Case Study: Notre Dame Peak Shaving

AN.XXX.X.T.E R0.1

For more information contact Cutler-Hammer at www.ch.cutler-hammer.com
Open Transition Switching

The open transition transfer removes power to the load when it switches from one source to another.

This results in a “second” outage when returning to the utility source.

Closed Transition Switching

The closed transition transfer switch waits until the two sources are “synced”.

This permits the two sources to be paralleled without causing excessive current or voltage swings.

The load can be switched from one source to another without an outage. Closed transition switching requires special synchronization and protection not included in conventional open transition transfer switches.

Peak Shaving Retrofit

A Peaking Switch Retrofit permits adding closed transition to an existing open transition switch. What’s more, the peaking switch includes engine governor and voltage regulator control to permit a “soft” or “zero-power” transfer from one source to another.

When the shorting switch is closed, the load receives power from both the normal utility and from the generator.
Cost Savings
Since the existing transfer switch does not need to be removed, labor and downtime is reduced.

Also, the cost of the peaking switch is less than the cost of a new closed transition/paralleling transfer switch, so capital costs are lower.

The result is the cost to retrofit an existing generator was less than the cost to install new peak shaving generation.

While the generator was 500 kW, it was oversized for the load. Since the excess power from that generator had to backfeed through a 225 kVA transformer (see Figure 1 at right), the peaking capacity of this retrofit solution was limited to 225 kVA.

Based on Notre Dame’s $14/kW charge, 225 kVA x $14 = $3150. Since the utility ratchets a peak demand event for 12 months, the generator reduced the annual demand charge by $3150 x 12 = $37800.

The generator is called upon during various hot days, but can average 4 hours a day, 5 days a week for 8 weeks or 160 hours per year, producing 160 x 225 = 36000 kWh. At 5.1 cents per kWh, that generates $1800 in energy savings or $39600 ($37800 + $1800) total savings per year.

Offsetting these savings are the cost to implement, which includes fuel, maintenance and installation cost. Based on current prices of fuel and engine efficiency, the generator costs approximately 9 cents per kWh for fuel and maintenance or $3240 per year. The projected net savings (per year) is $36360.

Additional Benefits
The new peaking switch included a Modbus and Lonworks communication port. These ports allowed the peaking switch to be connected to the existing PowerNet™ campus power monitoring system.

This permitted an automatic dispatch when the campus energy consumption came dangerously close to setting a costly new demand limit.