Feasibility of Efficient Photovoltaics in Eastern Kentucky & Developing a 3-D printed solar vehicle with CFD simulator

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Introduction
- The research focuses on assessing the potential of solar energy in Eastern Kentucky.
- The study also includes the development of a 3D printed solar vehicle with a CFD simulator.

Findings
- The findings are presented in the form of graphs and images.

Results
- The graphs show the performance of the solar panels across different locations.

How to improve
- The algorithm development is described in detail.

Objective
- Develop a highly efficient solar vehicle by using CFD programs to minimize drag coefficient.
- Establish a working design for future prototyping.
- Prototype and test a working model.

Computational Fluid Dynamics
- Study of fluid flow by using advanced numerical analysis and algorithms to solve the interaction of liquids and gasses on boundary surfaces.

By using CFD, the vehicle design can be optimized by simulating the interaction of air flow on the model and utilizing the visual data received to make adjustments.

American Solar Challenge
- The American Solar Challenge is a competition to design, build, and drive solar-powered cars in a cross-country time/distance rally event. Teams compete over a 1,500-2,000 mile course between multiple cities across the country.

Future works
- Implementation of developed algorithm in the field.
- Actual field test of designed solar collection tracking system.
- Realize future data to compute for percentage increase.
- Exhibit true newly developed efficient photovoltaics with full power for this region.

Appendix: Algorithm in MATLAB

Conclusion
- In conclusion, the study demonstrated the potential of photovoltaics in Eastern Kentucky, highlighting the feasibility of developing an efficient solar vehicle using CFD technology.

Current design is roughly around a .65 drag coefficient with top tier solar racers reaching as low as .07-1. My current goal is to optimize design until I can reach a drag coefficient around .15.