

POWER STATION

Background Information:

As it stands now, the city of Arusha, Tanzania is powered by a power company called Tanesco. Tanesco's generates electricity primarily from hydroelectric plants, but also burns gas to supplement the electricity; its capacity is 939 MW (megawatts). For comparison the United States has an electrical generating capacity of 1,067,010 MW (megawatts).

While a nationwide electrical grid is available for use, some area's are still plagued by blackouts that can last anywhere from 5 hours up to many days. At the United African Alliance Community Center their main goal is to help educate village children that can not afford to attend school. Through donations the UAACC has collected computers and built several classrooms that must have a supply of electricity or else the lessons can not take place. Therefore, the UAACC would like to have a system for backup power to service desk computers, laptops, refrigeration and lights. This system should allow for high quality electricity to be delivered to the classrooms for continued use during blackouts. Importing energy in the form of gas or oil is very expensive. Renewable and/or local resources would be the best option as they would offer long term solutions at a minimum cost to the residents.

Project Description

Design a safe back up power station for the center that can be maintained locally and provide "high quality" power for up to 5 laptop computers and 10 cell phone chargers. It would also be desirable for this system to be portable so that it can be carried around the campus to help with any emergencies that come up. Therefore the system should also be flexible enough that it could serve multiple needs (e.g., refrigeration, lighting, cooking, etc.)

Requirements

Power supply 220 VAC, 30A for 5 hours

Resources:

<http://www.solarelectricpower.org/>

<http://ewb-sfp.org/projects/ATDT/work2.html>

<http://www.awea.org/>

<http://www.tanESCO.com>

<http://www.eia.doe.gov/>

http://electricitystorage.org/tech/technologies_comparisons.htm

Considerations:

How will the power be distributed safely for different uses? Should there be a priority of use if there is an emergency? How should priority be decided? How will the station be protected from inclement weather? How will workers, children and animals be protected from harm?