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Solar Roads

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Abstract**—***Revolution in "Science & Technology" is always been a CHANGE for everyone. SOLAR energy is one of that change. The IDEA of "ROADS" converting solar radiations into an optimal output can generate huge amount of energy. Unlike the solar road in FRANCE, This idea is to "REINFORCE" concrete with solar technology. In a country like India where sunlight is available in abundance, just imagine the OUTPUT this roads can provide. This can lead to a new era, where one is using solar power at its maximum and also will prove an alternative to other FUELS which will "EXHAUST" in the near future.*

Keywords—Generating Roads, Reinforced Roads, Solar Roads.

I. INTRODUCTION

Solar roads is a concept that has a potential to replace all asphalt and concrete roads with a desire to generate electrical energy from solar radiation. These roads will not only have the capability to provide power to street lights, signals, CCTV but also can meet up energy demand of several houses.

II. WHY SOLAR ROADS

In a country like India where there are approximately 300 clear, sunny days in a year, one can say that India is blessed by solar radiations. Installation of these roads can produce energy that can solve the problems of power failure as the generated electrical energy will be utilized to supply for the areas nearby.

Fig. 1

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III. NEED OF SOLAR ROADS

Everyone is aware of the fact that the conventional sources of energy are exhausting at a very fast rate and will be unavailable in the near future. Renewable source like solar energy can prove to be an alternative to all the fuels that are being currently used. As the source of solar energy is the sun, and the process of generation of electrical energy us pollution free, this can change everything as it can reduce the biggest problem faced by us of global warming.

IV. MATERIALS USED

The material used for manufacturing of these type of solar panels should be capable of bearing high load. Cars, bikes, trucks and busses are basic vehicles used for transportation, as some of these vehicles are on heavy load like trucks, the panels should be able to meet up the expected load conditions and should not break.

Another factor that can affect these solar panels is various seasons and climatic changes that these panels will undergo. Hence the martial should also be water-proof and durable at the same time to prove reliability.

Fig. 2

V. COST

The biggest challenge for this vision of having solar power roads on the streets of India is its cost. The solar road currently build in France costs around 400 dollars per square feet which rounds up to billions of dollars per square mile, which us ridiculously expensive.

The reason why it is so expensive from my opinion is that, there needs to be innovation done for the making, testing and installing of these solar panels which is lacking behind. For example, when mobile phones where just launched in the later part of 20th century the cost to make a single call anywhere was unbelievable and only the rich personalities was able to afford those mobile phones. But if we compare it with today's date, mobile phone are provided with all the facilities someone can think if that too at a very cheap amount.

Same kind of innovation in the technology can be done by introduction of materials that are cheap but have higher rate of absorbing solar radiations also materials having higher refractive index which help in collecting most of the solar rays helping to increase the efficiency of the entire system.

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VI. EFFICIENCY

The average efficiency if the panels used by residents in United States is about 20%. In other words it can be said that 80% of total energy that could have been converted for electrical energy generation is wasted.

But by constant progress in the technology and innovations done in this field has given us a shocking experimental result of reaching world record of 46% efficiency of a 4-junction solar cell experimentally on 24th April, 2017 by Kobe University. This result is more than two times efficient than that of the commercial solar cells which are available in the market. This will lead to production of more than twice as much electricity from the previous used panels.

Experiments will keep on going to find ways to reach the highest efficiency possible for solar panels as this source is renewable and is available in abundance in country like India.

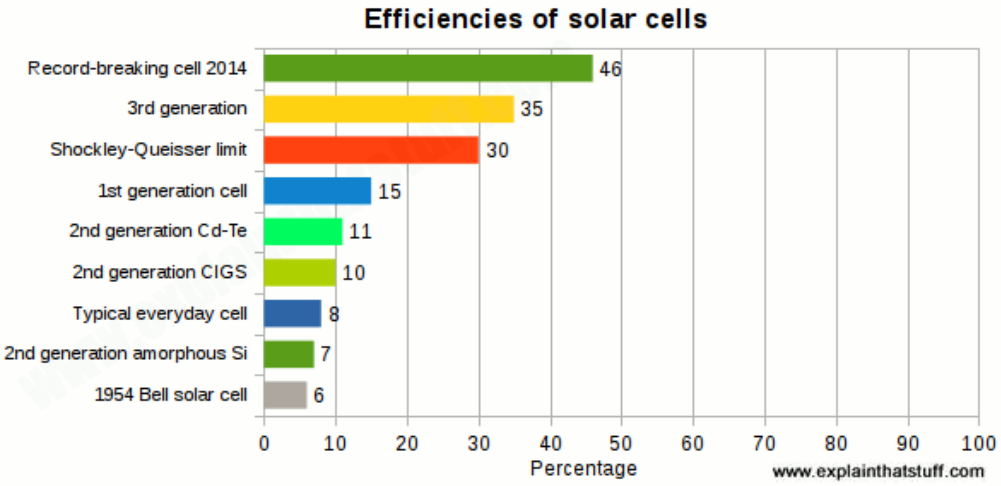

Fig. 3

VII. LIFE OF SOLAR PANEL

The average life of solar panels made commercial today is about 20 years. However in case of solar roads these panels has to deal with much more harsh environment including heavy load of vehicles, changing temperature, change in applied pressure on the panels, climatic changes etc. still the life of the currently working solar road in France is expected to have a life span of 25 years which is satisfying.

The more the durability of the solar panels used in the construction of solar roads, more will be the life span of these roads. Again selection of material used for manufacturing of these solar panels is very important as it is responsible for the reliability, efficiency and economy of the built-up of these solar roads.

VIII. CONCLUSION

8.1 Advantages

1. Renewable source of energy.
2. Reduction is transmission cost.
3. Lighting up of roads.
4. Digital direction assistance and signal system.
5. Intelligent road system.
6. Life span.
7. No more need if over-head transmission lines.
8. Management of snow.

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9. On the go charging for E-vehicles.
10. Traffic control system.

8.2 Disadvantages

1. Low efficiency of panels.
2. Maintenance cost.
3. Seasonal efficiency.
4. Proper requirement of town planning.
5. Solely dependent on solar radiations.

Implementation of solar roads can be the future of generation of energy not only for India but for the entire globe. Being a renewable source of energy and being non-polluting this system has an potential to not only provide a huge amount of electrical energy but also proving to be eco-friendly and will play as a vital role in decreasing the biggest problem faced by us that is global warming.

ACKNOWLEDGEMENTS

An acknowledgement section may be presented after the conclusion, if desired.

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