



# Rapid Response

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## Rapid Response Research Service

**Are there good energy efficiency success stories and opportunities for these targeted businesses: grocery stores, cold storage, convenience/corner stores, and restaurants?**

**Requestor:** City of Seattle, Office of Economic Development

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### Key Findings:

There are numerous good examples, ideas, and cost-saving success stories about energy efficiency improvements at grocery stores, cold storage, convenience/corner stores, and restaurants. Many of the success stories have been published by Environmental Protection Agency's (USEPA) Energy Star, public utilities, and in other general newsletters or publications.

In summary, the energy opportunities for the sectors, as found in these case studies are:

### Business Type      Energy Opportunities

#### Cold Storage

- Lighting upgrades, including some LEDs and motion sensors
- Advanced or upgraded demand and load controls on the refrigeration system
- Storage temperature optimization
- Modernization of insulation and draft techniques and materials, and/or adding insulation for truck doors, equipment and refrigeration or freezer rooms, or suction lines
- Installation of high efficiency motors as old motors need replacement
- Improvement of draft control

#### Restaurants

- Lighting upgrades, including some LEDs and motion sensors
- Upgrades to heating, ventilation and air conditioning (HVAC), some with economizers
- Addition and/or modernization of insulation techniques and materials, on equipment, refrigeration systems, or freezer rooms, or suction lines
- Installation of Energy Star or energy efficient appliances, including freezers, cookers/fryers, dishwashers, ice makers, and a solar hot water pre-heater for dishwashing
- Installation of ceiling fans to better circulate air
- Installation of tinted window coatings
- Installation of high efficiency motors as old motors need replacement
- Installation of air to air heat exchangers
- Design and installation of advanced or upgraded demand and load controls on high demand equipment such as air conditioners, kitchen ventilators, and refrigeration systems
- Improvement of draft control

- Installation of humidity controls
- Reduced hot water consumption

**Business Type**  
**Grocery Stores**

**Energy Opportunities**

- Installation of a fuel cell to supply electricity
- Installation of LED lighting in food display cases
- Installation of photo sensors to adjust interior lighting based on exterior light
- Improvement of draft control
- Installation of “anti-sweat” heaters to reduce condensation
- Installation of other humidity controls
- Lighting upgrades, including some LEDs and motion sensors
- Installation of Energy Star or energy efficient appliances, including freezers and refrigeration
- Switching from open freezer to enclosed freezers (display and storage)
- Upgrades to heating, ventilation and air conditioning systems

**Convenience Stores**

- Installation of LEDs for interior and exterior and display case lighting
- Installation of case covers or “night shields”
- Installation of programmable thermostats
- Installation of heat pumps
- Installation of door “misers” in refrigerated glass display cases
- Replacement of evaporative coolers
- Upgrades to the HVAC system, specifically a high-efficiency energy recovery ventilator

**Summary**

Links to success stories are provided below, under category headings for the four specific operations, along with short descriptions of each project.

**COLD STORAGE**

- [Gardner Cold Storage -“Nothing Goes to Waste at Gardner Cold Storage – Especially not Energy.”](#) Installing advanced demand controls on the refrigeration system and adjusting the storage temperature for cranberries yielded a 50% decrease in energy demand.
- [An energy consultant, EPS, designed and implemented refrigeration controls at a cold storage facility in Southern California.](#) Through a detailed energy study, EPS determined that the installation of an upgraded control system would allow for new energy conservation measures. These controls included floating discharge pressure, cycling evaporator fans, defrost control and the ability to participate in demand response programs. In addition to providing a very attractive investment option, the control system reduces maintenance costs, allows remote monitoring of systems and assists with regulatory compliance. EPS completed this project as a turnkey solution, including all required electrical installations. **The net result:** Annual savings of \$81,256 with a payback of approximately 7 months.

- [Orion Energy Systems posts two project results at cold storage facilities](#), documented energy savings. Exact details of the improvements are not provided.
- [Atlas Cold Storage implemented several energy retrofits](#) with modern insulation techniques and materials, direct load controls, installing plastic curtains to reduce air flow, constructing a new roof with R80 insulation, and insulating bay doors for trucks to ensure minimal drafts. They also purchased high-efficiency motors, introduced innovative storage units, installed energy efficient lights and lamps, as well as motion sensors on the lights in the refrigeration warehouse to minimize run times. The resulting energy savings are over \$800,000 per year.
- Carolina Cold Storage utilized the services of the Industrial Extension service at North Carolina State University to conduct an energy audit and provide recommendations for improvements. [The company expects to save over \\$50,000 per year with implemented changes](#).

## **RESTAURANTS**

### [USEPA's ENERGY STAR Success Stories for Restaurants](#)

- [Jose O'Shea Café and Cantina](#) upgraded their lighting system with new and efficient products, including light emitting diode (LED) exit signs. The HVAC system was upgraded along with refrigeration improvements and new insulation, saving 157,000 kWh and \$11,000 annually.
- [Reedville Café](#) installed three new ENERGY STAR qualified gas fryers. These fryers are generating savings of 3,390 therms, or more than \$3,800 a year.
- A [Subway](#) store upgraded lighting, replaced old air-conditioning units with high-efficiency models, and added ceiling fans to circulate the air. {{SAVING WHAT OR HOW MUCH?}}
- [Tripp's Grill & Six Pack](#) opened a 1,400 square-foot restaurant and grill in 2002, knowing that restaurants are among the most energy intensive businesses for their size and sales. That is why they purchased new ENERGY STAR qualified freezers to replace older freezers saving more than \$1,900 a year and 31,700 kWh.
- [McDonalds \(in New York\) upgraded their lighting and installed rooftop HVAC units equipped with economizers](#). Economizers allow air-conditioning units to use up to 100 percent outside air instead of return air when the outside temperature is less than the inside temperature. In a city like New York where the temperature is frequently in the 50-65 degrees Fahrenheit range, or where facilities generate substantial heat (such as restaurants), economizers can help businesses capture savings. They also installed a tinted coating on windows to keep solar heat out in the summer and interior heat in during the winter. Ready for more energy savings, they contacted the local utility, Consolidated Edison (Con Ed), and requested a free energy audit. Recommendations included high efficiency motors when others break down, air-to-air heat exchangers, and demand limiters to control high-demand-producing equipment, such as air-conditioners, kitchen ventilators, and refrigeration equipment.
- [Subway Sandwiches installed energy-efficient lighting, heating, ventilating, air-conditioning, ceiling fans, and ice makers throughout seven Subway locations in Oklahoma, reducing energy costs by 40 percent and improving customer's comfort inside the stores.](#)

- [Southern California Edison \(SCE\) helped an Italian restaurant “save dough” via energy efficiency](#) - refrigeration systems, a vital food and wine storage component, are typically one of the restaurant’s biggest energy consumers. After conducting a detailed on-site audit, SCE identified: inefficient and poorly maintained reach-in freezer, un-insulated suction pipes, inefficient and poorly maintained remote condensing units, and inadequate strip curtains. SCE assisted in replacing and upgrading , and even increasing refrigeration capacity while reducing energy consumption. The results range from 10 percent less energy consumption for one of the walk-in coolers to 53 percent less energy use for the two-door reach-in freezer.
- At Taco Bell, a typical kitchen built around steam tables was using about \$7,500 in electricity per year and 125 gallons of hot water per day. Its [move to a dry electric Grill-to-Order \(GTO\) operation](#) with help from Southern California Edison (SCE) cut Taco Bell’s power costs for the production lines by nearly two-thirds, and eliminated hot water use in the process.
- [Installing a high-efficiency dishwasher and solar hot water pre-heater](#) resulted in a \$250 per month electric bill savings for Homestead Farms Restaurant, a family-style eatery in Blackfoot, Idaho.
- [Applebee’s reduced energy costs and food waste by installing humidity control units](#) in their walk-in coolers. The humidity control units remove excess moisture and help to decrease the workload on the refrigeration unit to maintain the proper temperature. Reduced moisture also inhibits bacteria growth, helping to keep food safer and fresher. Applebee’s in Louisville saw a four degree decrease in the walk-in temperature after installing the humidity control units, without increasing energy usage.

## **GROCERY STORES**

### Recommendations and Guidance

- [Boulder County’s Partners for a Clean Environment \(PACE\)](#) is a free program in Boulder County committed to providing local businesses with technical assistance to improve their energy efficiency, waste management, and water conservation, and allows for certification and recognition. PACE is a partnership of local governments.
- This program may be a good model for other cities or counties. The criteria for certifying under PACE is [here](#).
- [The Energy Efficient Grocery Store \(A Virtual Tour\)](#)
- Recommendations by Sector - GROCERY STORES (from the [Energy Efficiency Guide for Colorado Businesses](#))
- [Grocery Store - 50 Percent Energy Savings - Technical Support Document](#) (By Leach M, Hale E, Hirsch A, and Torcellini P, 2009, prepared for the National Renewable Energy Laboratory). This report documents technical analysis and design guidance for grocery stores to achieve whole-building energy savings of at least 50 percent over ASHRAE Standard 90.1-2004 and represents a step toward determining how to provide design guidance for aggressive energy savings targets.
- [Better Bricks – A Valuable Set of Tools & Resources for Grocery Stores](#)

- [Energy Saving Tips for Grocery Stores](#), from Power Line

## Success Stories

- A new (2010) [Albertsons supermarket in the San Diego community of Clairemont will be one of the first in California to generate nearly 90 percent of the electricity it needs with a 400-kilowatt fuel cell](#) from United Technologies Corporation (UTC) Power. Other environmentally focused amenities situated throughout the Albertsons Clairemont store include, LED lighting in the dairy and frozen food doors, photo sensors in 33 skylights to measure the amount of day light from the outdoor sky and adjust the electric light levels accordingly, night curtains that are pulled over all open cold cases in the evening to seal in the cool air, and reduce spoilage and energy costs by up to 25%, and installed water-saving fixtures. Water-saving faucets and fixtures installed in the restrooms to reduce the amount of water used by more than 45%. [More....](#)
- [Janesville Pick-n-Save \(Wisconsin\) Reduces Energy](#) – invested \$11,700 to install controls on “anti-sweat heaters” so that the heaters—which prevent condensation from forming on refrigerated display cases—are used at full power only when necessary. Savings are projected at \$15,900 a year.
- [Vassar Grocery \(Michigan\) Store Goes Green](#) – This grocer installed a new, ultra-efficient freezer, refrigeration and lighting components, after previous efficiency improvements implemented with assistance from Grand Rapids-based Vantaura Energy Services. These improvements included replacing fluorescent lighting with LEDs, installing night-time shields over produce, meats and other open coolers, and upgrading the refrigeration systems. Their electric bill has been cut by nearly a third, by about \$5,000
- [USEPA ENERGY STAR Success Stories for Grocery Stores](#)
  - [Bestway](#) slashed energy costs by a whopping 33 percent by converting an open freezer to a closed glass freezer case, lighting upgrades, and other changes.
  - [Community Mercantile](#) installed highly efficient equipment in place of old equipment, including lights, a refrigerator, and a new heating, ventilation, and cooling system. The store saves an estimated \$55,000 annually.
  - [Vic’s Market](#) installed a new, 80-foot row of enclosed freezers to replace the 80 feet of open multideck freezers that save a lot on electricity, but also eliminated customer complaints about being too cold in the freezer aisle. The local utility also helped finance replacement of the compressor room and the purchase of new deli, meat, and freezer cases.

## **CONVENIENCE STORES**

- USEPA ENERGY STAR Success Stories for Restaurants
  - [CITGO Convenience Store upgraded lighting in six stores](#) and is saving 60,000 kwh per year.
  - [Myobz Shell Station completed interior lighting upgrades and new T-5/HO fixtures outdoors](#) to save energy and help increase sales with higher and better quality exterior illumination. New programmable thermostats, new heat pumps reduced and the installation of door “misers” in the convenience stores’ refrigerated glass display cases, added to the energy savings. (Door misers monitor the units for condensation, and allow the heat strips to turn on only when condensation is detected). Finally, new evaporative coolers were installed to reduce energy use of walk-in cooler fans by 40 percent to 50 percent. The \$120,000 worth of energy efficiency improvements saved \$24,000 and 180,000 kWh of electricity annually.
  - [On-The-Move Convenience Store](#) - A high efficiency energy recovery ventilator and two in-line fans were installed. The store experienced a dramatic reduction in kilowatt consumption.
  - [Howdy’s Convenience Stores](#) - This chain designed their newest store to use LEDs for all interior and exterior lighting.
- Blogs on LED lighting for display cases

Cooler Connection - [SCHOTT-Gemtron Announces CrossFire LED Lighting at T-8 Pricing](#)

Cooler Connection - [Retrofitting LED Lights Can Pay Off In Your C-store](#)

### **Additional Resources:**

- Energy Star [Guide for Restaurants](#)
- Energy Star [Restaurants Fact Sheet](#)
- In January of 2010, stimulus funding went to Outlaw Consulting Inc., to work with convenience stores throughout Georgia, awarding [\\$450,000 to conduct lighting retrofit projects at convenience stores throughout the state](#). The program includes the establishment of a revolving fund to finance projects chosen in an annual competitive process administered in partnership with the Georgia Association of Convenience Stores for at least three years.
- [PPRC does not endorse or promote these specific products, but the link is included for information purposes]. SuperMarket Energy Technologies website offers a description of three energy saving opportunities: [Anti-sweat heater controls, evaporator fan and motor controls, and case cover technology](#).