

**ENERGY SAVINGS GUIDE**

**GROCERY STORES**

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## 1. Executive Summary

Grocery stores remain among the most energy-intensive commercial buildings due to around-the-clock refrigeration, long operating hours, HVAC load, lighting demands, and strict food-safety requirements. Reducing energy use presents one of the largest, fastest ways to lower operating expenses while protecting product quality, improving shopper comfort, and strengthening sustainability performance.

This guide summarizes practical steps grocery operators can take—focusing on refrigeration, lighting, HVAC, and operational improvements—to reduce energy consumption, achieve substantial cost savings, and reduce greenhouse gas emissions.

### Key Benefits of Energy Saving Practices

- 1 Reduce Operating Expenses
- 2 Improve Food Safety & Reduce Shrink
- 3 Enhance Brand Image & customer comfort
- 4 Strengthen Sustainability & GHG Reduction

### Savings Potential

Typical energy improvements in grocery operations include:

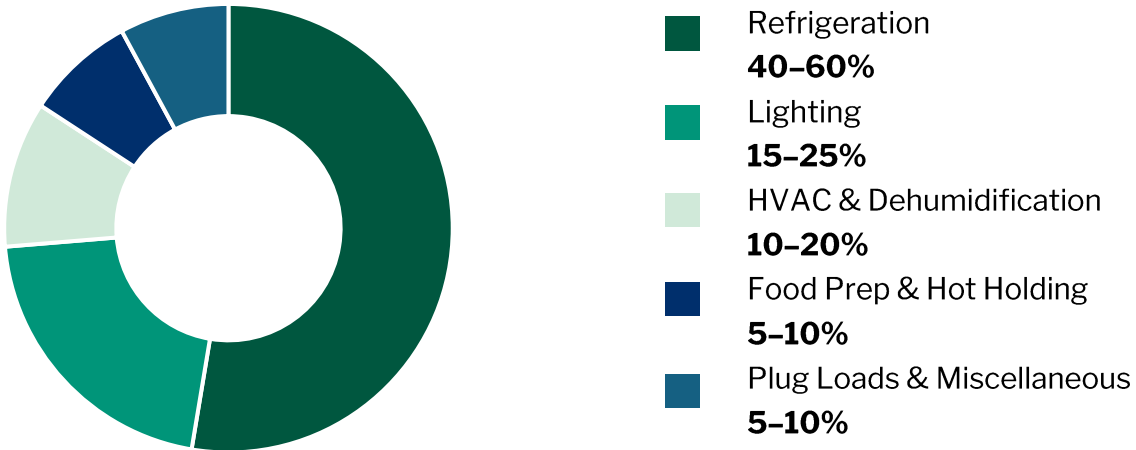
- **Up to 70% savings** from refrigeration upgrades/retrofits<sup>1</sup>
- **50–70% savings** from lighting upgrades<sup>2</sup>
- **10–20% savings** from HVAC optimization<sup>3</sup>

For a 5,000-square-foot grocery store in British Columbia, the average annual electricity use is about **285,000 kWh**<sup>4</sup>. Achieving these potential efficiency upgrades would save roughly **72,000 kWh per year** through improvements in lighting, refrigeration, and HVAC performance. With BC's low-carbon grid intensity of **9.9 g CO<sub>2</sub>e/kWh**<sup>5</sup>, these reductions prevent approximately **712.3 kg of CO<sub>2</sub>e annually**, lowering operating costs by **\$7,780**<sup>6</sup> while strengthening sustainability performance in this energy-intensive sector.

## 2. Understanding Grocery Store Energy Use

The median site energy use intensity for Canadian grocery stores is around **54 kWh** per square foot per year<sup>4</sup>. This range varies depending on the size, hours and equipment used by the store.

## 2.1 Typical Energy Use Profile<sup>7, 8</sup>



These proportions make refrigeration, lighting, and HVAC the primary targets for high-impact savings. [Energy Cap](#) has created a free grocery store energy savings calculator that can help you estimate savings potential.

## 3. Refrigeration: The Highest-Impact Opportunity

Refrigeration systems run continuously, directly affect food safety and consume the most energy in a grocery store, making them the top priority for grocery energy savings.

### 3.1 Equipment Upgrades

#### Closed-Door Refrigeration & Case Retrofits

Replacing or retrofitting open cases with closed-door models reduces cold-air loss, improves aisle comfort, and greatly reduces compressor load. Depending on the case type and climate, installing doors on open refrigeration cases can deliver **20-50% energy savings** for those cases. Adding night covers to open cases further cuts after-hours consumption. A case study of a 3,000 sq meter



supermarket where 82 doors were installed on 15 open refrigeration cases showed 1.1-year payback time over 192,000 kWh/yr of energy savings<sup>9</sup>.



Refer to the [retrofitting guide](#) in the resources section if you would like to retrofit your open-display cases.

### LED Case Lighting

LED lighting reduces both lighting energy use and case cooling demands while enhancing visual merchandising. A study found that replacing fluorescent T12 lighting with LED lighting resulted in 72% energy savings annually<sup>15</sup>.

### High-Efficiency Fan Motors & Variable Speed Controls

Upgrading to ECM (Electronically Commutated Motor) fan motors, which are high-efficiency brushless DC motors with built-in electronic controls that adjust speed and torque, lowers energy use, improves temperature stability, and extends equipment life. Adding variable-speed controls further reduces unnecessary run time and improves overall system performance.

### Low-GWP/Natural Refrigerant Systems

Modern systems using natural or low [global warming potential refrigerants](#) (CO<sub>2</sub>, R290, R600a) offer improved efficiency, lower environmental impact, and help future-proof operations. To learn about Low GWP refrigerants, refer to our [guide](#) in the resources section.

## 3.2 Operational Best Practices

### Routine Door Seal & Gasket Checks

Regular inspection helps maintain temperature control and reduces compressor strain. A damaged fridge seal can increase overall refrigerator energy consumption by as much as 25%, as the compressor must work harder to maintain temperature<sup>16</sup>. Open refrigerator doors and check for visible signs of damage, such as cracks, tears, or stiff/brittle areas.



### Strip Curtains for Walk-In Coolers

Well-installed, floor-length strip curtains reduce warm air infiltration during stocking and deliveries and improve cooling efficiency by preventing cold air from escaping. Research shows that strip curtains can reduce refrigeration energy use by 15–20% by limiting infiltration when doors are opened<sup>10</sup>.



### Airflow Management

Proper airflow reduces compressor workload and enhances temperature uniformity. To maintain adequate airflow avoid overpacking and leave sufficient space between items for air circulation. Additionally, ensure that vents and air circulation pathways are not obstructed by boxes, containers, or other items.



### Clean Condensers, Coils, and Fan Components

Train someone from the staff to safely unplug the unit and perform basic refrigeration cleaning—such as dust vacuuming, brushing condenser coils, and wiping fan blades. Alternatively hire maintenance contractors to handle the work professionally. These tasks should be done every three months, which is the most widely recommended interval to prevent overheating, energy waste, and premature component failure. Regular cleaning is critical because dirty condenser coils can increase energy use by 17% or more, placing additional strain on compressors and shortening equipment life<sup>17</sup>.

### Temperature Monitoring & Alerts

Digital temperature monitoring improves food safety and helps operators detect inefficiencies early.



Find an in-depth [guide](#) on the best practices for commercial refrigeration systems in the resources section below.

## 4. Lighting: Fast Savings with Immediate Impact

Lighting improvements provide quick, cost-effective savings and improve customer experience. The installation of LED lights can reduce overall building energy use by approximately 10-20% depending on application, with higher savings often observed during warmer months due to reduced cooling loads.<sup>11</sup>

### 4.1 Equipment Upgrades

#### Full LED Conversion

Converting interior, exterior, and case lighting to LED reduces energy use, maintenance needs, and cooling loads while significantly improving lighting quality. For a typical grocery store, LED retrofit project costs often range from \$0.50–\$5.00 per square foot<sup>18</sup>.

In British Columbia, these upgrades qualify for several BC Hydro programs—most notably the Business Energy-Saving Incentives (BESI) for one-for-one lighting replacements, and the Self-Serve or Custom Programs for full redesigns or advanced controls. You can find more details in the [BC Hydro Programs and Support](#) section below.

With incentive stacking, grocery LED retrofits in BC commonly achieve payback periods of 1–2 years, sometimes shorter in high-operating-hour environments<sup>7</sup>.

#### Advanced Controls

Motion sensors, timers, and daylight sensors ensure lighting operates only when needed. Controls are especially effective in areas that are not continuously occupied such as storage rooms, back-of-house, and washrooms.



#### Exterior Lighting Optimization

LED parking lot and exterior fixtures paired with photocells and timers reduce waste while maintaining site safety. Common wattages for LED parking lot lighting can range from 40w to 600w, often resulting in a 50% reduction in energy consumption when you make the switch to LED lighting<sup>12</sup>.

## 4.2 Operational Practices

### Lights-Off Protocols

Establish clear operating procedures to ensure lights in staff-only and low-traffic areas are turned off when unoccupied. Add “lights off” stickers in areas that are typically unoccupied as a reminder.

### Zoned Lighting

Dividing and controlling lighting by department enables partial operation during early-morning stocking, cleaning, or off-hours tasks.

### Routine Lighting Walkthroughs

Quarterly reviews ensure sensors are calibrated, fixtures are working, and lighting levels remain appropriate for each area.



## 5. HVAC & Building Comfort Systems

HVAC systems are essential for maintaining comfort and supporting refrigeration performance in grocery stores, where HVAC and refrigeration together can represent **50–60% of total energy use**. Even small improvements deliver meaningful savings: proper maintenance, recommissioning, and modern controls can reduce HVAC electricity use by **10–20%**, with some stores cutting usage by **up to 14% or 29,000 kWh annually** through advanced optimization technologies<sup>13</sup>.

### 5.1 HVAC Optimization

#### Regular Maintenance & Filter Replacement

Clean filters and properly tuned HVAC equipment are essential for maintaining strong airflow, good indoor air quality, and overall system efficiency. When filters clog or components go unmaintained, the HVAC system must work harder, consuming more energy, increasing wear, and raising operating costs. For example, clogged filters restrict airflow and cause energy use and mechanical strain to rise significantly. Most commercial HVAC systems should be serviced by a contractor at least once per quarter.



### Ventilation & Airflow Management

Ensure that your HVAC service contractor balances the airflow at least once every 2-3 years. Proper maintenance reduces both heating/cooling demand and the infiltration load on refrigeration systems.

### Temperature & Humidity Optimization

Slight setpoint adjustments while keeping customer comfort and food safety in mind can yield meaningful savings. Effective humidity management prevents frost buildup and supports refrigeration efficiency.

## 5.2 Building Envelope Improvements

### Sealed Entrances & Vestibules

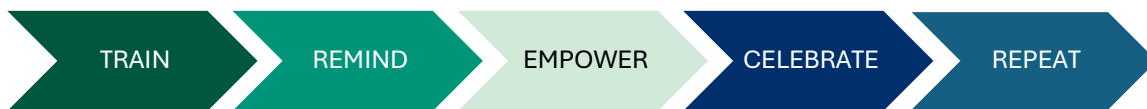
Well-sealed front doors, vestibules, and back-of-house entries reduce infiltration and ease the load on both HVAC and refrigeration.

### Bay Door Draft-Proofing

Air curtains, well-maintained seals, and proper bay door draft proofing prevents warm, humid air from entering cooled zones.

## 6. Staff Engagement: Creating a Culture of Energy Awareness

Staff play a major role in the day-to-day energy performance of a grocery store, since they regularly interact with refrigeration doors, lighting, and HVAC systems. Simple behavioural actions—such as keeping cooler doors closed, turning off lights in unoccupied areas, and reporting equipment issues early—can reduce overall energy use by **5-10%**, based on workplace studies showing similar behavioural interventions achieving 5% or more in savings<sup>14</sup>. Building awareness and encouraging consistent habits strengthens food safety, reduces shrink, and supports long-term sustainability.



### 6.1 Practical Engagement Strategies

#### Energy Awareness Training

Incorporate energy efficiency practices into new-hire onboarding and regular staff meetings.

Reinforce simple habits such as:

- Keeping cooler and freezer doors closed
- Turning off lights when leaving stock rooms
- Reporting equipment issues early



See BC Green Business Staff Engagement Guide.

### Visible Reminders & Signage

Place reminders in key areas, such as:

- “Lights Off When Not in Use” in back-of-house spaces
- “Please Keep Door Closed” on coolers and freezers
- Temperature checkpoints in perishable departments



### Department-Level Ownership

Assign energy responsibilities to leads in each department (produce, meat, bakery, etc.). These leads ensure:

- Night covers are used
- Strip curtains are intact
- Sensors are not blocked
- Equipment issues are reported promptly

### Energy Champion Program

Designate one staff member per store as an Energy Champion to coordinate actions, monitor progress, and celebrate successes. This fosters accountability and boosts team motivation.

### Monthly Micro-Challenges

Examples:

- “Best Door Discipline Week”
- “Lighting Reduction Challenge”
- “Refrigeration Inspection Marathon”
- These micro-competitions keep engagement fun and consistent.

## 7. BC Hydro Programs & Support



Below are key BC Hydro programs that support large commercial customers, including grocery stores, in managing energy use and identifying efficiency opportunities. Programs offer expert guidance, funding, and technical assessments to help reduce operating costs and improve long-term energy performance.

| Resource   | Eligibility  | About  |
|--|--|--|
| <a href="#"><u>Commercial Energy Manager</u></a> | Annual electricity use of 6.5 gigawatt-hours or more.  | Hire an energy manager, partially funded by BC Hydro, to look after energy management changes and projects at your organization  |
| <a href="#"><u>Business Energy Advisors</u></a>  | Business Energy Advisors are available to business customers who don't have a Key Account Manager and who operate in one of the following regions: <ul style="list-style-type: none"> <li>• Lower Mainland</li> <li>• Fraser Valley</li> <li>• Vancouver Island</li> <li>• Interior B.C.</li> <li>• Northern B.C.</li> </ul> | A free consultation at your facility from a Business Energy Advisor. They'll identify energy-saving opportunities, provide you with a report on your current technologies and the new, energy-efficient replacement options, and give you advice about next steps and financial incentives that you may qualify for. |
| <a href="#"><u>Regional Energy Manager</u></a>   | Combined annual electricity use of 2 gigawatt-hours or more across all your sites.   | An assigned regional energy manager will help you identify operational energy efficiency opportunities and access programs.  |

**Energy Wise  
Network**

Eligibility: Annual electricity use of 2 gigawatt-hours or more.

Join to help engage people in your organization to save energy through training, networking, coaching, funding and more.

**Continuous  
Optimization**

Owner or long-term leaseholder of a large commercial or institutional building, or a facility with a total indoor floor area of at least 40,000 square feet.

Incentives, tools, and support to improve your building's energy efficiency now and in the future.

**Integrated Energy  
Audit**

Annual company-wide electricity use of two gigawatt-hours or more.

An energy expert will audit your facility and determine major areas of energy usage and which of your systems present the best opportunities for improved efficiency.

**Feasibility Study**

Annual company-wide electricity use of two gigawatt-hours or more.

An energy expert will conduct an in-depth study and evaluation of energy solutions within a single or multiple systems and provide the cost/benefit details you need.

**Business Energy  
Saving Incentives  
(BESI)**

Available to commercial and small industrial sites using under 500 MWh/year and requires installation by an Alliance of Energy Professionals contractor.

Provides funding for energy-efficient upgrades such as lighting, refrigeration add-ons, and HVAC/mechanical measures, typically covering ~40% of costs with an additional 30% bonus available.

**Self-Serve  
Incentive Program  
(SIP)**

For facilities using over 500 MWh/year, with eligible technologies including compressed air (40–300 HP) and lighting, and requiring an Alliance vendor.

Offers incentives (25–50% of project costs) for large-facility lighting and compressed-air upgrades, with a 30% bonus available during the current offer window.

## 8. Additional Resources

### List of sustainability and operational resources:

- [BC Green Business](#)
- [Grocery Store Energy Savings Calculator](#)
- [Guide for retrofitting open display refrigeration cases](#)
- [BCGB Refrigerant Gases Guide](#)
- [Operational best practices for commercial refrigeration systems](#)
- [BC Hydro Programs & Incentives](#)
- [Energy Star Benchmarking tool](#)
- [BCGB Grocery Checklist](#)

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