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**Detailed Design**

**ENGE 270 - A**

### **What real world components are modeled?**

On all the phases of our generator we have the power hooked up to two huts that are modeled by parallel wires. In total we are modeling six huts for the African village. Each hut has the basic components of living which includes a light bulb, air heater, hot water heater and fan. The light bulb will be modeled by an LED, the air heater will be modeled by a resistor, the hot water heater will be modeled by a resistor and the fan will be modeled by an inductor.

The third phase of our generator is hooked up to the “lower class” of our village meaning that these huts contain the basic components of living plus an oven. The oven will just be modeled by a resistor. The second phase of our generator is connected to the “middle class” of our village. The bottom hut in this phase includes a hairdryer, oven and the basic components of living. The hairdryer is modeled by a resistor. The top hut in this phase includes a phone charger, oven and the basic components of living. The phone charger is modeled by a capacitor. The first phase of our generator is connected to the “upper class” of our village. The bottom hut in this phase includes a phone charger, oven and the basic components of living. The top hut includes two stereos, T.V., phone charger and the basic components of living. The Stereo is modeled a resistor in series with a rectifier. The T.V. is modeled by an resistor and LED in series with a rectifier.

Lastly, on all the phases of the generator it is hooked up to a common water pump where all the villagers draw their water. The water pump will be modeled by a resistor.

### **Why were these parts chosen?**

These parts were chosen because they accurately model a real world African village. The low cost of each part was also a determining factor of why these specific parts were chosen.

### **Cost**

The overall cost for each real-world component is fairly cheap, especially if purchased in larger packs. Components such as resistors, capacitors, LEDs, and diodes are very cheap and easy to purchase in bulk. Some other components such as relays are going to cost more in respect to how many we get. Our budget as of now is \$85.54.

### **General comment about real world design**

Some things to note about the design of our village, is that for the fans in the huts, we have decided to use inductors to represent them, instead of purchasing actual fans or small motors, to reduce costs. We have also decided that instead of purchasing a Diode Bridge Rectifier to represent our TV and stereo, we are going to construct our own out of four diodes to reduce cost and improve creativity.

### **Lead Times for Parts**

Lead times for our parts are definitely going to be a factor that is worth considering when choosing parts to order. Some parts, such as the LEGO's we will use to build the huts are on Amazon.com™ and are even listed under the Amazon Prime™ service, which we have access to. The Amazon Prime™ service ensures that shipping is free, and will be shipped to us within two to three business days. Other parts that we will have to order off of websites with access to more

specific components that we will need, will take a little longer to get to us. Unfortunately, since our packages will have to go through mail services at George Fox, all shipping times could possibly be increased an extra day due to the delay from the inefficient mail center.