

# Cold Hard Facts About Refrigeration and Energy Conservation



## Maintaining, upgrading and replacing refrigeration equipment can help reduce energy costs for grocery and convenience store owners like you.

Whether you operate a supermarket, grocery store or convenience store, refrigeration represents an average of 43% of your electricity usage.<sup>1</sup> That includes the power required to run reach-ins, walk-ins, and under-the-counter refrigerators/freezers, as well as a multitude of food and drink storage and display cases.

## Conserving Energy Is Easier Than You Think

The good news is that proper maintenance, plus modest retrofitting or upgrades, can save your business a significant amount of energy. Factoring in various incentives and potential savings on replacing certain older equipment may also be a smart choice.

We have compiled this handy guide to help you in that effort.

## How Do You Rate?

A good energy conservation program starts with good measurement. So be sure to use the Energystar.gov Portfolio Manager to measure and track your energy consumption at [energystar.gov/buildings/facility-owners-and-managers/existing-buildings/use-portfolio-manager](http://energystar.gov/buildings/facility-owners-and-managers/existing-buildings/use-portfolio-manager).

## Preventive Maintenance Is Job One

Refrigeration is the biggest energy load for a typical grocery store. But that means you can make potentially big improvements through routine maintenance as well, much of it with store staff.

### ✓ Clean evaporator and condensing coils every 30 days

Clean your A/C's condenser/evaporator coils at the beginning of the season. Clean coils will lower your energy costs, extend the unit's life and provide cleaner air for you to breathe. The fin coils on the outside A/C unit can be washed with a hose. Coils on inside units are best serviced by a trained technician.<sup>2</sup>

So keeping them clean should be your top priority. As a side benefit, clean condenser coils tend to preempt maintenance problems, which cost time and money.

As a cautionary note, some coil cleaning solutions are corrosive, expensive and should be avoided. Instead, use soap and water with a soft bristle brush; or try a mixture of three parts water to one part de-greaser.

### ✓ Check refrigerant charge

By putting extra strain on the compressor, incorrect refrigerant levels can compromise efficiency by 5 to 20% and raise the risk of early component failure.<sup>3</sup>

### ✓ Adjust controls

Adjusting floating suction pressure control (FSPC) and floating head pressure control (FHPC) can save an average of 30,000 to 60,000 kWh from FSPC and 75,000 to 150,000 kWh from FHPC in a typical Southern California grocery store.<sup>4</sup>

<sup>1</sup> Facility Type: Supermarkets and Grocery Stores. Energy.gov, January 2008.

<sup>2</sup> energysavers.gov

<sup>3</sup> Facility Type: Supermarkets and Grocery Stores. Energy.gov, January 2008.

<sup>4</sup> Portland Energy Conservation Inc. (PECI). San Diego, California.

## Did You Know?

Refrigeration is by far the largest load in a grocery store, representing an average of **43% of electricity usage.**<sup>5</sup>

## Fascinating Fact:

Dirty evaporator and condensing coils can rob refrigerators of **90% of their energy efficiency.**<sup>7</sup> Clean every 30 days.

### ✓ Clean fan blades to reduce drag

Remove the fan cover and clean with a de-greaser solution. Periodically, you should also have a service technician make sure that the fan motor is running at its specified speed.

### ✓ Clear trash and weeds around exterior condensing units

Doing so will ensure adequate airflow and promote better performance.

### ✓ Reduce air leakage

Have a qualified technician carefully test the entire system, as air leaks make the compressor work harder, which translates into higher energy usage.

### ✓ Inspect gaskets and door sweeps

Worn gaskets and torn door sweeps allow air seepage and increase refrigeration cycling.

### ✓ Lubricate door hinges annually

Doors that don't shut properly can cause refrigeration units to overwork to maintain proper temperature.

### ✓ Maintain appropriate temperature settings

Set the holding temperature between 35° and 40° for walk-in coolers, between -5° and 5° for freezers.

### ✓ Inspect electrical connections

Have a qualified electrician verify that they are tight. Loose wires can result in high amperage, which will increase energy usage.

### ✓ Conduct regular inspections

A detailed on-site inspection every one to three years more than pays for itself through improved energy efficiency and preemptive maintenance. Have the technician check control settings plus the condition of gaskets, hinges and motors.

## Give Existing Equipment a Makeover

Maximizing your existing refrigeration investment through modest upgrades can deliver a significant payoff in terms of energy savings.

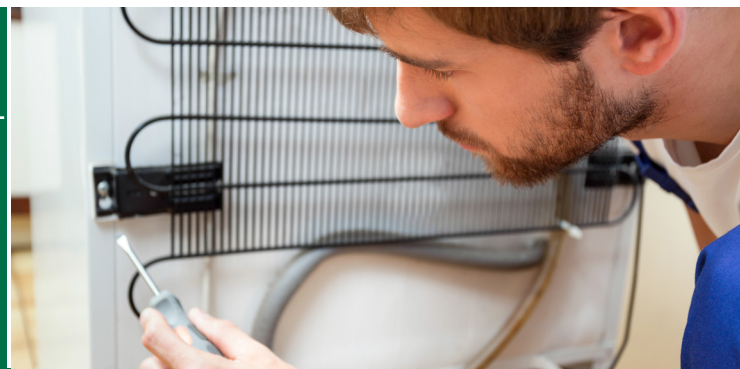
However, be advised that your staff may not have the expertise to fully accomplish this. That's why it may be advisable to use outside experts, who are often able to uncover maintenance and operational issues that are not readily apparent.

### ■ Insulate suction lines

Suction lines move refrigerant from the evaporator to the compressor. Keeping them from absorbing heat can make the entire system run more efficiently and reduce energy usage. This is normally a very easy and inexpensive task.

## How Cool Is That?

Replacing refrigeration fans with electrically commutated motors will **reduce the energy consumption** of refrigerator and freezer cases by **40 to 70%.**<sup>6</sup>



<sup>5</sup> Facility Type: Supermarkets and Grocery Stores. Energy.gov, January 2008.

<sup>6</sup> Duke Energy® Progress. progress-energy.com.

<sup>7</sup> 14 Ways Restaurants Can Save Money on Refrigeration. Biermayer, Peter. PG&E, March 2015.

- **Use automatic door closers on walk-in refrigerators**

Installing these closures is also one of the least expensive things you can do to cut energy usage. Spring hinges are easy to install and are ideal for high-traffic walk-ins.

- **Purchase strip curtains for walk-ins**

Strip curtains minimize the amount of hot air entering the cooler, which reduces system cycling and energy usage.

- **Install heat recovery systems**

Waste heat from refrigerators is often sufficient to make hot water for a midsize supermarket. By taking some of the burden off your hot water heater, you can save energy.

- **Install LED lights in walk-ins and display cases**

LED lights use less energy, operate better in cold and give off less heat, which lessens refrigeration cycling.

- **Display case shields**

Placing shields over your display cases can reduce energy usage by 8% when applied overnight—with even more savings the longer they stay in place.<sup>8</sup>

- **Install evaporator fan motors**

Most walk-in evaporator fan motors run continuously, even though full airflow is usually required only about half the time. Using electrically commutated motors will reduce the energy consumption of your refrigerator and freezer cases by 40 to 70%.<sup>9</sup>

- **Add evaporator fan controllers to walk-in coolers**

These devices improve the energy efficiency of walk-in refrigerators by reducing airflow when the compressor cycles off and cutting fan motor power during off cycles.



## illuminating Insights!

**LED lights use less energy, operate better in cold and require refrigerators to work less because they generate less heat.**

### Good Habits Can Have a Great Impact

Just modifying a few procedures and educating employees can make a huge difference in how much energy your store uses—with no out-of-pocket expenditures in many cases.

- **Don't leave cooler doors propped open**

When loading and unloading walk-ins, escaping cold makes the equipment work harder to maintain a consistent temperature.

- **Turn off lights upon exiting walk-ins**

Even the small amount of heat that lights produce can cause the unit to work harder.

- **Set the proper holding temperature**

Temperatures set too low will make equipment work harder. Supermarkets can realize big energy savings by recalibrating temperature set points. Walk-in coolers should be kept between 35° and 40°, freezers between -5° and 5°.

- **Check humidity sensors**

In many stores, these devices are not working or are inaccurate by several percentage points. Fixing and cleaning them ensures that air-cooling systems and anti-condensate heaters are not operating more than needed.

### Above and Beyond Energy Savings

Improving the performance of refrigeration equipment brings a host of additional benefits:

- ✓ Uniform cabinet temperatures
- ✓ Reduced heat output from more efficient compressor systems and fan motors
- ✓ Improved food quality
- ✓ Increased productivity
- ✓ A cleaner environment
- ✓ Extended product lifetimes

<sup>8</sup> Duke Energy® Progress. progress-energy.com.

<sup>9</sup> Ibid.

## ■ Make room around equipment for better air circulation

Disrupting the airflow around your refrigeration equipment—especially the coils—decreases performance.

## ■ Set defrost frequency set at minimum requirements

Shoot for four- to six-hour intervals spanning 20 to 40 minutes depending on the traffic through your walk-in.

## ■ Turn off door heaters

Unless there is significant frost on the door or water dripping from the front of the refrigerator, these devices are probably unnecessary.

## New Equipment Means New Ways to Conserve

Sometimes, it's better for energy conservation and your bottom line to invest in newer, more energy-efficient refrigeration. It could save you thousands of dollars per year in energy and energy-efficient equipment is often priced similar to standard equipment.

A simple way to ensure that new equipment is energy efficient is to purchase only Energy Star®-Qualified products. These are approximately 30% more energy-efficient than standard models.<sup>10</sup>

New equipment may also qualify for incentives and financing which, factored into your purchase price, could yield a favorable payback period.

## How Do You Know When It's Time to Buy New?

Start your decision-making process by following these steps:

- ✓ Calculate current costs
- ✓ Include cost to maintain current equipment
- ✓ Figure total price of ownership



## What Is Energy Star?

Commercial equipment that has earned Energy Star qualification meet strict guidelines set by the U.S. Environmental

Protection Agency for energy-efficiency. Performance is certified by third-parties based on testing performed in an EPA-recognized laboratory.



## Star Quality?

Investing in new Energy Star-Qualified refrigeration can help cut energy costs by 10 to 30%!<sup>11</sup>

## Make Your Refrigerators Energy Stars<sup>12</sup>

Installing new Energy Star-Qualified refrigeration could bring you benefits like these:



**\$60 to \$70 Annual Savings**

**Save 590 to 730 kWh/year**

**\$560 to \$700 Lifetime Savings**

- ✓ Use the Food Service Technology Center lifecycle calculator at [fishnick.com/saveenergy/tools/calculators](http://fishnick.com/saveenergy/tools/calculators). Calculators are customizable and include actual brand names and models.
- ✓ Include the purchase price and cost to install new equipment



<sup>10</sup> Duke Energy® Progress. [progress-energy.com](http://progress-energy.com).

<sup>11</sup> Ibid.

<sup>12</sup> Energy Star.gov. Based on 12-year life and 4 % discount rate. Actual savings will vary depending on use.

## Energy Star-Qualified Refrigerator and Freezer Products

### Eligible products

Solid, Glass Plus Mixed Solid/  
Glass Door Refrigerators And  
Freezers

### Examples

Reach-In, Roll-In Or Pass-Through Units;  
Merchandisers; Under-Counter Units; Milk  
Coolers; Back Bar Coolers; Bottle Coolers;  
And Beer-Dispensing Or Direct Draw Units

### Ineligible products

Drawer Cabinets, Prep Tables Or Deli  
Cases; Open Air Units; Laboratory-  
Grade Equipment; And Refrigerator/  
Freezer Combination Units

## By Conserving Energy, We All Win

Maintaining, retrofitting and/or upgrading your refrigeration equipment is not only a great way to reduce your energy usage— it's good for business, and good for all businesses that count on the electrical grid for power.

**For more help in saving energy and a list of eligible equipment, contact your Account Manager or visit [sce.com/business](http://sce.com/business)**



## Additional Resources

### **Food Service Technology Center.**

[fishnick.com](http://fishnick.com)

### **U.S. Department of Energy, Federal Energy Management Program.**

[eere.energy.gov/femp/procurement](http://eere.energy.gov/femp/procurement)

### **Facility Type: Supermarkets and Grocery Stores.**

### **Energystar.gov, January 2008.**

[energystar.gov/sites/default/files/buildings/tools/EPA\\_BUM\\_CH11\\_Supermarkets.pdf](http://energystar.gov/sites/default/files/buildings/tools/EPA_BUM_CH11_Supermarkets.pdf)

## Interested In Learning More?

Choose from the many topics in our Energy Conservation Series:

- LED Lights: A Bright New Way to Conserve Energy
- Plug In To Greater Energy Savings— With Smart Plug Load Management
- Switch To a More Energy-Efficient Business—With Smart Lighting Controls
- Manufacturing Motors & Compressors: Start Your Energy-Efficient Engines
- On the Menu: Major Energy Savings With Restaurant Refrigeration
- Energy Efficiency Is In the Air: Optimizing Your HVAC
- Agricultural Pumping: Pumped and Primed to Save Energy