

## 2012 Case Study

# Dillons Food Stores

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### ***Company background***

The Kroger Company is one of the largest retail grocery chains in the United States. Kroger operates 2,400 grocery stores, 800 convenience stores, 500 jewelry stores, 500 supermarket fuel centers, and 42 manufacturing facilities. These locations span 31 states and employ more than 338,000 associates nationwide. The Kroger Company strives to establish and maintain a high level of integrity and adheres to the highest moral, ethical, and legal standards. Dillons Food Stores are a division of The Kroger Company dedicated to providing safe and quality food products to its customers. The Dillons division covers much of the Midwest region, and supplies its customers with a wide variety of products from consumable food goods to household and outdoor furniture.

### ***Project background***

The objective of the summer 2012 internship program was to survey three Dillons stores that had been consistently showing an increase in energy consumption over the past three years. The survey process consisted of mapping out each store with light-level readings and proposing lighting changes to adhere to specific Kroger standards. This lighting reinvention project was later expanded to include an additional three stores, or six total. In accessory to lighting reinvention, the intern was given license to investigate additional energy and water conserving techniques. Hand-sink aerators and waterless woks were examined to promote water conservation, while demand-control ventilation systems for exhaust hoods were explored to further encourage energy savings.

### ***Incentives for change***

Over the past three years, Dillons' locations 33, 34, 35, 66, 72, and 91 have shown an upward trend in energy consumption. Using electric-use data from 2009-2011, it was clear these stores were not using energy efficiently. With annual electric bills in the hundreds of thousands of dollars, it was important to find innovative ways to save money directly from the bottom line. Dillons and The Kroger Company would like to see stores becoming more energy efficient as technology improves, and stray from trending in the opposite direction.

### ***Projects reviewed for E2/P2 potential***

#### ***1. Lighting reinvention***

Lighting reinvention was a previously existing program focused on eliminating excessive lighting while simultaneously improving effectiveness of product illumination. The intern surveyed stores with an EXETECH foot-candle meter to determine light levels, and made recommendations to reduce the number of light fixtures while maintaining required standards.

LED lamps were recommended in cold-temperature applications. LEDs function effectively at sub-zero temperatures and run more efficiently than standard fluorescent tubes. LEDs also operate at a lower temperature, reducing the required cooling load of refrigerated cases.

A net annual energy savings was estimated at 228,000 kWh/yr, yielding annual savings of \$17,624 based on a loaded per-kilowatt-hour charge of \$0.0773. All lighting reinvention projects are either in progress or have been

implemented.

## 2. Intelli-Hood systems

Traditional kitchen exhaust hoods use electricity very inefficiently. They have a simple on/off function that operates the exhaust fan at either 0% or 100%. A number of these hoods are found throughout Dillons as food preparation is a considerable operation. Installing demand-control ventilation allows fan speed to automatically adjust based on amount of heat and smoke detected.

A case study of a similar food store was investigated to estimate potential cost savings to Dillons. Intelli-Hoods were estimated to reduce fan power consumption by 73%, for an annual savings of \$2,424. Intelli-Hoods are recommended only for new installs due to difficulty of retrofit with older systems.

## 3. Waterless woks

Wok stoves found in the Chinese kitchens require an abundant amount of water for cooling the cooking surface. The woks are in operation four hours per day and consume approximately 960 gallons of water during this time. Waterless woks utilize an air gap to insulate the cooking surface, negating the need for cooling water. Waterless systems also employ a knee-controlled timer for a water curtain used to repel food scraps.

Four of the six stores examined contained Chinese kitchens. Total water savings from

waterless woks was estimated at 1.39 million gallons per year, or \$8,062 per year. Waterless woks are recommended for all Chinese kitchens.

## 4. Hand washing sink aerators

Hand washing is an essential repetitive duty required by all Dillons associates. Many hand-washing sinks are found throughout food preparation areas, as well as in guest and associate restrooms. After taking inventory of the hand-washing sinks, it was determined a great volume of water could be conserved by installing low-flow, 1.0 gpm aerators. The sinks were previously outfitted with either a 2.0 gpm aerator or none at all. Assuming a conservative estimate of 10 minutes per day of operation, and more than 64 sinks, it was determined 279,000 gallons of water usage could be avoided annually by installing 1.0 gpm aerators. This project has been implemented.

## 5. Water heater insulation

Insulating water heaters, storage tanks, and adjacent pipes is a very cost-efficient method to reduce heat loss through convective and radiant heat loss. If a tank feels warm to the touch, then energy can be conserved through insulation. With various insulating materials, type and size of water heaters, and electric- versus gas-heated systems, it proved difficult to predict cost savings. More research needs to be conducted in order to predict savings with such variability.

### Summary of 2012 E2/P2 intern recommendations for Dillons Food Stores

Project description	Annual estimated environmental impact	Annual estimated cost savings	Status
Lighting reinvention	228,000 kWh	\$17,624	Implemented/in progress
Intelli-Hood systems	180,000 kWh	\$13,914	Recommended
Waterless woks	1,390,000 Gallons	\$8,062	Recommended
Hand-washing sink aerators	279,000 Gallons	\$1,618	Implemented
Total savings *	1,669,000 gal, 408,000 kWh	\$41,218	
GHG reductions *	289 metric tons CO2e		

\* Does not include projects that are "not recommended" or "further research is needed."