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**Project Proposal**

**ENGE 270 – A**

### **What is the project?**

This project deals with designing and building a scaled model of a small “smart” micro-grid in a rural village in Africa, with different types of loads, and a “smart” control system that will automatically correct the power factor and balance the load when problems arise. The grid will include smart switches (relays), capacitors bank, a microcontroller, and other electrical components to help the generator provide power to the loads more efficiently throughout the day and night. Five different periods in the day will be simulated, each with different load combinations, based on what is happening in the village at that period.

### **How will it work?**

This project will include one push button that will change the current time of day, and show the client how the load balancing and power factor is affected negatively. Another button will be used to show the client how the micro-grid will handle the problem. An oscilloscope will be used to show the various problem-states and fixed-states that the Arduino is making during each time change.

### **Difficulty level**

This project will be semi-difficult because it will challenge our circuit design skills and circuit techniques. Due to this challenge our circuit design skills and circuit techniques will drastically improve.

### **Why will it benefit the village?**

This project will benefit the people by providing them with a “smart” power control system. This system will allow them to use the required power they need throughout the day. For example, they could use the “smart” power control system to power their huts throughout the day.

### **The Different Types of Loads:**

Sunrise (6am): Air heaters (resistive), water pump (resistive) (village wide).

Morning (9am): Hot water heater (resistive), hair dryers (resistive), stereo (rectifier and capacitive), water pump (resistive).

Afternoon (2pm): Everything shuts off (overload).

Evening (6pm): Fan (resistive), lights (LED's), tv(rectifier in series with an LED), stereo (rectifier and capacitive), water pump (resistive), oven (resistive).

Bedtime (10pm): Fan (resistive), charging cell phones (rectifier and capacitive) Air heater(resistive).

### **Overall Cost**

The budget of the project is \$100. So, our cost will get as close to that as possible. With our current Bill of Materials, the cost comes out to \$57.12.

### **Lead Time of the Parts**

Our parts will mostly be ordered online. This being said, shipping is around 5 days for most products. So, our lead time will be 5 days for online shopping, and day-of for store shopping.