

Shade & Sustain

Collapsible Solar Fabric Canopies to Protect and Power the World.

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Related SDGs:

3 GOOD HEALTH AND WELL-BEING



5 GENDER EQUALITY



7 AFFORDABLE AND CLEAN ENERGY



8 DECENT WORK AND ECONOMIC GROWTH



10 REDUCED INEQUALITIES



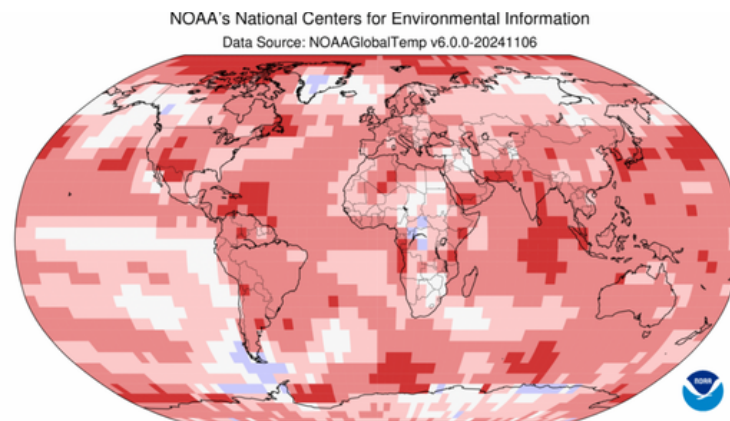
The Challenge:



2024 is on track to be the warmest year on record.

Heat stress is the world's leading cause of weather-related deaths.

Women disproportionately face the physical and financial effects of rising temperatures.



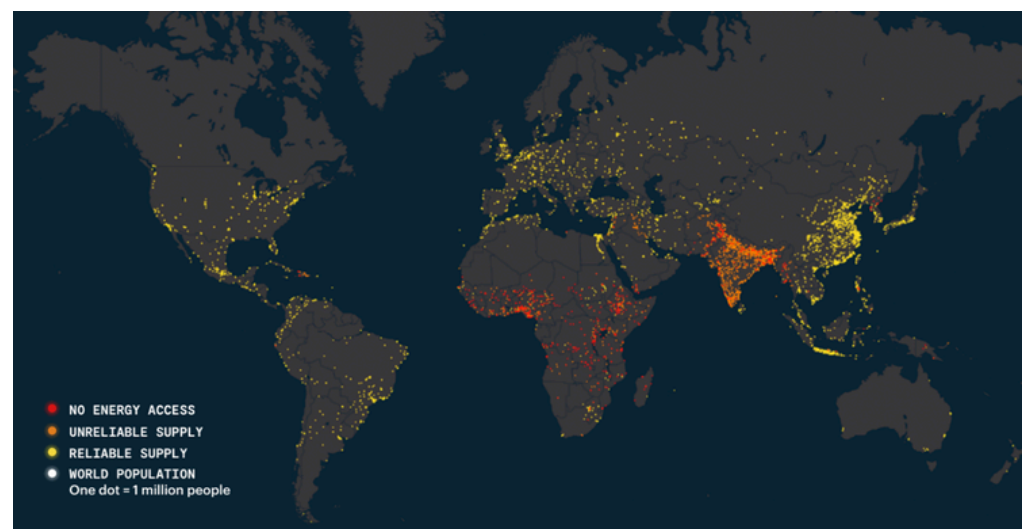
Land & Ocean Temperature Percentiles Oct 2024



789 million people worldwide have no access to energy and roughly 1.5 billion are without reliable access to energy.

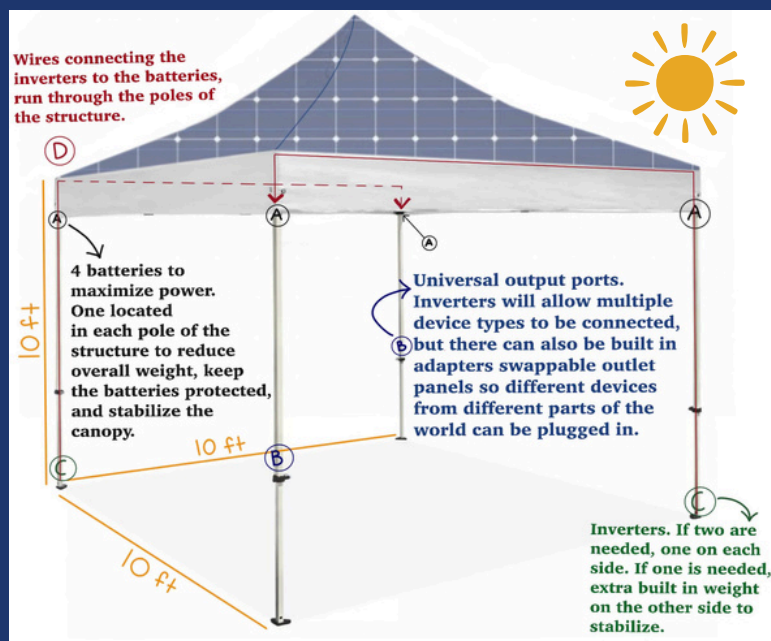


Access to energy is unequal throughout the globe.



Our Solution:

We propose a collapsable, portable solar fabric canopy to provide relief from extreme **heat** and an **energy source** for underserved areas.



Solar Fabric: Our project was inspired by solar fabric technology designed by MIT engineers. They have designed flexible, durable solar cells that can be applied to fabrics. Other solar fabrics have been designed as well, and we believe this technology could be helpful in creating a *collapsible, portable solar canopy*.

Challenges:

This canopy would require time to charge in the sun before being ready for use, so clear instructions must be provided to users. There are also challenges related to the efficiency and water-resistance of the solar fabrics.

How it Works:

- 5-12 volts of power.
- Will power standard electronics, and if it can harness more energy, we'd like to power things such as small-scale refrigeration.
- We would like to find a way to connect multiple canopies together to maximize power.
- Will include physical copy of user instructions.

Implementation:

Potential Locations/Uses:

Street Markets, Refugee Camps, and Climate Disaster Relief Areas. Our goal is to create an adaptable product that can be utilized in various settings across the globe. Vulnerable, low income, and displaced populations are most impacted by extreme heat and lack of access to energy. Distribution of our product would target these populations first. The product's portability allows it to be utilized in both long term and temporary settings.

Life Cycle Analysis

In an effort to reduce unnecessary additions to the waste stream, we would like to:

- Use new batteries/inverters/wires in production to maximize power and life span.
- Identify a way for used batteries to be shipped backed to us and then sent to an R3 recycler with an e-Stewards certification - such as BLH Computers, Inc in Springfield, IL - to ensure ethical electronics recycling.
- Reuse and remanufacture as much of the product as possible for as long as possible.
- Work with experts to find some use(s) for solar fabrics (the entire product or parts) after the end of the product's life span.

Similar Products:

Solar powered tents have been developed, mostly for emergency situations, with efficiencies of 15-25% and lifespans of 10-15 years. Since our product's design is different in that it utilizes solar fabrics and is more portable, its specific efficiency levels and lifespan are unknown.

Next Steps:

- **Funding for Research:** The U.S. The Department of Energy (DOE) provides funding for research on photovoltaic technologies among other organizations/agencies.
- **Development:** Work with electrical engineers to develop the product and plan for manufacturing.
 - Solar Cloth is a company that uses thin photovoltaic layers and works with individuals to help develop project ideas.
 - Their efficiency for their technology is increasing and is currently at 17%.
- **Partnership** with an organization that can distribute the product such as the U.S. Agency for International Development (USAID) or the Solar Electric Light Fund (SELF).

SDG Advancements:



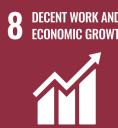
3 GOOD HEALTH AND WELL-BEING Protection from heat and heat-related harm is essential for good health and wellbeing. Reducing personal energy loss from heat will allow individuals to complete activities that better their wellbeing.



5 GENDER EQUALITY Relief from heat will help women to be healthier/safer. A portable energy source will promote economic equality and will empower women by providing them with access to the internet for economic, educational, and personal activities.



7 AFFORDABLE AND CLEAN ENERGY This product could provide a portable, renewable energy source for various settings and locations.



8 DECENT WORK AND ECONOMIC GROWTH Reduction in economic losses from climate disasters by providing access to the internet for economic endeavors.



10 REDUCED INEQUALITIES Access to energy in underserved areas reduces inequalities by connecting individuals and communities to economic opportunities, virtual healthcare, educational materials, and more.

Conclusion:



As climate change causes global temperatures to continue to rise, adverse health risks from extreme heat exposure will increase. Access to a portable shade source is and will be crucial for protecting individuals from heat-related harms. While the world strives towards development, it is imperative that we aim to develop sustainability. Providing a renewable, portable energy source will promote clean energy and equitable access to energy in both developed and developing countries.

Specialist Acknowledgment: Karin Hodgkin Jones | Sustainable Design at the University of Illinois - Urbana/Champaign | khodgin2@illinois.edu

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