Linear vs. Parabolic Concentrated Solar- Thermal Power

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My experiment involving concentrated solar-thermal power investigated the efficiency of linear and parabolic energy systems for heat production targeting to identify the most effective model for harnessing solar energy. Through construction, testing, and data analysis of both systems, I compared their heat generation capabilities on a hot day in the Caribbean. My results indicate that the parabolic system outperforms the linear counterpart in terms of heat production, as the receiver on the parabolic model was at 311 degrees, compared to the low 130 degrees of the receiver on the linear model, after 15 minutes. The parabolic model suggests its superiority for centralized solar thermal energy generation. Moreover, the study discusses the potential implications of these findings for renewable energy adoption, particularly in regions like the US Virgin Islands, emphasizing the need for government support and community engagement to facilitate widespread implementation. Even though the parabolic system contained more reflectors than its linear counterpart, it was still able to outperform it by over triple the heat generation. Problems that occurred in this experiment were gluing various parts of the models together, and measuring the temperature of the receivers as the thermometer was having difficulties with the high temperatures. Overall, this research provides valuable insights into optimizing concentrated solar thermal energy systems, highlighting the potential of parabolic models in the Virgin Islands for sustainable heat generation from solar power.

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