SMART CIRCUIT

Restaurant – The Duffeyroll Cafe

Case Study – Energy Reduction Using Circuit Monitoring and Controllers

Results, anticipated

Peak demand reduction of 17% (6 kw) and consumption reduction of 3% (3,700 kwh) is anticipated. Gas usage reduction is also projected by lowering exhaust fan run times thereby eliminating unnecessary air exchanges. Overall savings are anticipated at $123 per month. The biggest impact was achieved by lowering the peak and this was achieved with no impact to the business.

Savings, anticipated

	Peak		KWH		Total $	ROI / payback
Monthly	6 kw	$ 99 @ $16 per kw	308 kwh	$ 24 @ $0.08 per kw	$ 123	30% 5 year ROI
Annual		$1,180	3,700 kwh	$296 @ $0.08 kwh	$1,476	24 months payback

Methodology

The business met the criteria: interested owner, monthly electric bill over $1200, and on a peak charge rating. An energy audit, paid for by the utility, was conducted which identified areas of usage and opportunities for savings: lighting change out to T8, insulation on south wall, VSD for exhaust fan. Next a walk-thru was conducted with the owner to understand the business process and which loads were potentially controllable. Next the main feed was monitored using a meter streaming data to the internet for 2 weeks to identify the overall load profile and peak load characteristics. Based on this information, a combination approach was taken involving peak load shedding and turning loads off during unneeded times. Twenty SC20s were installed on best guess selected circuits to get baseline load characteristics.

The following plan is scheduled for Q4/Q1. Five circuits will be identified as candidates for switching based on their verified contribution to overall peak loads and their usage during unneeded times. These five circuits will be wired to the previously installed SC20s, and the remaining 15 SC20s will be removed. Signoff from the owner and operations manager will be received and the rules will be implemented via the web. During the next 10 business days, operations will be monitored closely and the rules will be modified to eliminate any unacceptable interruptions to the business. During the next calendar month, actual results will be monitored and the savings calculated. Signoff for the project completion will be received and the system transitioned to the owner and operations manager. They will both be trained on monitoring, changing rules, and possible future considerations.

Equipment

5 SC20's in a pre-wired panel enclosure (p/n 32305) installed next to the main breaker panel. Network and power was easily run from the adjoining wall. The SC20's were wired to the following circuits.

Circuit	Load Switching Rule	Total EMS cost	$2,896
1. Walk-in refrigerator	Not at the same time as freezer; peak shedding	Installation	$ 500
2. Walk-in Freezer	Not at the same time as refrigerator; peak shedding	Analysis	$ 500
3. Proofer (oven)	Peak shedding 80% of 35kw threshold	Equipment facility meter	$ 800
4. Fan	Peak shedding 80% of 35kw threshold, and off at night	Equipment SC20	$ 1,096
5. Fan	Peak shedding 80% of 35kw threshold, and off at night		

Background

The Restaurant – The Duffeyroll Café has become a landmark in Denver as a neighborhood gathering place famed for it's cinnamon rolls. A casual, 1200 square foot restaurant serving breakfast and lunch (working hours 4:30am – 4pm), approximately 3 years old. Service is 3 phase 400 amp 240V on a demand rate with an average monthly bill of $1700 ($500 gas & $1200 electric). Facility included gas fired ovens, electric warmers, gas heat, swamp cooler, walk-in refrigerator, walk-in freezer, typical cooking equipment and seating for 55 people.

The Team – Xcel Energy (utility sponsored audit), City of Denver, Go Green Electric (installation), Groundwork Denver (analysis), Watts up? (SC20's), Duffey's staff.