Step 1

Microgrid Block Diagram

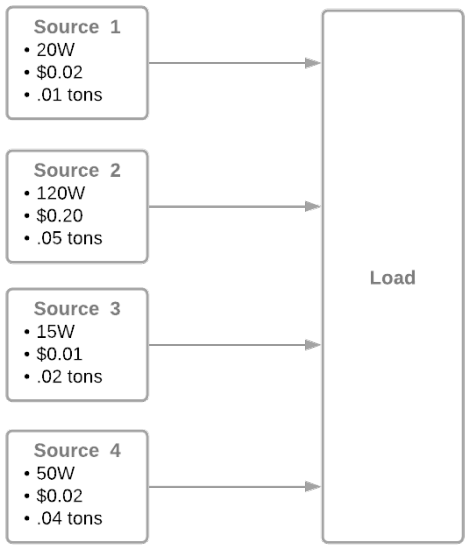

Figure 1: Block Diagram

Load Time Series

This time series was designed by deciding with the idea that the power is being sent to a residential area. The usage would be low in the middle of the night and high when residents are home from work. It would gradually increase/decrease throughout the other parts of the day. The assumption is that a week days are being explored.

To find the values, a range was given for each hour through out the day. A value for each hour within these ranges is randomly selected. A set number of days can be produced. In order to smooth out the curve an additional parameter was utilized to combine a set of days into a group and take the mean. The purpose of this is to smooth out the curve into something that would look more realistic.

Source Chromosome Format

The chromosome format for each source is

$$[power, cost, emission]$$

The gene boundaries are:

- $15W \leq power \leq 120W$
- $\$.01 \leq cost \leq \$.2$
- $.01tons \leq emission \leq .04tons$

Fitness Optimization

Economic optimization means that lower cost is better. If the requirements can be met with lower cost this would be a beneficial economic adjustment.

Economic boundary for fitness function: **TODO**

Environmental optimization would imply that less emissions produced would be better for the environment.

Environmental boundary for fitness function: **TODO**

Another optimization that is required is the amount of power is delivered. If there is not enough power being delivered then outages will occur. **TODO**

Defined Constants

- Population size: 100
- Mutation rate: .1
- Crossover point:
- Stopping point: fitness ¿ .9