

Example of essay on argument research synthesis paper - chapter 1

[Environment](#), [Electricity](#)



The practicality of solar power is a very important environmental issue for mankind; due to the dwindling natural resources of this planet, it is growing more and more feasible as an energy alternative. As a result, I found it an intriguing topic on which to base my synthesis paper. The section of Chapter 1 of Physics for Future Presidents called "Sunlight and Solar Power" pertains directly to this subject; providing essential information for the basic facets of solar power, it permits a baseline knowledge for a greater understanding of the topic. With the help of other studies on its usefulness and practicality, these concepts can be synthesized in a useful way.

In Physics for Future Presidents, Muller (2008) explains the power that comes from the sun. It provides 1 kilowatt per square meter of the sun, which also totals up to 400 watts of electricity, provided it is captured accurately via solar cells. The perspective of most environmentalists, according to the book is that "the best source of energy for the long-term future is sunlight" (p. 19). The appeal of solar power comes from its renewable nature, as the solar energy will be around for at least the entirety of human history. Silicon solar cells are used to collect this solar energy and convert it into electricity.

The impracticality of solar power at the time is also brought up, making it far from completely feasible as a complete replacement; solar cells can only convert approximately 15% of the power it receives, the rest just getting reflected (Muller, p. 15). The only way that solar power is going to be a viable alternative to fossil fuels is when the ratio of collected energy can be increased. At the same time, the power requirements for many cities are much smaller than anticipated; also, as long as a good way to store the

leftover energy is found (such as hydrogen fuel cells), it would be possible to power devices at night without direct sunlight power (Muller, 2008). The high expense of solar panels at this time is also an incredibly cost-prohibitive measure; it must become more cost-effective to produce these photovoltaic panels (or more durable ones) in order to create a successful solar power initiative (Muller, 2008).

Muller also examines the potential benefits of powering cars and planes with solar power; private races of solar-powered vehicles have proven the feasibility of these vehicles as real, working machines (Muller, p. 18). The only problem, however, is the incredible cost of manufacturing for these - even the most efficient solar panels only have a 40% efficiency rate (Muller, p. 20). A car powered by solar energy would need an incredible amount of space in order to have the solar panel layout required to run it effectively (Muller, p. 20).

Patel (1999) discusses various aspects of solar power, in particular the specifics of how a solar photovoltaic power system would work. The pv Cell is the primary means by which solar power is collected and turned into photovoltaic energy; it works by absorbing light into the cell, thus transferring the absorbed photons into the electron system contained within the cell. This creates charge carriers which circulate just like an electrical circuit, thus generating power (Patel, p. 125). By understanding the specifics of the science of solar power generation, finding ways to implement it on a large scale to replace fossil fuels can be more easily found.

Chedid (1997) emphasizes the importance of efficiency when designing new solar power and wind power systems. He offers a design model in which to determine exactly how best a solar power system would work when linked to a power grid. In this technique, linear programming principles are used to make solar-powered electricity costs much smaller, while reliably meeting the power requirements needed for infrastructure (p. 84). With Chedid's methods, solutions are being met to the potential problems of effective solar power conversion and integration into city power grids, thus solving the inherent problems of switching to this renewable energy source.

Lorenz et al. (2008) discusses the economics of solar power, and determines that it is far more feasible and economically attractive than previously thought. One particular factor that is leading to the appeal of solar power is the increasing cost of fossil fuels; while alternative energy is still expensive, the cost gap between it and traditional sources of power is closing. The solutions, according to Lorenz et al. are the increase of investment capital into solar solutions, creating a whole new private sector being created for solar energy. The investment capital would allow the solar-generating capacity of the world to expand up to 40 times higher than it possesses now (Lorenz et al., p. 3).

In order to make these technologies feasible, solar producers have to do a few things first. Costs must be driven down, in terms of production of these solar-making materials. This means more research into cost-effective ways to produce these materials (perhaps like the molten salt-based program suggested by Slocum et al.), as well as the careful distribution of subsidies to

make sure that they pay off on the alternative energy market. Different varieties of photovoltaics, such as silicon-wafer-based and thin-film, provide unique subsets of problems, from lack of cost-effectiveness to inefficiency, as well as limited scope in their uses (thin-film, for example, can only be used in large field installations) (Lorenz et al., p. 4).

Zweibel et al. (2007) presents a 'grand plan' for solar energy that would remove the US dependence on foreign oil, cut greenhouse gas emissions down dramatically, and increase solar power by the year 2050. In this plan, they lean heavily on previously-mentioned methods like hot salt generators, as well as new ones like compressed-air energy storage. This relies on the pumping of compressed air into empty underground caves, which would power a turbine that creates the electricity needed to power cities; these would be powered by solar panels themselves. This increases efficiency of the solar panels immensely by creating a secondary level of power generation (Zweibel et al., p. 4). The building of direct-current power lines is suggested as an alternative to alternating current, and a schedule for loans, subsidies and the like to turn solar power generation into a competitive market (Zweibel et al., p. 4).

The authors' biggest concerns are lack of material resources, as well as a lack of public awareness that would slow down the rapid deployment necessary to make their grand plan feasible. However, if implemented, they suggest it would leave 69% of the country using all solar power to run their electronic devices, and would save money in the long run by taking our overall dependence off foreign oil and onto domestic solar power. The cost in

eliminating American presence in Middle Eastern conflicts to maintain oil supplies would more than pay for what is required.

All of these varying perspectives have one common thread: solar power is the most renewable source of energy that is available to mankind, and it must be harnessed in order to remove dependence on fossil fuels. However, much of the literature is focused on eliminating the inherent problems of cost effectiveness, stunted technology and an overall lack of development in making panels that will harness enough solar power without taking up a lot of space. Both our homes and our cars need to be powered, and so researchers are coming up with solutions to both issues. From offering alternatives to increase solar panel power efficiency (hot salt, compressed air caves) to creating solar stations to help power hybrid cars during long commutes, there are new ways to make this type of energy practical and workable in a modern setting.

In conclusion, Muller and others present a very optimistic view of solar panels; due to its nearly infinite energy capacity, it has the capability to power all the electricity needed for the rest of human history. However, the problem lies in finding the most effective way to harness that energy, all from a scientific, physical and economic standpoint. Regardless of the different approaches these authors take, these are the overall themes of their works.

Works Cited

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