

Solar-dc Microgrid for Indian Homes

One of the key contributors to the Business of Humanity project, Dr. Ashok Jhunjunwala, along with his colleagues Aditya Lolla and Prabhjot Kaur, recently published an article in IEEE Electrification Magazine (June 2016) on solar microgrids for Indian homes. In this article, these authors assert that energy is the key to socioeconomic development and it is documented that the country of India has the largest population of individuals lacking electric service, with 237 million people affected. However, this figure does not account for the other segments of the population who only have intermittent service. India lacks the capacity to supply the amount of electric power demanded by the population (although that gap has narrowed in recent years) and even in villages that are on the electric grid, it is common that the majority of homes in the village lack an electrical connection. Ultimately, when one looks at the economics of the situation, many of the households cannot afford to pay for power, even at India's highly subsidized rates and even if their homes were connected to the grid.

Dr. Jhunjunwala and his colleagues suggest a remedy in the form of solar microgrids. The first gain in efficiency is to mitigate the power loss due to DC to AC power conversion. A solar microgrid with a DC battery and a smart controller powering DC appliances in place of the AC appliances that are currently available in the marketplace could lower the cost of energy to an affordable level. Such an intervention also has the additional benefit of pushing India towards becoming a green nation rather than relying on the current most cost effective method of burning coal and other fossil fuels. ***[For a detailed description of the technical aspects of this system, please see Dr. Jhunjunwala's article posted below this entry.]***

A disruptive technology is needed to resolve the energy challenges in India. Delivery of power via traditional AC grids is not financially feasible when considering that the push for lower carbon emissions by the global economic powers and building up a traditional grid is also cost prohibitive. However, the system described by Dr. Jhunjunwala and his colleagues presents the possibility to leapfrog the limitations of current grid technology and raise the standard of living for hundreds of millions of people with a small fraction of the environmental impact of traditional solutions.

Thought leaders such as Dr. Jhunjunwala offer the possibility of taking ideas from universities to the public (e.g., research to practice) and significantly raising the standard of living for not only those at the bottom of the pyramid, but for all people. As technologies such as DC microgrids are mass produced, their costs will come down. Incremental improvements will add to the efficiency of such systems. As individuals have access to the benefits provided by such systems, new ideas will emerge and have a multiplier effect.

In my university experience, it has amazed me how many of my colleagues had parents or grandparents who were farmers, miners, or unskilled industrial workers. Without the advances that led to the opportunities available to the working class of the United States in the 1950s and 1960s, the very real possibility is that I too would be a coal miner with a third grade education like my grandfather instead of a university professor. No doubt, more opportunities available to the farmers, miners, and laborers around the globe will translate to society being able to ultimately reap the rewards.

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["Solar-dc Microgrid for Indian Homes" by Ashok Jhunjunwala, Aditya Lolla and Prabhjot Kaur](#)