



Integration of Recycled Tire Rubber Pavements and Solar Energy, a Novel Concept

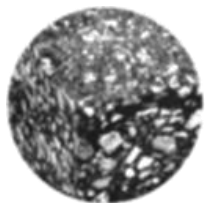
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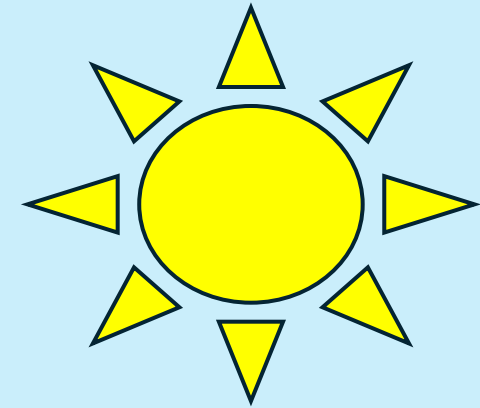


AR and Solar panels over roadway

Good synergy

- **AR recycles tires**
- **Saves energy**
- **Less CO2**
- **Improves pavement performance**

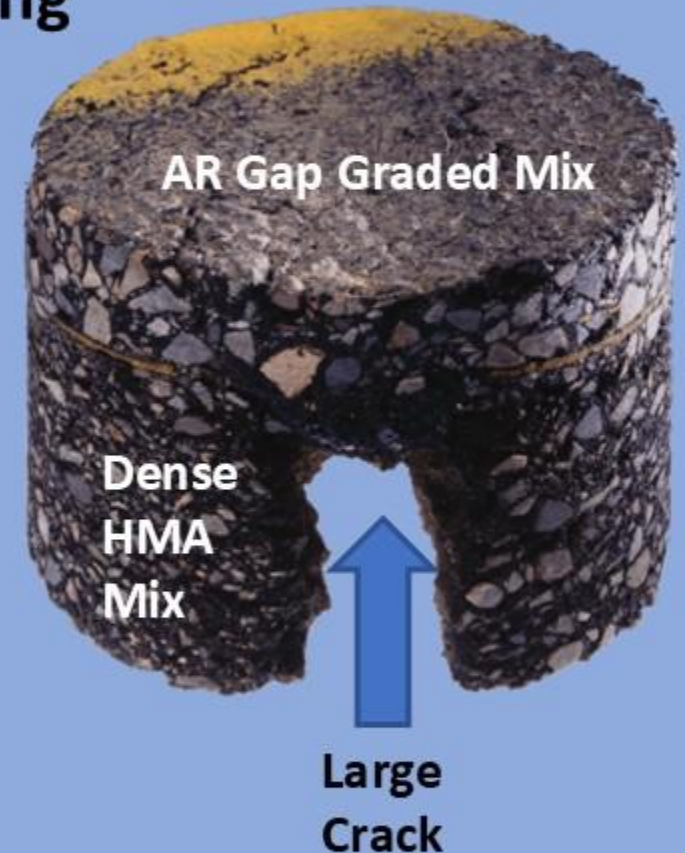
- **Solar panels over roadway**
- **Ample supply of electricity**
- **Roadways last longer less sunlight**
- **Safer roads, less wet pavements**
- **Lighted at night**



Asphalt Rubber Benefits from Numerous Studies

- Less Reflective Cracking and other cracking
- Less Maintenance/More Durable
- Less Raveling
- Good Rut Resistance
- Good Skid Resistance
- Smooth Ride
- Good in hot & cold climates
- Less Splash & Spray Better Drainage
- Less Noise
- Cost Effective
- Engineering Use for Old Tires
- Sustainable & Environmentally Friendly

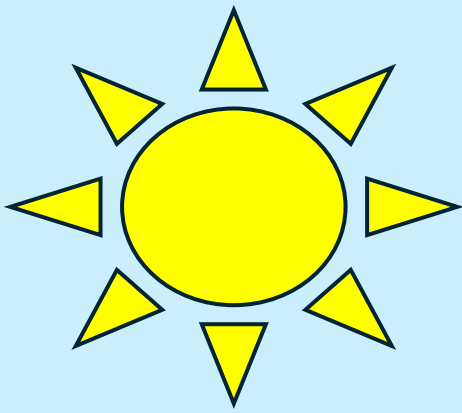
■ Benefits of AR



Environmentally friendly

- Recycle tires in a engineering beneficial manner, there are a billion scrap tires per year
- Reduce chance of tire fires
- Eliminate mosquito breeding place
- Reduce noise via open graded surface with rubber, less splash and spray
- Thinner pavements energy and CO2 reduction
- Help reduce degree of urban heat island



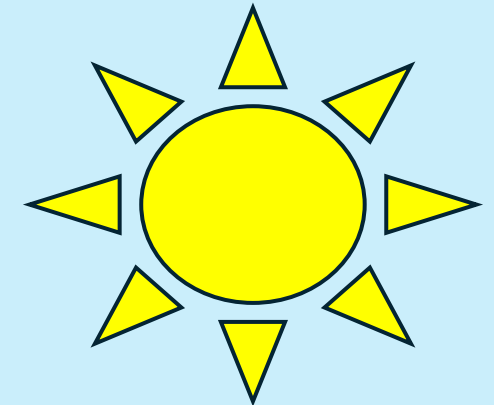


Solar Power Energy Benefits

- ❖ **Clean and renewable source of energy**
- ❖ **Reduces emissions**
- ❖ **Conserve water**
- ❖ **Reduces air pollution**
- ❖ **Low maintenance**
- ❖ **Grid instability and resilience**
- ❖ **Job creation**
- ❖ **Versatile applications**

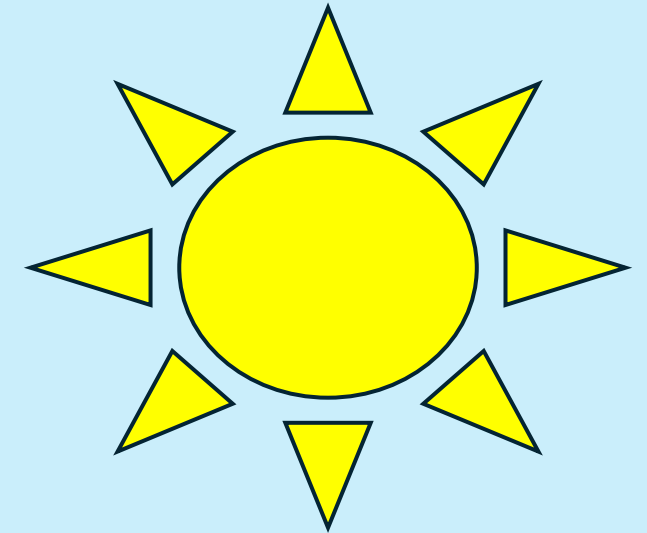
Meet the needs of society

- ✓ Recycling tires
- ✓ Conserve energy
- ✓ Provide sustainable pavements
- ✓ More energy particularly electricity
- ✓ Electricity to support transport cars/trucks
- ✓ Electricity to support AI
- ✓ Resilient sustainable society



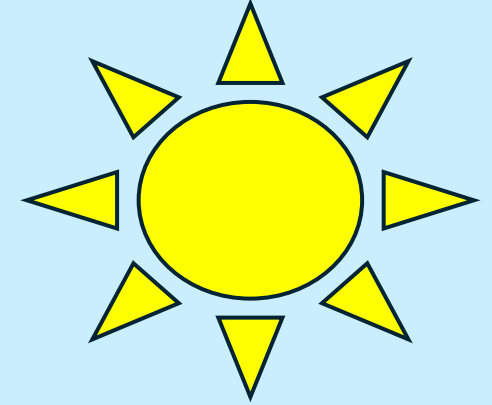


2022
Concept
of solar
panels
over an
AR roadway
Source
Sousa 2022



The southwestern U.S. receives the highest levels of solar radiation.

Source NREL 2018.



The entire U.S. electricity demand could be supplied by photovoltaic (PV) cells covering the area in the desert Southwest represented by the yellow box (assuming 10% of incident solar energy is delivered to the consumer) Source [Holtzapple, 2020]

Concept Phase:

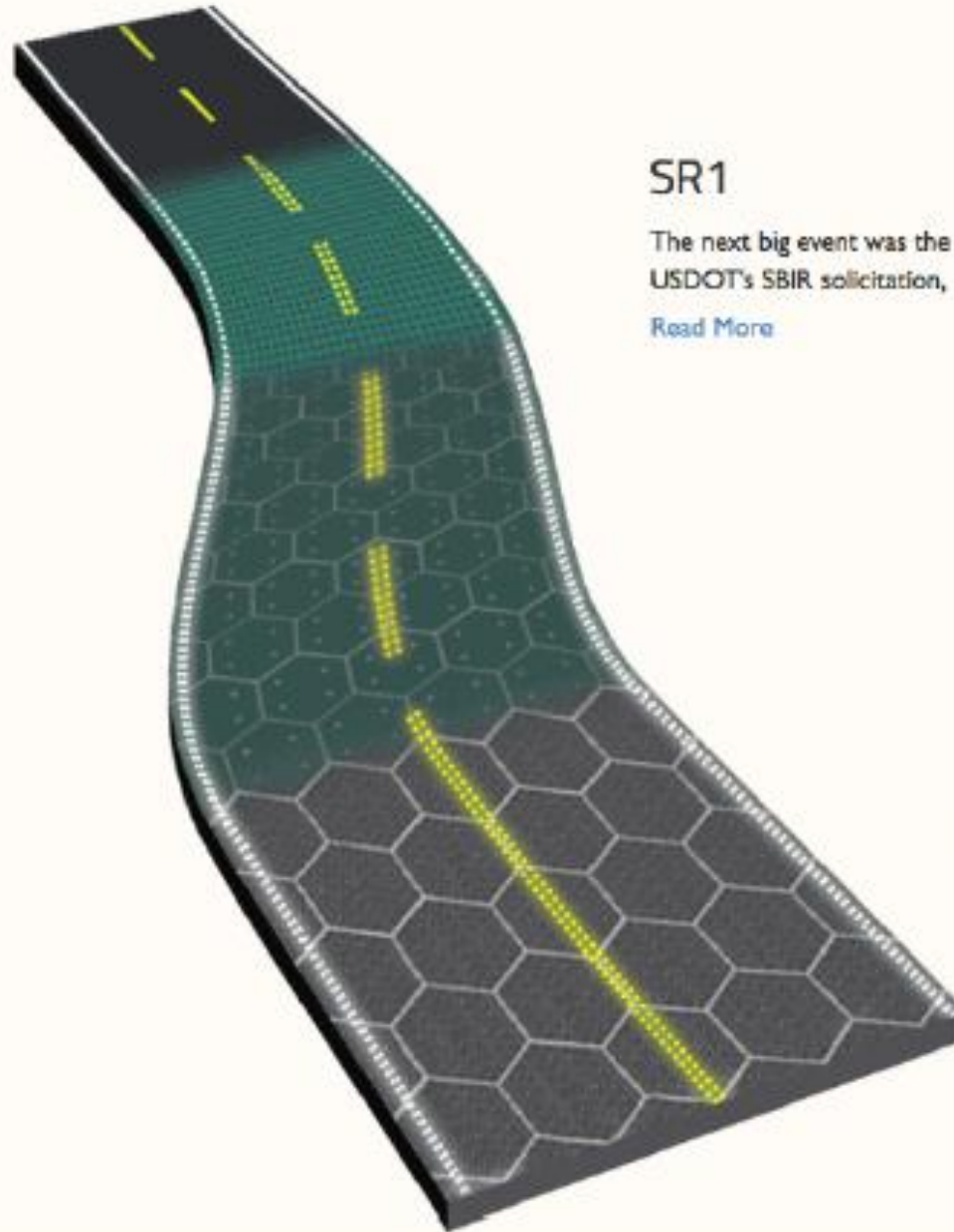
The Solar Roadways® journey began on an ordinary day, as

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SR2

We were awarded a 2-year \$750,000 Phase II SBIR.

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SR1

The next big event was the USDOT's SBIR solicitation,

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SR3

At the end of our Phase II contract, we were invited back

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**Concept
solar panel
roadway
2017
Source
[Potti, 2017]**



**Concept
solar
panel
roadway**

**Solar road in France suffered
damage under traffic2016-2018
Source [Colagressi, 2019]**





Concept of future solar panels over roadway



Concept of future solar panels over roadway



Concept of future solar panels over roadway

U.S. Interstate Highway System



**Inside Red
Outline Area of Highest
Solar Energy Best Location
For Solar Panel Roadways**

Solar Panel Photovoltaic (PV) Research Paper 2024

Hou Jiang, Ning Lu, Jun Qin, Ling Yao, Xu Lian, Jijiang He, Tang Liu, Chenghu Zhou, “Roofing Highways With Solar Panels Substantially Reduces Carbon Emissions and Traffic Losses,”

“Our assessment reveals that highway PV (Solar Panels) can generate tremendous amounts of electricity and bring huge co-benefits by reducing both CO₂ emissions and traffic losses.”

Solar Panel Photovoltaic (PV) Research Paper 2024

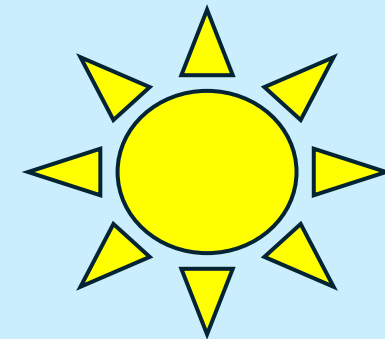
Key Points

PV systems across existing highway networks has the potential to generate 17,578 (TWh). Which is 17,578 trillion-watt hours of electricity annually, offsetting nearly 28% of concurrent global carbon emissions.

Additionally, the highway PV could potentially prevent 150,000 traffic deaths annually and bring profits amounting to \$14.42 trillion over a 25-year lifetime.

Summary Benefits

- **Solar Panels Generate Electricity for 25 Years+**
- **Help meet need for more electricity, cars, homes, AI**
- **Less CO2 emissions from solar electricity**
- **Less sunlight on the pavement longer pavement life**
- **Especially AR pavements**
- **Recycle tires for great sustainability benefits**
- **Less rain on pavement fewer wet weather accidents**
- **Light the roadway at night fewer nighttime accidents**
- **Saves lives**
- **Solar energy could be directed to the pavement vehicles**
- **could recharge while driving in the recharge lane(s)**
- **Reduce cost of land, government owns highways**



Arizona Sunrise on the future of AR and Solar Energy

