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A Review on Design and Fabrication of a Solar Roadways

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Abstract - The Solar roadways is a series of structurallyengineered solar panels that are driven upon. The idea is to replace all current petroleum-based asphalt roads, parking lots and driveways with solar road panels that collect energy to be used by homes and businesses. The renewable energy created by solar road panels will replace the current need for fossil fuel which is used for generation of electricity in turn reduces greenhouse gases. An intelligent highway infrastructure and a self-healing decentralized power grid at will eliminate our need for fossil fuels. Additionally, it can ue used for traffic detection, illuminated roadways and on the go charging of electric vehicles using inductive charging.

Key Words: solar, renewable energy, fossil fuels, greenhouse gases, electric vehicles.

1. INTRODUCTION

The solar roadways are a series of structurally engineered solar panels that are driven upon. The idea is to replace all current petroleum-based asphalt and concrete roads, parking lots and drive ways with solar road panels that collect energy to be used by our homes and businesses. The ultimate goal is to store excess energy in or alongside the solar roadways. This renewable energy replaces the need for the current fossil fuel use for the generation of electricity. This, in term, reduces the greenhouse gases to half. The Solar roadways system would might, at present, cost about 3 times

hat it costs to install and asphalt road but would be more uurable, more easily replaced in modular fashion and is able to pay for itself by generating more electricity than our economy can consume. At just 15% efficiency, far below what is expected, 100% solar roadways at enabled driving infrastructure would produce 3 times total electricity demand. There are additional benefits as well, which is a built-in smart grid, major new investment and job creation. The economic benefits inherent in global leadership in build in the most advanced clean energy infrastructure. Every dollar invested in renewable sources ultimately generates return because the resource is not burnt and lost. The roadways can also communicate with drivers, altering drivers with visual message to caution about the road ahead, help in traffic management, illuminate roads, at night for better visibility of the roads and lane markings. By integrating wireless inductive charging in the solar roads, we can also charge electric vehicles on the go.

They can make the emerging electric vehicle economy far more affordable and easier to manage. They can help us to eliminate 100s of billions of dollars per year, or more in

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externalized costs of burning fossil fuels. Perhaps the most important element of solar roadways technology is that its power generation capacity demonstrates the base load viability of renewable energy sources. Clean energy technology existence can power the entire countries economy and more.

1.1 Mean Daily Global Isolation

Insolation (also known as solar irradiation) is a measure of the solar radiation received by a given area over a given period of time. The unit used for insolation is either MJ/m2 or kWh/m2. The mean daily global insolation will give a measure of total solar energy available in each part of India. In order to calculate the amount of electricity that can be produced by the solar panels, the solar insolation data for each area are required, so that the calculated amounts of electricity that can be produced by the solar panels are closer to the actual electricity that will be produced under real environmental conditions. The mean daily global insolation values given in map for the purpose of evaluating the mean daily global insolation, the following factors have been taken into consideration:

- Solar panel orientation is treated as horizontal for this case, as they are going to be placed on roads.
- Period for which the mean daily global insolation is considered is annual. This consideration is made as we require data for calculation purposes only. The period can also be considered on a monthly or daily basis instead of annual, for more accurate calculations.
- Maximum and minimum available mean daily global insolation value as depicted in map are taken into consideration, so that an upper and lower bound estimate of the amount of electricity that may be produced by the Solar Roadways system can be predicted.

The Average Mean Insolation received in India is around 5 kWh/m2/day which is around 1825kWh/m2 per year.

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