

CASE STUDY

IN SEARCH OF A BETTER HOT FOOD LINE: TECHNOLOGY CAN HELP

CHALLENGE

Panda Express Chinese Kitchen, an international fast-casual restaurant chain, presents hot prepared food on a visually appealing display line in holding wells designed to keep food at a safe temperature until serving. The restaurant group has used the standard method of holding food, which involves heated water or steam, but was seeking alternatives because the standard holding method uses a lot of energy and is labor-intensive to clean.

When waterless holding wells using induction technology became available, Panda Express, which is headquartered in Southern California, reached out to its utility, Southern California Edison (SCE). The restaurant group sought to investigate the energy-saving potential and evaluate whether the technology could fit into its operations. Additional considerations were holding temperatures, holding times, and cleanup procedures. SCE, the manufacturer of the induction equipment, and the local manufacturer’s representative together conducted a field test at a Panda Express store in Southern California.

OLD WAY

The typical Panda Express store uses 25 holding wells, each about 12 inches in diameter. These holding wells keep food hot by use of an open-loop system that applies a certain level of conductive power to heat water and create steam beneath each well. An open-loop system does not incorporate temperature feedback, therefore does not adjust the amount of heat being applied. (It operates like a simple crockpot that continues to apply power without regard to how hot the food inside is getting.) Furthermore, these water-based systems must be filled with water, drained, and cleaned daily.

NEW WAY

For purposes of this test, water-based holding wells were replaced with a system of individually controlled closed-loop induction holding wells. Unlike an open-loop system, the closed-loop induction system can detect and hold at the target temperature. The new system was set at 180°F, the same temperature as the water-based system, and run 18 hours a day for six weeks. During this time, energy data loggers took regular recordings of the energy consumed by each system.



RESULTS

Energy Consumption

As shown in Table 1, the test data found the induction holding wells provide an annual energy savings of 5,497kWh, or 219.85kWh per well. The induction holding wells also provide a demand reduction of 0.98kW or 0.0392kW per well due to the closed-loop system controls.

Table 1 – Demand and energy consumption data for the holding wells in the test restaurant.

	Demand (kW)	Total Energy Consumption (kWh/Year)
Steam Wells	2.09	10,599
Induction Wells	1.11	5,102
Demand Reduction/Energy Savings	0.98	5,497

Payback Calculation

The water-based steam wells system cost approximately \$8,200. The induction system came with a \$2,000 premium, which increased cost to \$10,200. At these 2011 costs, simple payback, based only on energy savings (assuming \$0.15/kWh), was 2.4 years.

Other Benefits

The life of the food was extended due to the more precise heat control. Induction-heated wells prevented overcooking of the prepared food that can occur with continuous, uncontrolled heating of steam wells.

Because the induction system did not require each well to be filled and drained with water, cleanup time was reduced.

Additional Projected Cost Savings

Aside from the single store test, which calculated only energy savings and helped spur Panda Express to begin incorporating the technology at other stores, additional savings can be projected. The following projected savings from new induction equipment are associated with equipment installation and labor. Reduced water usage and food waste represent additional benefits to be taken into account.

Because the induction system does not require water lines for steam heating, installation savings range from \$1,500 to \$2,500, assuming 25 wells. Corresponding water savings are approximately 40 gallons per day.

Labor savings for 25 wells are on the order of \$6,500 annually, assuming staff time of 2 hours per day cleaning and filling wells at an hourly wage of \$10.

The payback improves considerably once these additional projected \$8,000 to \$9,000 annual savings are taken into consideration.

BOTTOM LINE

With all the operational and food-handling considerations being the same, in a head-to-head comparison, the induction holding system not only provided substantial energy savings, it extended the life of the food on the line and reduced labor due to the ease of cleanup time. Panda Express has since installed induction holding systems in many of their new stores.

FOR MORE INFORMATION

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