



# ENERGY SAVINGS GUIDE RESTAURANTS



**focus on energy<sup>®</sup>**

Partnering with Wisconsin utilities

# WHAT'S INSIDE

<b>Your guide to reduce energy waste .....</b>	<b>1</b>
<b>Interior lighting .....</b>	<b>2</b>
<b>Exterior lighting.....</b>	<b>6</b>
<b>Refrigeration .....</b>	<b>10</b>
<b>Commercial kitchen equipment .....</b>	<b>14</b>
<b>HVAC .....</b>	<b>20</b>

# YOUR GUIDE TO REDUCE ENERGY WASTE

FOCUS ON ENERGY® helps Wisconsin businesses incorporate energy-efficient technologies and systems to cut operating costs, save energy, and reduce environmental impacts for years to come. We assist you by providing:

- Dedicated staff who understand your business and provide hands-on support.
- Experience to identify key savings opportunities in your restaurants.
- Information to make fast and informed energy savings decisions.
- Financial incentives to help offset costs of making energy-efficient equipment upgrades.

## About this guide

We know your company may have multiple locations and multiple priorities. We will help make the most of your energy efficiency dollars while improving the dining experience of your customers. Use this guide as a tool to walk through your food service operations and identify different savings opportunities. You'll find guidance on identifying savings opportunities in:

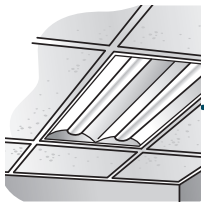
- Interior lighting.
- Exterior lighting.
- Refrigeration.
- Commercial kitchen equipment.
- Heating, ventilation, and air conditioning.

## We're here to help

Contact **800.762.7077** or visit **[focusonenergy.com/business](https://focusonenergy.com/business)** to get started. Check the website for full eligibility and participation requirements.

# INTERIOR LIGHTING





## • High Performance Troffers

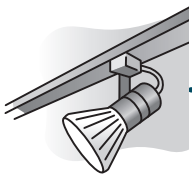
- In general, LED troffers deliver the same amount of light as most existing 3- to 4-lamp T8 systems while consuming **40-65% less wattage**.
- Lighting quality is often improved with better uniformity and color fidelity.
- Tubular LEDs (TLED) can be an attractive retrofit option due to their raw Lumen Per Watt (LPW), however, a dedicated LED troffer tends to exceed tubular LED LPW, maximizing your energy dollar.
- Coupling LED troffers with integrated lighting controls can add additional energy savings through daylight harvesting, occupancy sensing and/or demand response strategies.

	ANNUAL KWH SAVINGS	ANNUAL SAVINGS	LIFETIME SAVINGS
LED 2x4 Product, per fixture	200	\$20	\$320
LED 1x4 Product, per fixture	85	\$8.50	\$135
LED 2x2 Product, per fixture	100-400	\$10-\$40	\$160-\$640

**PRO TIP**

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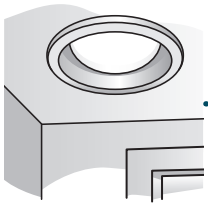
Lighting in kitchens should be lensed or gasketed to control the build-up of grease and cooking effluent.



## • LED Track Lights

- For displays, menu boards, and other track lighting applications, LED track lights can replace halogen, metal halide, and CFL track lights.
- Hardwired LED luminaires have a built-in driver and light engine. The latest LED products use, on average, **40% less energy** than traditional metal halide and halogen products, and offer a 5- or 10-year warranty.
- Screw-based LED lamps consume an average of 6.5-18 watts and can replace CFL or incandescent lamps requiring over seven times more energy. These LED lamps cost about the same, but offer twice the lamp life, and produce far less heat than traditional options.

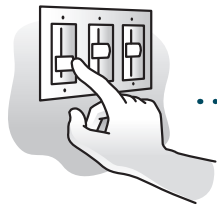
	ANNUAL KWH SAVINGS	ANNUAL SAVINGS	LIFETIME SAVINGS
LED Track Lights, per fixture	100-200	\$10-\$20	\$110-\$200



## LED Recessed Downlights

- LED recessed downlights offer reduced maintenance costs because of their impressive equipment life. With many lasting 50,000 or more hours, the average restaurant only needs to replace them every nine years.
- LED downlights can increase the amount of light in a room and open up spaces to make them feel bigger. When combined with dimming controls, they can transform the ambiance as desired to suit casual or formal dining room settings.

	ANNUAL KWH SAVINGS	ANNUAL SAVINGS	LIFETIME SAVINGS
LED Recessed Downlights, per fixture	160-520	\$15-\$50	\$180-\$600



## Daylighting

- A significant amount of energy can be saved by using natural sunlight to offset the amount of electrically-powered lighting needed.
- Daylighting sensors detect the amount of natural light present and dim light fixtures appropriately.
- Consider adding window treatments with light control to allow light to pass in while keeping diners comfortable.

	ANNUAL KWH SAVINGS	ANNUAL SAVINGS	LIFETIME SAVINGS
Daylight Controls, per 50W controlled	60	\$6	\$50

### PRO TIP

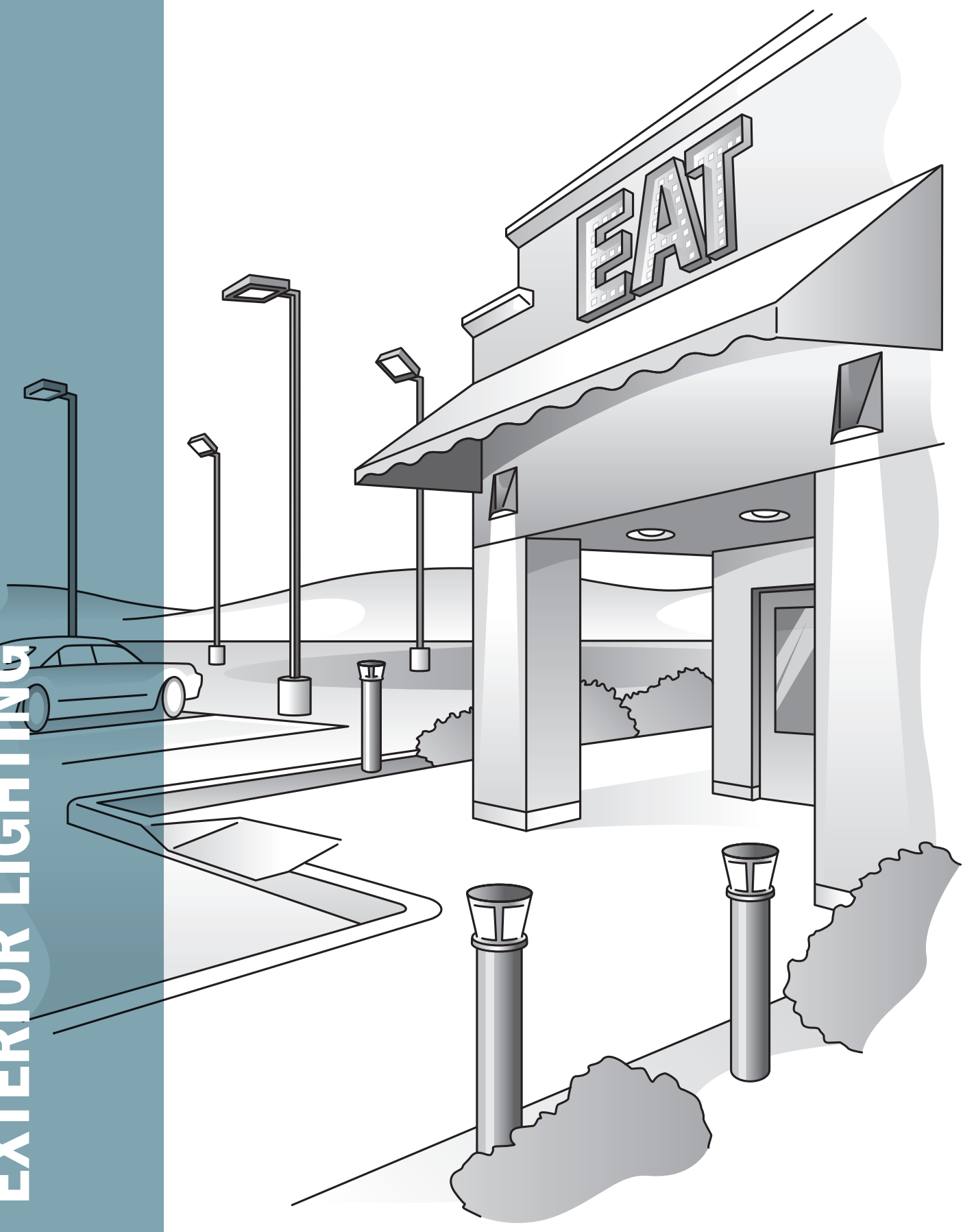
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Coupling LED upgrades with integrated lighting controls allows the facility ambiance and mood to be set and changed throughout the course of the day. This helps maximize the experience and enjoyment by diners.

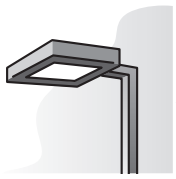




# EXTERIOR LIGHTING







## • LED Parking Lot

- LED parking lot lighting can be cost effective in many applications and provides better uniformity than their high intensity discharge (HID) counterparts. LED fixtures effectively distribute light to the ground and can be configured in a number of distribution patterns. This uniformity allows overall light levels to be reduced compared to traditional fixtures.
- LED parking lot lighting can be dimmed or turned off when not needed, with the ability to instantly turn on when motion is sensed. When combined with controls, savings from LED lighting systems increases from 60-70% less power to upwards of over 80%. Typical payback periods for these systems are less than 5 years.

	ANNUAL KWH SAVINGS	ANNUAL SAVINGS	LIFETIME SAVINGS
LED Parking Lot Lighting, per fixture	500-1,100	\$50-\$110	\$900-\$1,900



## • LED Wallpacks and Bollards

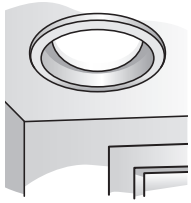
- Most wall packs and bollards use HID lamps, which, on average, consume twice as much energy as LED fixtures and lamps.
- LEDs can be turned on and off as needed and have the ability to be integrated with motion sensors. HID lamps typically operate all night as they are not able to turn on and off instantly, limiting the opportunity for controls integration.
- Most LED luminaires are dark-sky friendly with total upward light cutoff, reducing light pollution into the night sky which can negatively impact neighbors and the environment.

	ANNUAL KWH SAVINGS	ANNUAL SAVINGS	LIFETIME SAVINGS
Exterior LED Wallpacks and Bollards, per fixture	300-1,100	\$30-\$110	\$400-\$1,400

# Arby's®

SUCCESS STORY

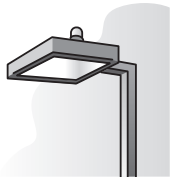
As part of an efficiency upgrade, Carisch Inc, an Arby's franchise owner, upgraded their exterior lighting to LED. The new lighting has provided better area lighting of the exterior; improving diner comfort and safety.



## • LED Recessed Downlights

- LED downlights are the preferred option compared to HID downlights because they provide more light output per watt consumed, allow for on and off control as well as dimming, and have a dramatically longer life.
- LED recessed downlights are recommended for entrances, drive through areas, and facilities with long service hours. These fixtures can dramatically increase efficiency, while maintaining building safety and security.

	ANNUAL KWH SAVINGS	ANNUAL SAVINGS	LIFETIME SAVINGS
LED Recessed Downlights, per fixture	220-550	\$20-\$55	\$230-\$630



## • Exterior Controls

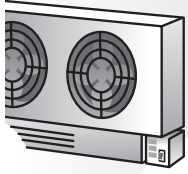
- LED parking lot lighting can be dimmed or turned off when not needed, such as after normal business hours or periods of low nighttime customer activity. The LED lights can be turned on or brought back up to 100% when an occupancy sensor detects motion.
- Combining the controls with an LED upgrade from conventional HID can produce **energy savings exceeding 80%**.
- Networked Lighting Control systems are part of the next evolution in lighting and LED technology. Coupling an LED exterior fixture upgrade with Networked Lighting Controls maximizes the full potential of LED control capabilities and your long-term energy saving investment.
- Choosing a DesignLights Consortium™ (DLC) listed system ensures your fixtures are networked (devices communicate with each other). In addition to detecting occupancy and traffic, these systems can offer additional energy saving strategies like scheduling, continuous dim, and zone-level programming.

	ANNUAL KWH SAVINGS	ANNUAL SAVINGS	LIFETIME SAVINGS
Exterior Lighting Bi-Level Controls, Dusk to Dawn per controlled fixture	550	\$55	\$450
Photocell with Integral Timer or Wireless Schedule per controlled fixture	600	\$60	\$510



# REFRIGERATION





## ● Evaporator Fan Motors & Controls

- Standard shaded pole (SP) and permanent split capacitor (PSC) motors are inefficient (ranging from 20-40% efficient) and use most of their energy to create heat which is dissipated into the refrigerated space.
- Electronically commutated motors (ECM) are approximately 75% efficient and create less heat, resulting in both motor and refrigeration savings. As an added benefit they also run quieter.
- The typical payback for replacing SP motors with ECMs is approximately 1 year.
- Evaporator fan speed controls increase the efficiency of walk-in coolers and freezers by alleviating the need for fans running continuously at one speed. The controller manages the fan speed by responding when the compressor cycles off and there is no refrigerant flow through the evaporator.
- Evaporator fan speed controls should not be used if the evaporator fan does not run at full speed all the time, or if the evaporator does not use off-cycle or time-off defrost.

	ANNUAL KWH SAVINGS	ANNUAL SAVINGS	LIFETIME SAVINGS
ECM Evaporator Fan Motors, per motor	350-2,500	\$35-\$250	\$650-\$4,650
Motor Controls, per motor	200-450	\$20-\$45	\$100-\$250

### PRO TIP

When upgrading to ECMs, consider upgrading the fan blades at the same time to ensure optimal operation of the fans. Many times the blades are dented or misshapen, causing the new motors to run less efficiently.



## • Demand Defrost Controls

- Demand defrost controls reduce evaporator coil defrost cycle time and optimize compressor performance by monitoring ambient temperature in the walk-in box and evaporator coil temperature.
- Greater savings exist (and faster paybacks) by installing demand defrost controls on walk-in freezers (low temp) with electric heaters.

	ANNUAL KWH SAVINGS	ANNUAL SAVINGS	LIFETIME SAVINGS
Demand Defrost Controls, per walk-in box	2,000-3,000	\$200-\$300	\$4,000-\$6,000



## • ENERGY STAR® Commercial Ice Machines

- ENERGY STAR labeled commercial ice machines are more energy efficient because they are designed with components such as high efficiency compressors, ECM fan motors, and water pumps. Additionally, these ice machines save water and allow for quicker ice harvesting.
- ENERGY STAR commercial ice machines have **energy savings over 10%** and **water savings around 25%**.

	ANNUAL KWH SAVINGS	ANNUAL SAVINGS	LIFETIME SAVINGS
ENERGY STAR Commercial Ice Machine, Ice-Making Head	1,250	\$125	\$1,250
ENERGY STAR Commercial Ice Machine, Remote Condensing Unit	3,000	\$300	\$3,000
ENERGY STAR Commercial Ice Machine, Self-Contained Unit	700	\$70	\$700



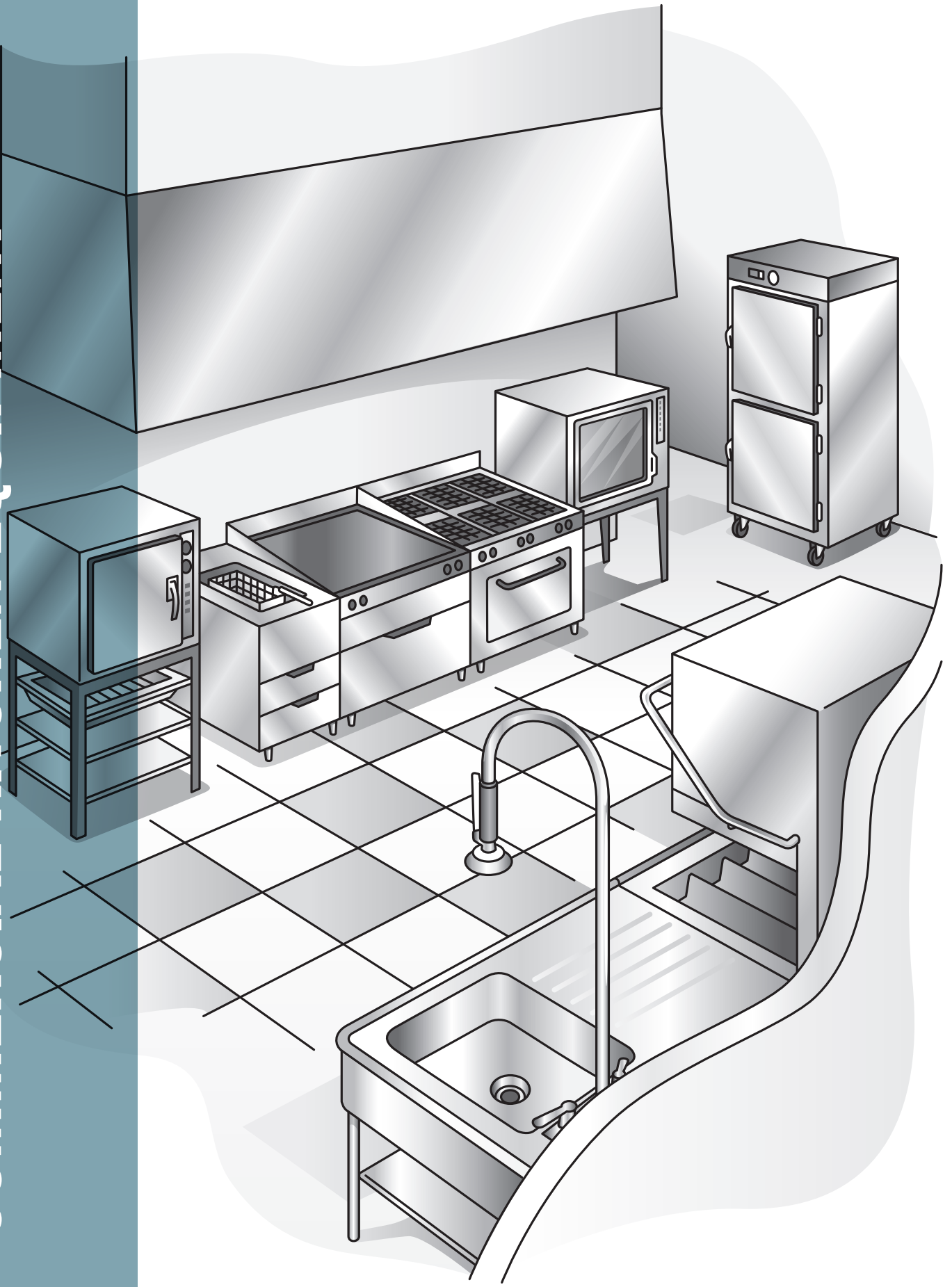
# ENERGY STAR Commercial Refrigerators & Freezers

- ENERGY STAR labeled commercial refrigerators and freezers are more energy efficient because they are designed with components such as ECM evaporator and condenser fan motors, high efficiency compressors, and increased cabinet insulation levels. These models **save as much as 35%** compared to standard models.
- Savings listed below are highly variable and are based on the appliance type (refrigerator, freezer), configuration of the unit (chest, vertical), door type (solid door, glass door) and internal volume of the unit (cubic feet).

	ANNUAL KWH SAVINGS	ANNUAL SAVINGS	LIFETIME SAVINGS
ENERGY STAR Commercial Refrigerators & Freezers, per unit	500-13,000	\$50-\$1,300	\$700-\$18,500



# COMMERCIAL KITCHEN EQUIPMENT

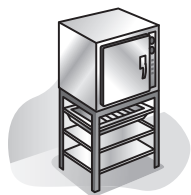




## ENERGY STAR Commercial Griddles

- Commercial griddles earning the ENERGY STAR label are about **10% more energy efficient** than standard models.
- The ENERGY STAR label can be found on gas and electric, single and double-sided models thermostatically controlled.
- Additional benefits of ENERGY STAR griddles include improved uniformity of temperature across the griddle plate and a higher production capacity.
- Save additional energy by reducing idle time, turning the griddle off during slow periods, and calibrating the controls to operate at the correct temperature.

	ANNUAL KWH SAVINGS	ANNUAL THERM SAVINGS	ANNUAL SAVINGS	LIFETIME SAVINGS
ENERGY STAR Griddle, Natural Gas, per linear foot	-	60	\$45	\$580
ENERGY STAR Griddle, Electric, per linear foot	650	-	\$65	\$830



## ENERGY STAR Commercial Steamers

- ENERGY STAR commercial steamers earning the ENERGY STAR label are up to **50% more energy efficient** than standard models.
- ENERGY STAR steam cookers offer shorter cook times, higher production rates, and reduced heat loss due to better insulation and more efficient steam delivery system.
- ENERGY STAR steam cookers also **save water—90% or more** when compared with standard steam cooker models, using on average 3 gallons of water per hour versus 40 gallons of water per hour for standard models.

	ANNUAL KWH SAVINGS	ANNUAL THERM SAVINGS	ANNUAL SAVINGS	LIFETIME SAVINGS
ENERGY STAR Steamer, Natural Gas	-	1,900-2,100	\$1,500-\$1,600	\$19,000-\$20,500
ENERGY STAR Steamer, Electric	11,000-15,000	-	\$1,100-\$1,500	\$14,000-\$19,000

### McDonald's® SUCCESS STORY

Courtesy Corp, a McDonald's franchise owner, updated their griddles and fryers to ENERGY STAR rated equipment. They have seen decreased cooking times and reduced fryer oil use due to these upgrades.



## CEE Tier 2 Pre-Rinse Spray Valves

- Pre-rinse spray valves (PRSVs) meeting the Consortium for Energy Efficiency (CEE) Tier 2 performance levels save on average **60% more energy and water** than models meeting the US federal minimum standards and **40% more energy and water** than models meeting the EPA WaterSense® performance specification.
- The CEE specification requires a minimum of 4 ounces-force (ozf) of spray force in response to concerns low flow rates may result in lower user satisfaction.
- If your restaurant or commercial food service establishment has a water pressure significantly higher or lower than 60 psi, performance and user satisfaction could be impacted with high pressure, low flow PRSVs.

	ANNUAL KWH SAVINGS	ANNUAL THERM SAVINGS	ANNUAL SAVINGS	LIFETIME SAVINGS
CEE Tier 2 Pre-Rinse Spray Valves, gas water heat	-	290-470	\$220-\$360	\$1,200-\$2,000
CEE Tier 2 Pre-Rinse Spray Valves, electric water heat	6,200-10,000	-	\$620-\$1,000	\$3,300-\$5,300

### PRO TIP

Consider a high-efficiency pre-rinse spray valve if purchasing a high efficiency dishwasher. A high-pressure, low-volume pre-rinse spray valve can reduce your electric or gas bill depending on your water heating type and may help save on your water and sewer bill.



## ENERGY STAR Commercial Dishwashers

- Commercial dishwashers earning the ENERGY STAR label are on average **40% more efficient** than standard models.
- High and low temp stationary rack machines (undercounter; single tank door type; pot, pan, and utensil) and conveyor machines (single tank and double tank) are all eligible for the ENERGY STAR label.
- Qualified models must meet maximum water consumption requirements during the final rinse and use less energy while idling between wash cycles.
- Savings listed below are variable and based on type of dishwasher, type of water heating on premises (gas, electric), and if a booster heater (gas, electric) is used in the dishwashing operation.

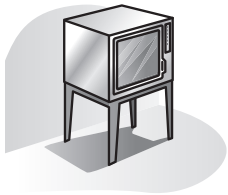
	ANNUAL KWH SAVINGS	ANNUAL THERM SAVINGS	ANNUAL SAVINGS	LIFETIME SAVINGS
ENERGY STAR Dishwasher, Undercounter	1,200	115	\$60-\$290	\$700-\$3,300
ENERGY STAR Dishwasher, Door Type	14,000	560	\$60-\$1,430	\$700-\$16,400
ENERGY STAR Dishwasher, Single Tank Conveyor	22,000	760	\$400-\$2,200	\$4,600-\$25,200
ENERGY STAR Dishwasher, Multi Tank Conveyor	38,500	1,500	\$600-\$3,800	\$7,000-\$43,500
ENERGY STAR Dishwasher, Pots/Pans/Utensil	12,000	500	\$350-\$1,200	\$4,000-\$13,700



## ENERGY STAR Commercial Hot Food Holding Cabinets

- Commercial hot food holding cabinets (HFHCs) earning the ENERGY STAR label are approximately **70% more energy efficient** than standard models.
- ENERGY STAR commercial HFHCs utilize enhanced technology such as greater insulation levels, more precise controls, full perimeter door gaskets, and magnetic door handles to improve their energy efficiency.
- ENERGY STAR commercial HFHCs also offer better temperature uniformity and cooler external cabinet temperature which leads to a cooler kitchen with reduced cooling load requirements.
- Savings estimates below are variable and dependent on the cabinet interior volume (cubic feet).

	ANNUAL KWH SAVINGS	ANNUAL SAVINGS	LIFETIME SAVINGS
ENERGY STAR Commercial Hot Food Holding Cabinets, per cabinet	800-9,300	\$80-\$930	\$1,100-\$13,000



## .....● ENERGY STAR Commercial Ovens

- Commercial ovens earning the ENERGY STAR label are **20-30% more efficient** than standard models.
- ENERGY STAR commercial ovens utilize enhanced technology to improve their energy efficiency such as direct-fired burners, infrared burners, improved insulation and gaskets, and the addition of quality control features.
- ENERGY STAR commercial ovens also offer higher production capacity, improved air circulation, faster and more uniform cooking processes, and a reduction in heat loss, leading to reduced cooling loads in the kitchen.

	ANNUAL KWH SAVINGS	ANNUAL THERM SAVINGS	ANNUAL SAVINGS	LIFETIME SAVINGS
ENERGY STAR Convection Oven, Natural Gas	-	300	\$230	\$3,300
ENERGY STAR Convection Oven, Electric	1,900	-	\$190	\$2,500
ENERGY STAR Combination Oven, Natural Gas	-	370	\$280	\$4,000
ENERGY STAR Combination Oven, Electric	10,000	-	\$1,000	\$14,000



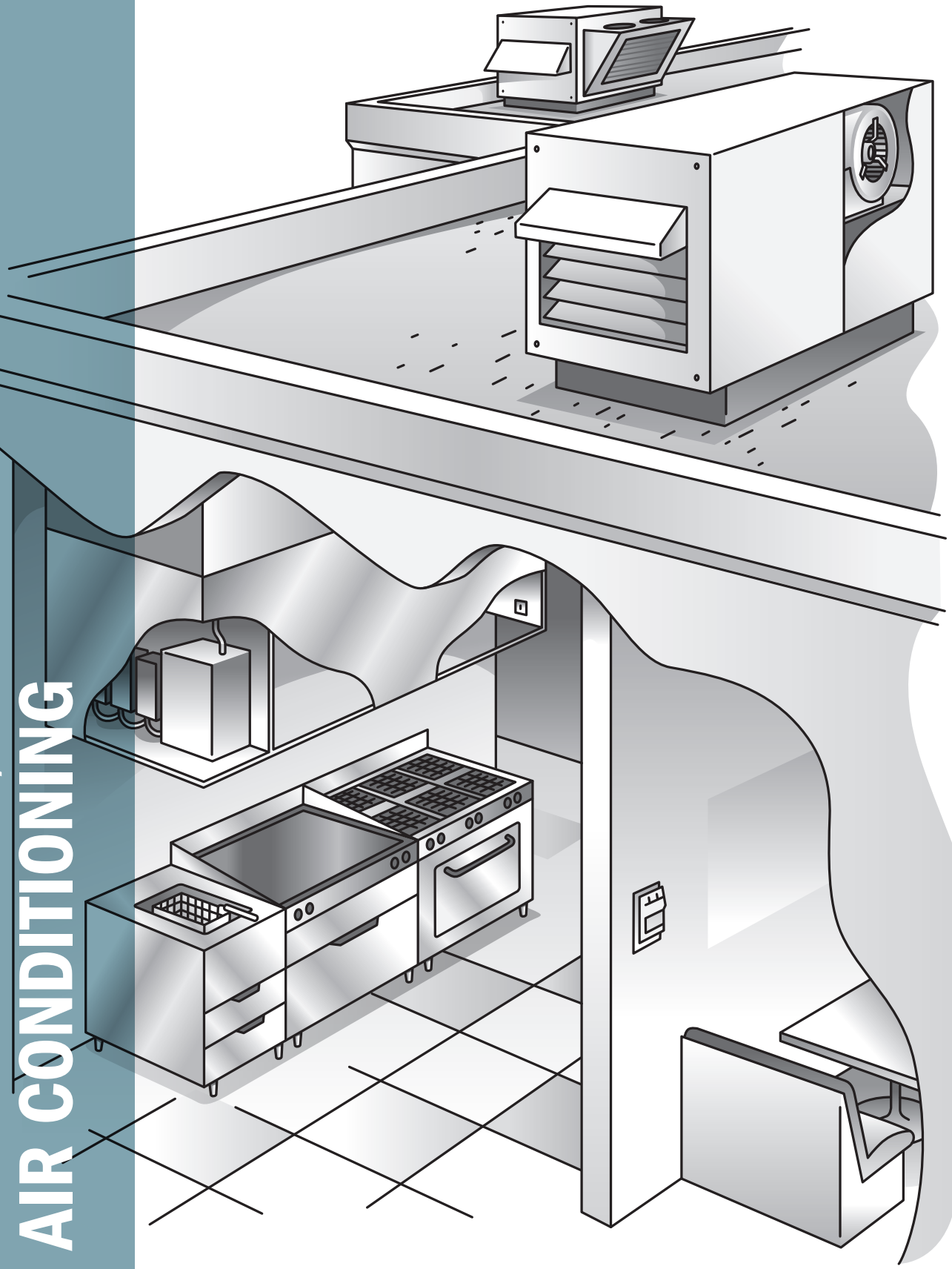
## .....● ENERGY STAR Commercial Fryers

- Fryers earning the ENERGY STAR label are **30-35% more efficient** than standard models.
- ENERGY STAR fryers offer shorter cook times and higher production rates through advanced burner and heat exchanger designs.

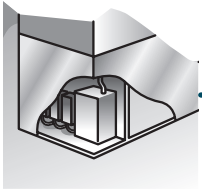
	ANNUAL KWH SAVINGS	ANNUAL THERM SAVINGS	ANNUAL SAVINGS	LIFETIME SAVINGS
ENERGY STAR Fryer, Natural Gas, per fry pot	-	400	\$300	\$4,200
ENERGY STAR Fryer, Electric, per fry pot	1,000	-	\$100	\$1,400
ENERGY STAR Large Vat Fryer, Natural Gas, per fry pot	-	600	\$450	\$6,400
ENERGY STAR Large Vat Fryer, Electric, per fry pot	1,800	-	\$180	\$2,500



# HVAC: HEATING, VENTILATION & AIR CONDITIONING







## Demand Control Kitchen Ventilation (DCKV)

- DCKV systems automatically modulate the amount of air exhausted through a kitchen exhaust hood based on equipment use and cooking demands.
- The system uses temperature and/or optical sensors to determine the appropriate fan speed. This results in savings from reduced fan energy and less tempered air leaving the kitchen while providing non-energy benefits like a quieter kitchen and improved climate controls.
- DCKV systems are ideal for commercial kitchens operating at least 10 hours per day, 300 days per year, and have a cooking line of 12 or more feet..
- The state of an existing kitchen ventilation system will impact the savings potential and project cost. A commissioning process involving field testing and air balancing is a key step when installing a DCKV system.

	ANNUAL KWH SAVINGS	ANNUAL THERM SAVINGS	ANNUAL SAVINGS	LIFETIME SAVINGS
Hood Exhaust Fan, per motor HP controlled	1,100-2,700	250-700	\$300-\$800	\$3,400-\$9,000
Makeup Air Unit Supply Fan, per motor HP controlled	470-1,200	-	\$50-\$120	\$570-\$1,375



# High Efficiency Packaged Rooftop Units (RTUs) with Advanced Rooftop Unit Controllers

- Packaged rooftop units are used in over 50% of commercial buildings, but most lack effective controls to perform efficiently through daily changes in operating conditions. Advanced Rooftop Unit Controllers (ARC) **improve efficiency by up to 50%** with the use of advanced control strategies.
- Integrated economizer control regulates the amount of ventilation airflow being introduced to the building. This saves energy by using cool outside air to condition the space - commonly referred to as "free cooling" - instead of running the compressors to provide cool, conditioned air.
- Demand control ventilation slows or speeds up fans based on building occupancy detected by carbon dioxide levels. This saves energy by reducing the amount of outside air requiring conditioning.
- Variable or multi-speed fan controls adjust the speed of the RTU supply fan based on operating conditions like temperature, pressure, or outside air levels. This reduces the amount of time the fan runs at full speed.

	ANNUAL KWH SAVINGS	ANNUAL THERM SAVINGS	ANNUAL SAVINGS	LIFETIME SAVINGS
High Efficiency Packaged RTUs (15 SEER), 5 ton units	1,100	-	\$110	\$2,000
High Efficiency Packaged RTUs (12.0 EER, 13.8 IEER), 10 ton units	3,000	-	\$300	\$5,500
Advanced Rooftop Unit Controllers	30-50% annual savings over existing operation			

## PRO TIP

Not only do advanced rooftop unit controllers optimize your existing units' runtime and efficiency, they also improve indoor air quality, occupant and customer comfort, and reduce the noise level of the rooftop units.

# Get started today!

- 1 Work with your Focus on Energy Advisor to identify the best opportunities for your facility and apply for incentives on your next project. Visit [focusonenergy.com/energy-advisor-map](https://focusonenergy.com/energy-advisor-map) to find your Energy Advisor.
- 2 Work with a Trade Ally to perform your energy efficient upgrades. Need a Trade Ally? Go to [focusonenergy.com/findtradeally](https://focusonenergy.com/findtradeally).
- 3 Apply for incentives. Go to [focusonenergy.com/business#program-catalogs-applications](https://focusonenergy.com/business#program-catalogs-applications) to download the most recent form.

## Contact us to get started

For more information, call **800.762.7077** or visit [focusonenergy.com](https://focusonenergy.com).

## Resources to reference

- PG&E Food Service Technology Center: [www.fishnick.com](https://www.fishnick.com)
- National Restaurant Association Conserve: [www.restaurant.org/conserve](https://www.restaurant.org/conserve)
- ENERGY STAR Restaurants: [www.energystar.gov/restaurants](https://www.energystar.gov/restaurants)
- Consortium for Energy Efficiency Commercial Kitchens Initiative:  
<http://library.cee1.org/content/commercial-kitchens-initiative-description>

Energy savings ranges within this guide are derived from Program assumptions documented in Program measure work papers. Cost savings ranges in this guide are derived from utility data provided by the Energy Information Administration (EIA), with annual \$ savings using present day assumptions of \$0.10/kWh and \$0.762/therm. Lifetime \$ savings assume an annual 3% utility escalation rate for the life of each measure. Expected lifetimes of each measure are calculated using the effective useful life values referenced from the Focus on Energy Technical Resource Manual.



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**REDUCING ENERGY WASTE ACROSS WISCONSIN**

Focus on Energy, Wisconsin utilities' statewide program for energy efficiency and renewable energy, helps eligible residents and businesses save energy and money while protecting the environment. Focus on Energy information, resources, and financial incentives help to implement energy efficiency and renewable energy projects that otherwise would not be completed. 067-0073-05-00

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Partnering with Wisconsin utilities