It's CCAT's MEOW!

MEOW stands for Mobile Energy Operations Wagon. It harnesses the sun's energy with roof-mounted photovoltaic panels and stores the energy in a pack of batteries housed inside. It was designed by ENGR305 students in 2003 to bring awareness to clean energy and the negative environmental impacts associated with energy consumption. This poster discusses the mission, the machine, and the fun!

The Need for Renewable Energy

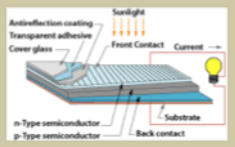
Our society is utterly dependent on the existence of readily available and inexpensive energy. Fossil Fuels were the driving force behind the Industrial Revolution. Their amazing energy density is the result of millions of years of concentration that cannot be replenished. Humanity has significantly depleted these resources in a little over a century, a blink of eye in geologic terms. We now have to find an answer to the question, "Where will our energy come from to sustain us in the 21st century?"

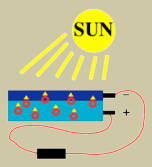
Fossil fuels are relatively ubiquitous and affordable at present, but relying on these resources is putting our eggs in a basket we know has hole in it; and it's getting bigger. We have to act quickly to transcend fossil fuels before our society comes to a grinding halt. The longer we wait to get serious about our pending energy crisis, the more difficult it will be to resolve. Procrastination only delays the inevitable while compounding the problem into a much more serious situation down road; and scarcity is only part of the problem.

Over 84% of our energy comes from fossil fuels.[1] The current scientific paradigm indicates that greenhouse gasses from fossil fuel consumption are altering planet-wide systems.[3] We are in the middle of an experiment with unknown results. The planet will persist regardless of our actions, but will we? We must recognize that this moment is the easiest and cheapest it will be to develop alternatives to fossil fuels. Our species will thrive only if we take our eyes off our feet and focus on the horizon.

How Does it Work?

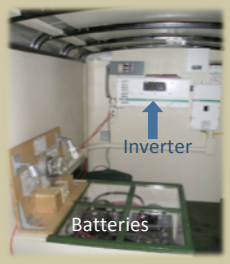
The MEOW is a portable energy delivery platform. It employs roof-mounted photovoltaic panels, comprised primarily of two layers (wafers) of very pure silicon.





Atoms are sandwiched in a substrate between the silicon and as they absorb photons from the sun, they let go of some of their electrons. This process is known as the photoelectric effect.[2] An electric current is generated and flows into the trailer.

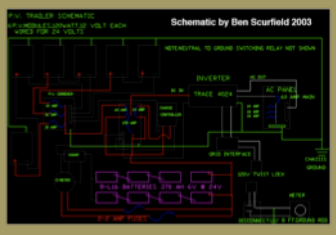
The current is directed to an internal battery bank comprised of durable lead-acid batteries. The batteries store the energy as direct current (DC). An on-board inverter can change the flow to an alternating current (AC), making the MEOW suitable to power virtually any electronic device.



SyNergy : PV and Pedal Power!

The unit is powered primarily by its photovoltaic panels, but you can help give it a electrical boost by hopping on one of our cycle generators! Attached to the stationary bike's flywheel is an electric motor that when spun in the opposite direction generates current instead of consuming it. Pedal power is a great way to convert your burned calories into clean electricity!

System Performance



Power comes from 4 120W Astropower and 2 Sharp 123 polycrystalline panels. It was designed to provide 24VDC at a rate of 21.3A. The trailer houses 8, 6V Trojan T-16 batteries set in a 24VDC configuration. The deep-cycle lead-acid battery bank has a capacity of 740 amp·hours, which equates to about 18kWh, which allows us to power an event with 1000 watts for about 14.5 hours (you can use up to 80% of the battery life) On sunny days, the energy is replenished with a steady stream of over 500 watts of power to supplement the batteries.

Associated Students

[1] DOE
[2] NASA
[3]IPPC, AR4

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