

## Electrical Breadth

The alternate mechanical design included addition of gas turbine generator(s) for electricity generation to reduce demand and usage purchased from local grid. Equipments for distributing electricity must be integrated as part of the new system.

The existing electrical system included two (2) 13.2 KV service feeders from electricity company, two (2) 2,500 KVA double ended substations with tie breaker to step 13.2 KV to 480/277 V, and a 5,000 KVA substation to steps 13.2 KV to 4160 V for a 2,000 ton electric centrifugal chiller. The gas turbine generator manufacturer for the alternate system offered standard and custom voltage options. Selecting 13,200 V electric output allowed the alternate system to connect to the existing substations to provide power to different loads, and use smaller distribution equipment.

## Feeders Selection

| Voltage     | 13.2 kV       |                             |                  |                           |         |
|-------------|---------------|-----------------------------|------------------|---------------------------|---------|
| Generator   | Amp/Conductor | Required Conductor Capacity | Conductor        | Actual Conductor Capacity | Conduit |
| (kW)        | (Amp)         | (Amp)                       |                  | (Amp)                     |         |
| <b>1210</b> | 53            | 66                          | (4) #6 AWG THHW  | 75                        | (1) 1"  |
| <b>3515</b> | 154           | 192                         | (4) 2/0 AWG THHW | 195                       | (1) 2"  |

### Equipment Staging Scenario 1:

- (2) 1.2 MW turbine generators
- (1) 3.5 MW turbine generator
- (2) sets of (4) #6 AWG THHW with (2) 1 inch conduit
- (1) 2/0 AWG THHW with (1) 2 inch conduit

### Equipment Staging Scenario 2:

- (2) 3.5 MW turbine generators
- (2) sets of (4) 2/0 AWG THHW with two (2) 2 inch conduit

### Paralleling Switchgear

The alternate design included two (2) or more generator sets for City Hospital campus. The purposes of a paralleling-switchgear are initiate multiple generator sets start up, synchronize electric output, and transfer power to loads. To select paralleling-switch gear for City Hospital alternate building system design, largest possible generation capacity (7.0 MW) is analyzed to select distribution equipment. At 7,030 kW and 13.2 kV, generator sets have combined amperage of 530. ASCO 4000 Series paralleling-switchgear, with 600 amp rating, is selected to parallel multiple generator set for the alternate building system design.

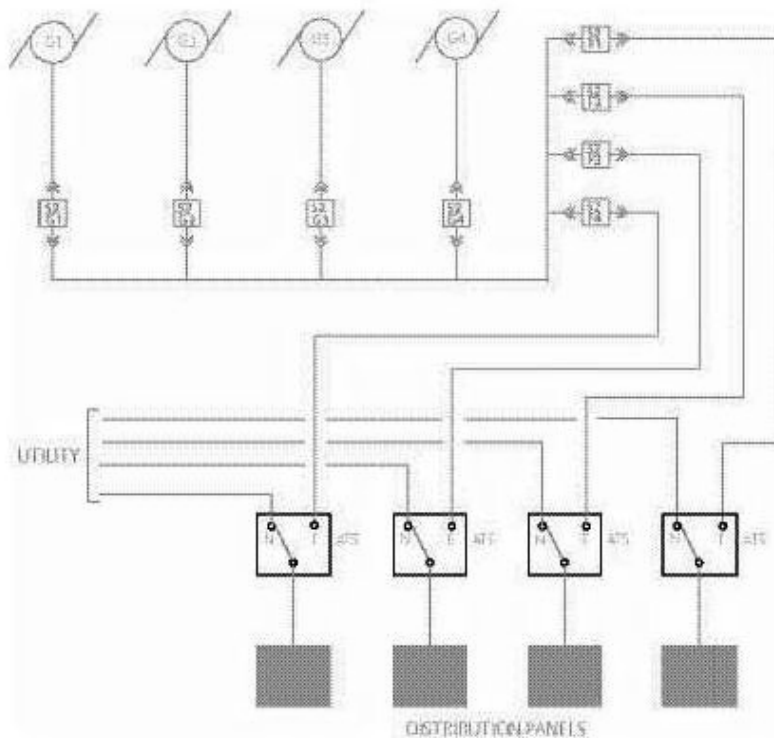


Figure 16: One-line Schematic of Typical (4) Engine-generator paralleling-switchgear configuration. Source: ASCO