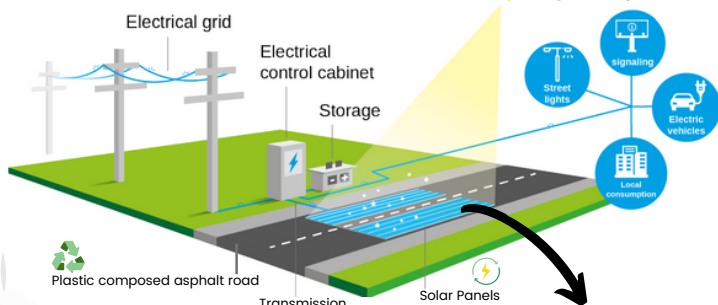


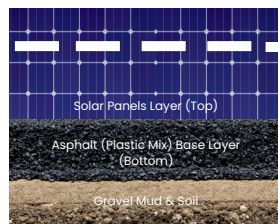
## Motivation

The climate is changing and CO<sub>2</sub> emissions have been rising steadily since 1769 Industrial Revolution. The **solar energy** is instead used as replacement energy to reduce the impact footprint from non-renewables. Moreover, the **asphalt roads** account for approximately 2.5% of total GHG emissions per year and have an albedo of 0.4 and 0.2–0.5 percent of the world's land surface. Combined with solar energy and **plastic recycling**, the solar road farms of the future are made. Amidst climate change worstly affecting the **Indian subcontinent**, this could play a part in mitigating it.



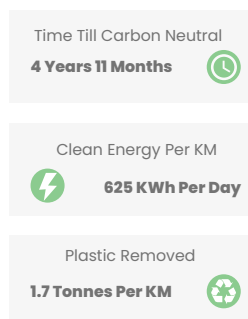
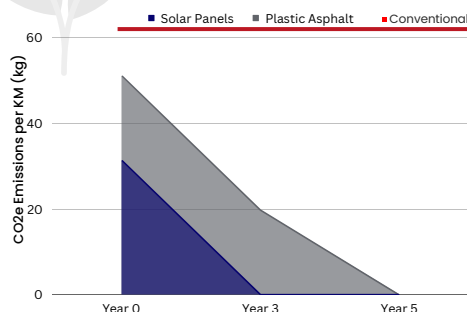
## Idea

The '**Recycled Solar Road**' is composed of a bottom base layer of an asphalt base with weight composition of 95% gravel & 5% bitumen (of which 8% plastic).



The upper layer is then embedded with photovoltaic solar cells along with its circuitry. The top-most layer is reinforced transparent plastic/glass for protection and grip. The bottom most layer is soil and gravel. Both technologies have been implemented in separate projects around the world, however, this idea proposes for a combined implementation to reap the benefits of plastic removal as well as clean & green energy.

## Environmental Footprint



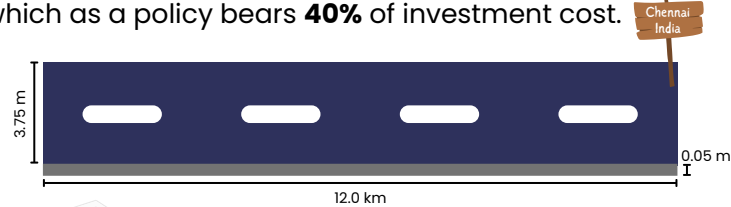
Solar Energy Production Per Day (12 kms)  
**7.5 MWh**

Life Span of Plastic Road  
**3X Times More 54 Years**

Houses That Can Be Powered in India Using This Solar Energy  
**1315 houses**

## Project

The project by **Larsen & Toubro Construction** (L&T) is the construction of a **12 kilometres** one-laned single carriageway highway of width **37.5 metres** in Chennai, India. The nature of the project is a 50 years public-private partnership (**3P**) with the Government of India, which as a policy bears **40%** of investment cost.



## Financial Outcome

*\*all figures are in INR currency*

The project's financial comparison is calculated in aspects of difference. Moreover, using the Recycled Solar Road, the project becomes relatively increased cash-flow generating asset, irrespective of added revenue streams, e.g. tolls, taxes, etc.

	Conventional	Recycled Solar	Trends
<b>Bottom Layer</b>			
Bitumen Cost	11,795,625	10,851,975	↓
Plastic Cost	0	251,640	↑
<b>Top Layer</b>			
Solar Panels Cost	0	256,542,857	↑
<b>Govt. Contribution</b>	4,718,250	107,058,589	↑
<b>Total Investment</b>	7,077,375	160,587,883	↑
Per Year Cash Flow by Selling Electricity @ Rs.6/KWh	0	98,592,792	↑
Per Year Maintenance Cost	1,800,000	600,000	↓
Solar Panels Replacement Cost @ Year 25	0	256,542,857	↑
<b>PV for 50 Years @ 5% Rate</b>	0	1,713,191,290	↑
<b>Net Present Value (NPV)</b>	-39,938,041	<b>1,552,603,407</b>	↑

Over time we expect the costs of this and similar projects to decrease further because of more favourable market price trends, increased competition, and further research in these active technology areas.

## Social Impact

This Recycled Solar Road has the potential to drive the following positive social impacts:

- Becoming a carbon-neutral project and a source of clean renewable solar energy.
- Removes plastic that would otherwise pollute landfills that could be used for, e.g. plant trees.
- Increased revenue stream for the Govt. to spend on further welfare policies for the public.
- Step in advancing UN Sustainable Development Goals '13: Climate Action' and '7: Affordable & Clean Energy'.