, the piezo-phototronic effect magnifies the efficiency of the solar cells, by creating a more excitable solar cell, while allowing for the collection of mechanical energy when sunlight is unavailable.

While the application of energy harvesting roadways seems daunting, one must look at it from a small scale perspective. Small scale application is things like driveways, neighborhoods, pathways, and parking lots. All of these areas are low speed, making the dilemma of texture and safety at high speeds, less daunting.

Adding piezoelectric technology to neighborhoods would allow for pressure detection and smart roads, making it easier for people to see distractions like small children playing on the road. With ever dwindling resources for energy consumption, combining technologies in order to most efficiently collect energy from renewable sources while improving our surroundings will be necessary.

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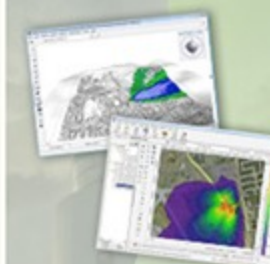
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