

Solar Roadways: Redefining Energy

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Purpose of Study

The purpose of this study is to show the viability of solar roadways and examine if they would help generate clean renewable energy.

Introduction

A Solar Roadway is a type of Smart Highway which are different proposals for incorporating technology into roadways to generate solar energy, improve smart cars, lighting and monitoring the roads. Solar Road Panels replace asphalt and absorb the rays of the sun.

Public Perception

Most people have never heard of Smart Highways or Solar Roadways. In general, Solar energy and renewable energy are viewed positively in the public realm.



Figure 1. Solar Panels on a Solar Farm.

Practical Application

The solar roadways have three layers:

- **Glass Road Surface Layer:** which contains photovoltaic cells, traction and waterproofing
- **Electronic Layer:** Contains a mini processors which regulates temperature or can measure weight
- **Base Plate Layer:** Collects energy and distributes to nearby structures

In Jinan, Shandong Province of China they have built the first solar roadway.

Potential Drawbacks

Cost: Solar roadways require a higher initial investment than concrete.

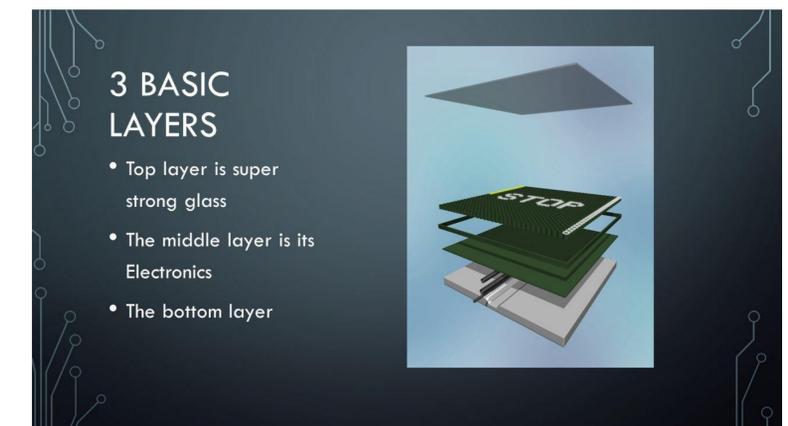
Efficiency: Solar panels are placed at an angle to maximize efficiency, however roadways need to be laid flat, therefore they aren't as efficient.

Safety: for the light to reach the base plate requires clear roads, adding gravel and rock to increase traction would reduce efficiency of the solar roadways.

Diagram

Solar Roadway cost \$458 meter sq compared to \$5 for conventional roadway.

The Jinan highway cost 2.7 million dollars and generated \$125,000 worth of energy or enough to power 93 American homes.



Conclusion

Solar Roadways require a significant upfront cost 90 times as much as a conventional road. It would cost 56 trillion dollars to replace all of the US roads with solar roadways. There is significant safety risks associated with Solar Roadways and further studies need to be done.

References

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