



the NACS[®] green toolkit

*A global guide to implementing a green
and sustainable convenience store*

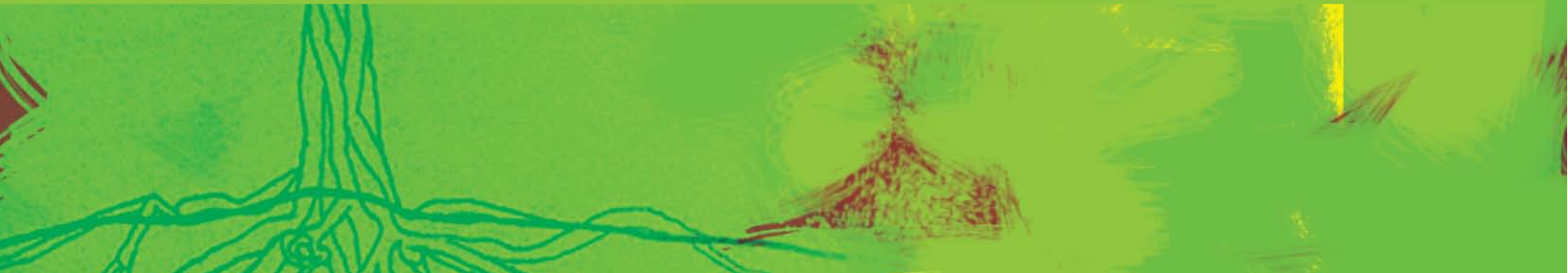
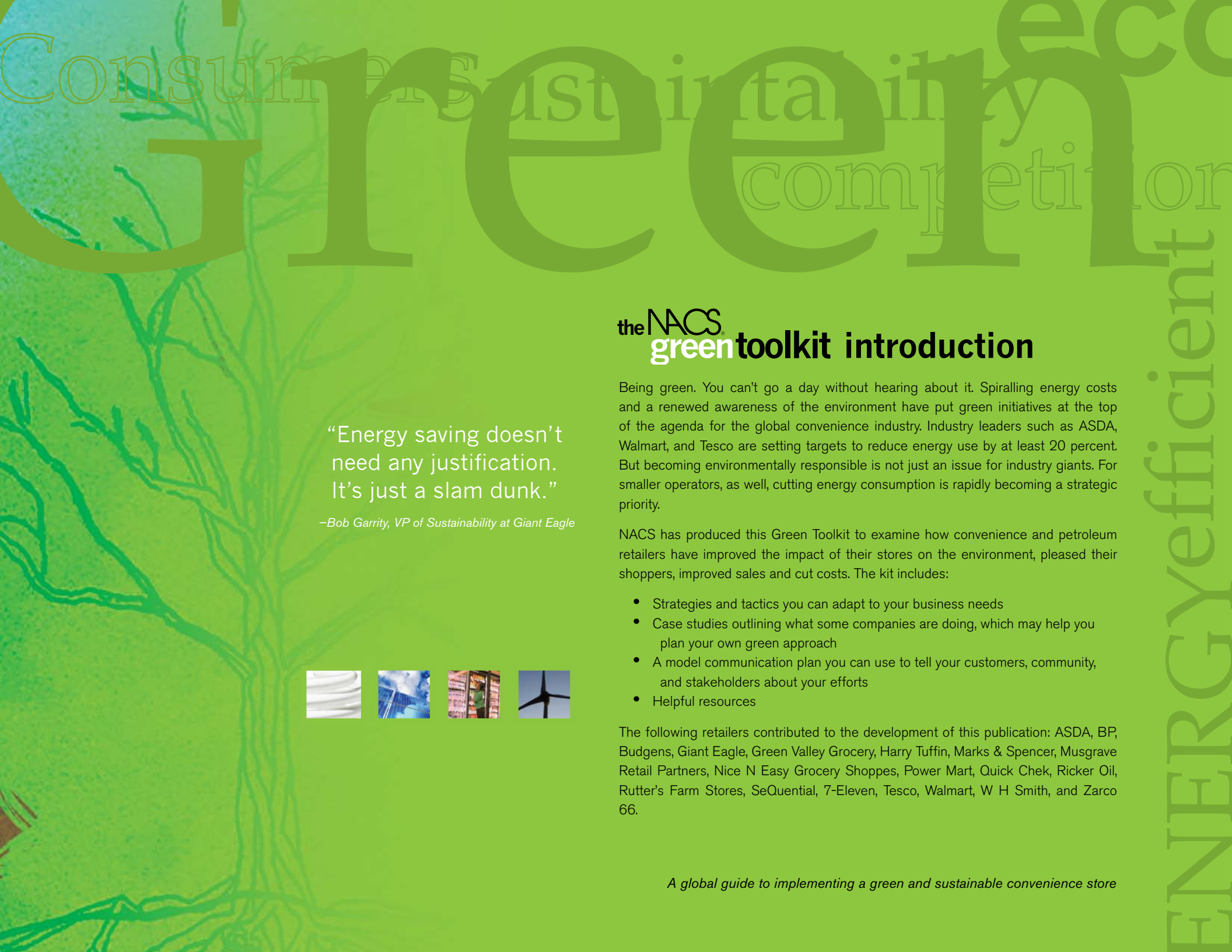


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“Energy saving doesn’t
need any justification.
It’s just a slam dunk.”

—Bob Garrity, VP of Sustainability at Giant Eagle



the **NACS** **green** toolkit introduction

Being green. You can’t go a day without hearing about it. Spiralling energy costs and a renewed awareness of the environment have put green initiatives at the top of the agenda for the global convenience industry. Industry leaders such as ASDA, Walmart, and Tesco are setting targets to reduce energy use by at least 20 percent. But becoming environmentally responsible is not just an issue for industry giants. For smaller operators, as well, cutting energy consumption is rapidly becoming a strategic priority.

NACS has produced this Green Toolkit to examine how convenience and petroleum retailers have improved the impact of their stores on the environment, pleased their shoppers, improved sales and cut costs. The kit includes:

- Strategies and tactics you can adapt to your business needs
- Case studies outlining what some companies are doing, which may help you plan your own green approach
- A model communication plan you can use to tell your customers, community, and stakeholders about your efforts
- Helpful resources

The following retailers contributed to the development of this publication: ASDA, BP, Budgens, Giant Eagle, Green Valley Grocery, Harry Tuffin, Marks & Spencer, Musgrave Retail Partners, Nice N Easy Grocery Shoppes, Power Mart, Quick Chek, Ricker Oil, Rutter’s Farm Stores, SeQuential, 7-Eleven, Tesco, Walmart, W H Smith, and Zarco 66.

A global guide to implementing a green and sustainable convenience store

Turning Green to Gold





Turning Green to Gold

"A majority of U.S. consumers are concerned with environmental issues.

They are expected to spend about \$500 billion on green products and services in 2008."

— 2007 ImagePower Green Brands Survey

The green movement dates back to the 1960s. Yet we saw very little progress for decades thereafter. Eco-minded individuals who hauled recyclables across town, switched to rough, recycled toilet paper, or sacrificed morning sleep to bike to work did not see much improvement in the environment in exchange for their discomfort and inconvenience. We see substantial progress only when governments mandate it or when businesses align their goals and objectives with societal goals and objectives. A December 2006 *Harvard Business Review* article makes a compelling argument:

The prevailing approaches to corporate social responsibility are so fragmented and so disconnected from business and strategy as to obscure many of the greatest opportunities for companies to benefit society. If, instead, corporations were to analyze their prospects for social responsibility using the same frameworks that guide their core business choices, they would discover that corporate responsibility can be much more than a cost, a constraint, or a charitable deed — it can be a source of opportunity, innovation, and competitive advantage.

The message is clear. Businesses can be both environmentally responsible and economically successful. But why should convenience store owners focus on environmental responsibility? Why not literacy or healthcare or some other issue? Quite simply, they affect the environment far more than literacy rates or healthcare delivery; it's their sandbox.

Convenience stores:

- Sell and store approximately 80 percent of the motor fuels in the United States
- Sell the highest percentage of immediately consumed packaged goods, which generates a lot of trash
- Require paved parking lots, which creates water runoff
- Operate more carwashes than any other channel of trade, which affects water quality

You can agree that being environmentally responsible is a good thing, but how does it affect your economic interests? It's all about supply and demand.

On the supply side, you can reduce supply and operating costs by using affordable, eco-friendly products and services. You may also be able to expand your labor force by attracting the growing number of employees who prefer to work for eco-minded companies.

On the demand side, you can tap into the growing consumer demand for eco-friendly products and practices and attract employees who want to work for socially responsible companies.

Your company operates within a competitive and social context, so the benefits you realize from being environmentally responsible depend on two conditions: what your competitors are doing and what your community values. You will need to weigh the costs, benefits, risks and opportunities associated with environmental

responsibility, but no matter what course you choose, it will play a role. Consider these market scenarios:

1. Employees and customers demand environmental responsibility
+
No or few eco-minded competitors
=
Expanded labor supply, increased sales and greater market share for environmentally responsible companies
2. Employees and customers demand environmental responsibility
+
Many eco-minded competitors
=
Greater competition for labor, sales and market share (you must become environmentally responsible to compete)

But what if demand is low because your customers perceive that green means expensive? In this case, you should aggressively pursue opportunities to reduce your costs by adopting low-cost, environmentally responsible practices and monitor the market so that you can move quickly in response to a change in demand.



Turning Green to Gold...

What are the benefits to convenience and petroleum retailers?

According to a 2008 survey by the research company Economist Intelligence Unit, the chief reasons for businesses to adopt sustainable practices were to attract new customers or retain existing ones. Some retailers describe adopting green strategies as “future proofing” their business. But there are other important reasons:

- Improved shareholder value
- Increased profitability
- Improved ability to identify and manage risks
- Better quality products and services
- Improved relations with regulators and nongovernmental organizations (NGOs)
- Reduced exposure to taxes
- Competitive advantage
- Rising cost of energy
- Increased brand equity
- Innovation
- Current or expected compliance mandates

What do consumers want?

Most green shoppers are young, affluent, educated and female, and there is little doubt that the green movement is gaining in popularity. Surveys in Europe and North America have found that high percentages (between 70 percent and 79 percent) of consumers are

concerned about the effects of climate change and are interested in green technology. Seventh Generation, for example, which produces green cleaning products, has averaged 40 percent growth annually over the last five years.

According to U.K. retailer Tesco, customers are demanding environmental responsibility: “Customers are driving us down this route. They tell us they want to know what they can do and want to see examples of how to contribute. They feel that large companies like us have a duty to drive technologies.”

When major retailers worldwide asked their customers about sustainability issues, here is what they learned: Most U.S. customers are not willing to pay more for green products and services or make lifestyle sacrifices for the sake of the environment. However, they do want retailers to take the lead in addressing sustainability issues on their behalf. And although European consumers have developed green awareness more quickly than their American counterparts, they, too, expect large companies to lead the fight against global warming.

What are retailers doing?

In the public's view, convenience stores generally have a poor social image because of their misperceived links with fuel, fast food, litter, loitering teenagers and increased traffic. The good news is that convenience stores can improve their image, build customer loyalty and create important links with their communities by adopting green practices. Retail consortiums, large companies and individual operators have

developed ambitious, but doable, strategies and goals. Here are a few examples of those goals:

The British Retail Consortium

- Cut energy-related emissions from buildings by 15 percent
- Cut carbon dioxide emissions from store delivery vehicles by 15 percent
- Assess and reduce water use
- Reduce waste that goes into landfills

Tesco

- Achieve a 50 percent reduction in electricity use per square foot by 2010
- Achieve a 50 percent reduction in carbon footprint by 2020
- Divert 80 percent of construction waste from landfills
- Achieve a 50 percent reduction in the carbon emissions needed to deliver a case of goods by 2012
- Create new stores with, on average, half the carbon footprint of a 2006 store by 2020

Walmart

- Use 100 percent renewable energy
- Create zero waste
- Sell products that sustain natural resources and the environment

Later in the NACS Green Toolkit you will find case studies that provide more details about how retailers are meeting their green goals. We hope that the contents contained in the ensuing pages will give you a useful perspective of the role that environmental responsibility can play in making your business even more successful in the future.



Green Solutions for Convenience Stores

"You've got to walk before you run.
We are just working with some
practical ideas. Some can save
money, but not all of them.
Some will be obvious to
customers and some won't."

—Rutter's Farm Stores

Begin by looking at going green as a phased-in process. There are some things you can do fairly quickly and easily, such as setting up recycling containers. But you can also achieve quick results through simple changes to power-dependent systems such as refrigeration, heating, ventilation, air conditioning (HVAC) and lighting. So how should you start? What should you do? We've identified a seven-step "go green" process:

1. **Gather information** to learn where you are now. Determine your energy costs and figure out how much waste you produce. You can do this fairly simply. For example, look at a year's worth of energy bills, and count the number of garbage bags you set out each week.
2. **Create a go-green plan** by making lists of specific tasks, achievable goals and measurable targets. Prioritize so that you can focus on what you can do now with available resources.
3. **Involve staff** by meeting with employees to hear their ideas for saving energy and cutting down on waste.
4. **Identify and involve partners** who can help you achieve your goals with advice, support and resources. Likely partners include utility companies, NGOs, government agencies, charities, local universities and schools.
5. **Take action** by deciding what things you can do fairly quickly and putting them into place. Set start dates for longer-term initiatives.

6. **Communicate** your green efforts to your employees, customers and local community. (Green success stories often generate free publicity.)
7. **Review** your efforts for both environmental responsibility and return on investment (ROI) and make any needed changes.

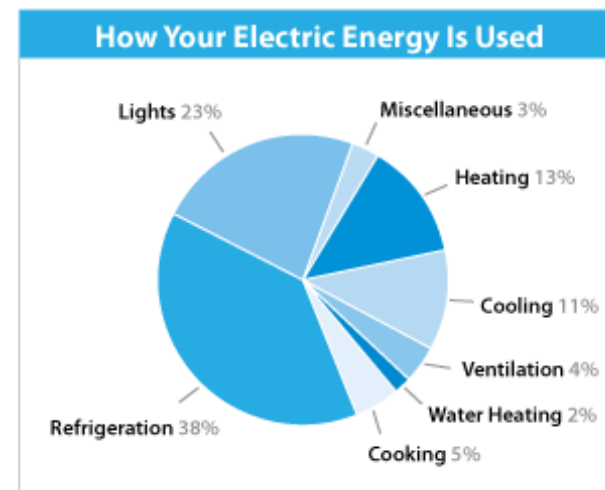
We've also included some actions you can start taking now to make better use of the energy your company consumes. As you will see, most of it is common sense, but these simple tasks or changes can dramatically affect the cost of your energy consumption — especially in a time of rising fuel costs and economic uncertainty. You can phase in some of these changes over time, such as when you replace equipment, remodel or build a new store.

Refrigeration

Refrigeration generates in-store heat that can strain the HVAC system in warm weather. Integrated refrigeration systems solve this problem. These systems employ a central bank of compressors located outside (often on the roof) to draw off unwanted heat. Most convenience stores use non-integrated refrigeration systems inside the store. Built-in compressors connected to external condensers removes the heat generated by these systems.

Compare Your Business With the National Averages

National Average
Electric Energy Intensity
52.5
(kWh/sq.ft./year)

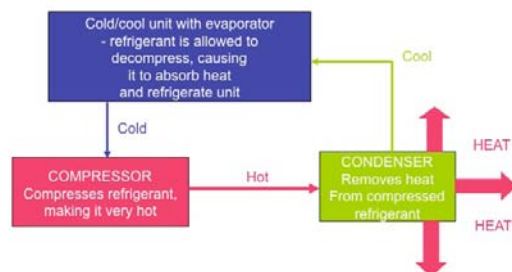


(Source: Energy Star)

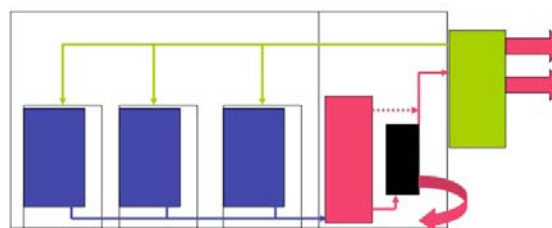


Green Solutions for Convenience Stores...

How Refrigeration Works

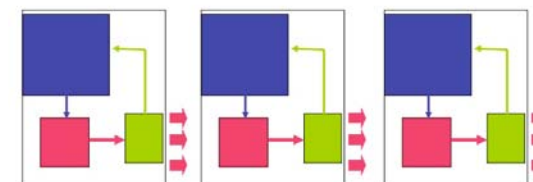


Best Solution: heat recovery



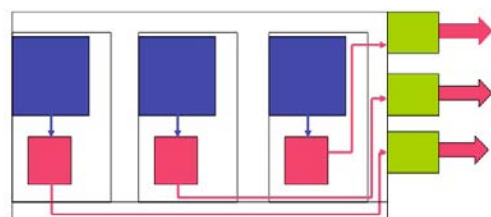
Correct amount of heat is recovered if needed to heat the store in cold weather. In warm weather, no heat recovery and relatively low energy use for air-conditioning.

Self-contained refrigerated units in a store



Each unit gives out heat at all times. Very high energy use for air conditioning, particularly in hot weather.

Typical Convenience Store Solution: external condenser(s)



Most of the heat produced by the refrigeration is dissipated outside building. But compressors still give out some heat, meaning increased energy use by air-conditioning in summer. In winter, heat is wasted outside that could heat the store. Moderately high energy use.

According to Energy Star research, refrigeration accounts for nearly 40 percent of the energy used in a typical convenience store and is key area in which you can achieve significant energy and cost savings with the following activities:

- Perform scheduled maintenance
- Follow the manufacturer's recommendations for defrosting and use defrost controllers
- Replace weak or broken door seals
- Monitor temperature settings
- Replace shaded-pole motors with permanent split capacitors (PSCs) or electronically commutated motors (ECMs)
- Deep-clean refrigeration cases annually to ensure efficient air movement
- Reduce humidity in the store

- Install a humidistat kit for heaters
- Hang plastic strip curtains over doorways
- Maintain unobstructed air vents
- Avoid empty spaces in open units
- Turn off nonessential refrigeration when the store is closed

For central refrigeration systems:

- Monitor system pressures and temperatures
- Monitor product temperatures
- Clean evaporator and condenser coils
- Remove anything that obstructs air flow to fan coils
- Replace worn belts and damaged or missing suction line insulation
- Service motors in evaporator and condenser fans
- Monitor the refrigerant charge, suction, and head pressure

The following are some additional ideas for you to consider:

■ Install display case shields

Research done by Southern California Edison found that retailers could realize energy reductions of 9 percent over a 23-hour period by using aluminium shields when a store is closed.

■ Close the doors

Leaving refrigeration unit doors open lead to increases in energy demand. Daily activities such as suppliers propping doors open while stocking or employees leaving doors open to dry a mopped floor have a cumulative effect on your energy costs.

■ Prevent condensation on doors

Install doors that don't require heaters. Rutter's uses Styleline doors that work well when the summer months bring in heat and humidity to the local area. You can also apply clear plastic film to existing doors. Farm Fresh used General Electric's Lexan plastic film on doors in its Virginia Beach, Virginia, store. Energy and Maintenance Director Jon Perry had this comment:



Green Solutions for Convenience Stores...

"More than half of air conditioning systems are oversized or have improper refrigerant charge, leaky ducts, or mismatched coils, which reduces equipment efficiency by 30 to 50 percent."

—Southern California Edison



Rutter's uses cooler doors that don't require heaters.

"We disconnected the anti-fog heaters on the doors and used Lexan film made by GE instead. We cut amperage from 5.2 to 2.4 for a four-door frozen food case and reduced the load on our compressors. We estimate energy savings of 10 percent to 30 percent on our compressors."

■ Install doors on open cases

Open cases, which are more widely used in Europe than in the United States, release cold air into the store. That generally reduces the load on air conditioning in warm weather, but may also make the store uncomfortably cold. Current discussion of energy saving is moving opinion in the direction of installing doors on open cases, but not everybody agrees. Some retailers feel that doors reduce impulse purchasing.

■ Use small chillers

Stores with central refrigeration systems can use small chillers, which are self-contained and not part of the central system. However, these units, though small, do produce heat

like a domestic refrigerator and will impose an additional load on the HVAC system.

■ Install groundwater condensers

Instead of condensers on the roof, which typically use energy for motors, some companies sink pipes down to subterranean aquifers, where natural water movement can take away the unwanted heat produced by refrigeration. (This technique is possible only where suitable aquifers exist and is not likely to be an option for many convenience stores.)

■ Use green refrigerants

The right refrigerant can reduce your store's carbon footprint. Most stores currently use carbon dioxide refrigerant.

■ Use off-peak electricity

Meet with your electricity supplier to determine ways that you can more effectively use cheaper power. In England, for example, Marks & Spencer convenience stores use off-peak power to make ice and use ice melt to reduce temperatures in refrigerators and stores.

HVAC

HVAC systems play an important role in indoor comfort and health, but companies generally overlook them until a problem occurs. Perform regular maintenance to keep HVAC equipment in good working order, and keep ductwork and filters clean. The following activities will also make your HVAC run more efficiently:

- Install fans to reduce the need for air conditioning in hot weather.
- Prohibit staff from changing temperature settings, or install automatic controls.
- Inspect ducts and seal leaks with UL-181 foil tape or mastic that remains flexible after setting. (Back with fiberglass tape; duct tape is not appropriate as the adhesive deteriorates over time.)
- Insulate ducts running through an attic or crawl space with foil-faced fiberglass.
- Maintain airflow around outside condenser units by clearing plants or other obstructions.
- Shade outside condenser units.
- Ask your utility company for ways to reduce humidity levels and to provide suggestions for purchasing and maintaining equipment.
- Ask your utility company if your HVAC unit is properly sized for the space.
- Maintain optimum temperatures in spaces containing your refrigeration units.
- Minimize solar gain by using films or tinted glass on windows.
- Use zones to handle cooling demand in different areas of the store. (Kitchens may need continuous air conditioning; the retail space may not.)



Green Solutions for Convenience Stores...

According to the Consortium of Energy Efficiency in Boston, Massachusetts, at least 25 percent of all rooftop HVAC units are oversized, resulting in increased energy costs, equipment wear and pollution.

Employees may want to have some control over temperatures, but constant changes in temperature cause HVAC system imbalance. Educate staff about how personal preferences affect the system and energy use.

- Reduce the load on HVAC with fans.
- Control outside airflow with air curtains or ducts that bring cool night air into the building to ease the HVAC load.

Lighting

Energy Star estimates that lighting accounts for 23 to 40 percent of convenience store electricity costs. It also directly affects store image and customer perceptions.

For example, Amelia's Grocery Outlet in Pottsville, Pennsylvania, saved \$8,389 on its electricity bill and got a brighter store when it replaced fluorescent and metal halide lights with energy-efficient high-intensity lighting. Steve Kaplan, a Subway franchisee in Oklahoma, replaced 40-watt T-12 lamps using magnetic ballasts with 32-watt T-8 lamps using electronic ballasts. Although the fixtures can hold four bulbs, he can adequately light the store with two. Some retailers have also noticed that point of sale (POS) material fades much more slowly under energy-efficient lights.

Here are some energy-saving strategies to consider for lighting:

■ Maximize existing lighting

Clean bulbs, fixtures and diffusers regularly. Replace old, yellowing or cracked lenses. Choose light colors for paint and tile.

■ Use compact fluorescent lamps

Most of the energy (95 percent) used by incandescent bulbs is converted into heat. Replace them with compact fluorescent lamps (CFL), which use 75 percent less energy and last up to 10 times longer. When possible, replace incandescent fittings with fittings designed for energy-efficient lamps. Placing

"We have frequency low energy lighting with a lot of mirrors around the tubes to give maximum output. Point of sale material doesn't fade and waste is reduced. The lower emission lights allow produce to last longer."

– Budgens, Dersingham

CFL bulbs in incandescent fittings may result in lower-quality light and reduced lamp life.

■ Replace inefficient lighting components

Replace T-12 fluorescent lighting systems with T-8 and T-5 lamps, which are more efficient, make products look brighter and fresher and have a longer life. This change should produce a 35 percent decrease in energy consumption, and you can gain further savings by using fewer bulbs than the fixture requires. Replace magnetic ballasts (which modify incoming voltage and control current) with electronic ballasts. In addition to providing nearly flicker-free operation, electronic ballasts use up to 30 percent less energy than magnetic ballasts.

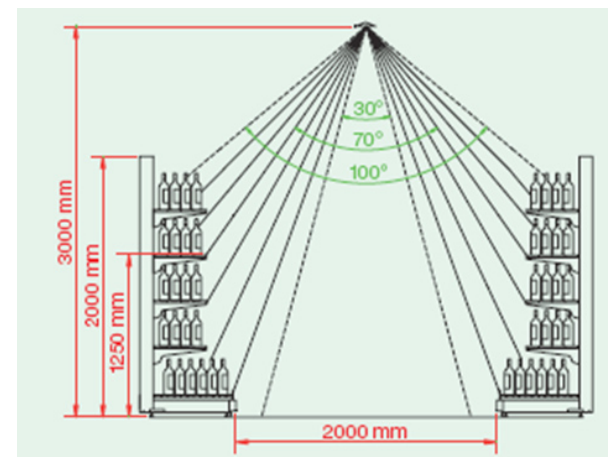
■ Use high-intensity discharge (HID) lighting

In theory, HID lamps are less efficient than fluorescent T-5s and T-8s. However, they may be an energy-efficient solution when reducing the number of fixtures. The Centra store in Marley, Ireland, reduced the number of fixtures required by using Baero's HID batwing

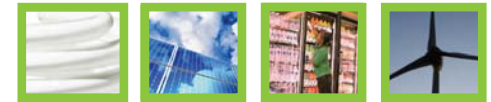
(see image below) fixtures and expects a 40 percent savings on energy bills.

■ Use light-emitting diode (LED) lighting

In the last 20 years, LED lamps have evolved from indicators on consumer electronics to a versatile and efficient lighting source. They provide effective light at a lower energy rate, produce little heat and protect spotlighted graphics from deterioration. LED bulbs are up to eight times more efficient than incandescent or fluorescent bulbs, and you can see them more clearly through smoke.



(Source: Baero)



Green Solutions for Convenience Stores...

Modern customers expect to have a “shopping experience,” and effective lighting can help create the right mood, highlight displays and attract customers who are more likely to buy more in this positive environment.



W H Smith uses LED spotlights on POS material.



Nice N Easy uses LED gas price signs.

BP's Better Day station in Racine, Wisconsin, uses LED lighting in the station's canopy, parking lot and carwash bays.



11

“We’re going to redo all the lighting on the perimeter and underneath the canopies and are looking to cut the costs dramatically with LED. A typical canopy might have 20 fixtures; with LED, we might go down to 15 without losing any light. It will cost more but we’re willing to make the investment in the belief that it’ll work for us.”

—Nice N Easy Grocery Shoppes



Green Solutions for Convenience Stores...

“Since the late 1980s, we have used a lighting control panel to automatically turn lights on and off in series in response to store needs. That saves a huge amount of money because people turn too many lights on early and leave them on.”

– W H Smith

■ Install lighting controls

Ideally, lighting controls should increase the flexibility of your system while eliminating unnecessary light use. There are two general approaches: energy management systems (EMS) and zone controls. EMS give managers more control over energy use and can be very cost effective. Common zone lighting controls include the following:

• Bi-level switching

These switches give managers control over groups of lights, allowing them to turn off lights to unoccupied areas.

• Dimmers

Managers can set these devices using a timer or photo sensor to respond to changes in natural light.

• Occupancy sensors

These come in two types: passive infrared (PIR) and ultrasonic technology. PIR requires a direct line of sight to operate. Applications include private restrooms, machine and electrical rooms, small storage rooms and outdoor security lighting. Ultrasonic technology costs more than PIR, but does not require a direct line of sight. Applications include public restrooms, large storage areas, offices, and stairwells. Occupancy sensors can generate considerable energy savings (see Table 2.1).

• Install daylight sensors and use variable lighting controls

A common inefficiency of exterior lighting systems is a tendency to burn during the day. Solve this problem by installing photo sensors that turn the lights on and off automatically in response to daylight. Use motion sensors, time clocks and photo sensors to control lighting for specific times (see Table 2.2).

Table 2.1

ENERGY SAVING WITH OCCUPANCY SENSORS

AREA	ENERGY SAVINGS (%)
Offices	25-50%
Restrooms	35-75%
Corridors	30-40%
Storage Rooms	45-65%

(Sources: California Energy Commission, U.S. Department of Energy, Electric Power Research Institute)

Consider a complete lighting remodel. With modern energy-efficient lighting, you often can improve store lighting dramatically without increasing operating costs. Here are some suggestions:

- Work with an interior designer or lighting designer to save time and money. A designer can research options and provide workable solutions to meet your needs.
- Take into account both the energy efficiency of individual fittings and the number of fittings you will need.
- Explore the benefits of additional highlight lighting, such as spotlights.
- Determine the effect of your lighting remodel on HVAC and refrigeration systems.
- Determine your ROI and balance increased efficiency and improved aesthetics against costs.

Table 2.2

USE OF VARIABLE LIGHTING CONTROLS

BUSINESS ACTIVITIES	LIGHTING REQUIRED (%)
Deliveries	20%
Pre-opening	60%
Opening	100%
Clear down	60%
Closing	20%

(Source: Musgrave Retail Partners)

• Use natural light

Use natural light. Natural light pleases shoppers and improves employee productivity. You should take solar gain into account when considering natural light. Indirect light from high and north-facing windows may provide the best solution to solar gain. You can maximize the benefits of natural light by using timers or daylight sensors, using light-reflective materials or colors for walls and floors and ensuring that windows are not blocked.

• Use eco-friendly lighting in new construction

New construction offers several opportunities to use natural light and reduce daytime electricity use. Options include roof lights, skylights and light tubes (also called tubular lighting or tubular day lighting). Light tubes with high-quality reflectors provide as much light as an electric light fitting.



Green Solutions for Convenience Stores...

"We worked with an interior designer and chose a T-5 lighting fixture and spots. We also installed pendants to drop light directly over our food-to-go and coffee areas. The light draws customers directly to those key areas. It's very simple, but we think it adds a lot of class to the store."

—Rutter's Farm Stores

In addition, light quality is better, there is no energy cost, and the only maintenance required is regular cleaning. The tubes are certainly effective. For example, McDonald's operates a store in Chicago that is Leadership in Energy and Environmental Design (LEED) certified as a green building. McDonald's installed film on its light tubes after staff complained that the kitchen was too bright.

Tesco incorporated a large roof light into specifications for its convenience format and used natural lighting in the forecourt. Putting skylights in a forecourt canopy is a good remodeling choice. Replacing a canopy is much less disruptive to store operations than replacing the roof.

"We don't have empirical evidence, but when you walk into a store that has day lighting, you feel as if you're not isolated in a big box or shut out from everything else, but rather in an open-air environment."

—Giant Eagle



Tesco's roof light.



McDonald's light tubes.



Giant Eagle's skylights.

Green Valley Grocery in Las Vegas, Nevada, boosts its day lighting with skylights over the main floor, restrooms and storage and electrical rooms. A central rotunda with indirect skylights allows maximum use of daylight without excessive solar gain, an important consideration in this desert location.

Giant Eagle operates a LEED-certified supermarket, which uses more than 50 skylights to provide natural light in areas with open and suspended ceilings.

Energy Management Systems





Energy Management Systems

Energy management systems (EMS) allow management to oversee and correct areas that store-level employees might neglect. In theory, on-site managers should notice problems with energy systems. In reality, however, their attention is focused on customer service, inventory, deliveries, and managing staff. Comparatively inexpensive to install, EMS employ sensors that monitor light and temperature levels, humidity, display case temperatures, energy consumption, refrigeration (in some packages) and HVAC. EMS turn systems on or off according to required criteria and adjust total energy consumption to prevent peaks in demand.

Before installing an EMS, consider the following issues:

- Existing systems may be incompatible or may not function at the expected efficiency levels.
- People tend to trust computer-generated information without bearing in mind the adage "garbage in, garbage out."
- Improperly positioned sensors can decrease the quality of data gathering.
- Employees may attempt to override the system with manual controls.

We recommend that you incorporate ways to deal with these issues when developing your energy use plans. For example, you can establish a working group during transition to EMS that allows staff to cite problems, air concerns and help create mutually acceptable solutions. A number of companies market EMS, some in packages specifically intended for convenience stores (see Appendix B: Online Resources for more information).

Power





Power

“There isn’t a black box that will spew out a number that tells you how much money you will make from going green. I’ve seen countless people try to create models which say if you invest ‘X’ you get back ‘X plus,’ but this is more about long-term investment in the future.”

—Marks & Spencer

“We started this project because we thought it was the right thing to do, not because it was going to make us a million dollars.”

—Zarco 66

Electricity companies base their charges on two measures: consumption and demand. So, spikes in demand result in higher energy costs. Many businesses manage peak demand by staggering the times when they turn on equipment. This simple step can substantially reduce peak demand and produce considerable savings.

Some companies express their green goals in two ways: a reduction in their carbon footprint and a reduction in energy use, often using these terms interchangeably. A reduction in energy is just what it sounds like, but a reduction in carbon footprint is measured by the amount of fossil fuels burned as a result of an individual’s or a company’s activities.

Companies can save money and benefit the environment when they reduce energy use. Reducing their carbon footprint, on the other hand, may not provide direct savings and is more likely to reflect a marketing-based commitment to sustainability (see Table 4.1).

Green power has the lowest carbon footprint. The U.S. Environmental Protection Agency (EPA) defines green power as electricity produced from solar, wind, geothermal, biogas, biomass and low-impact small hydroelectric sources.

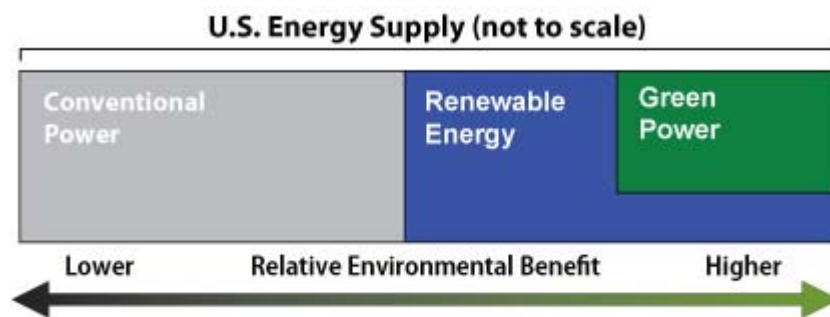
Renewable energy resources restore themselves over short periods of time and include the sun, wind, moving water, organic plant and waste material (biomass), and the earth’s heat (geothermal). Some renewable energy technologies have an impact on the environment. For example, large hydroelectric plants can adversely affect fisheries or land use.

Table 4.1

EXAMPLE OF ACTIVITIES AFFECTING ENERGY USE OR CARBON FOOTPRINT ACTIVITY

ACTIVITY	ENERGY USE	CARBON FOOTPRINT
Make stores 20 percent more efficient in seven years	X	
Use 100 percent renewable energy		X
Reduce incandescent bulbs with compact fluorescents	X	
Use sustainable materials in new construction and remodels		X
Replace incandescent bulbs with compact fluorescents	X	
Use natural refrigerants		X

(Source: Musgrave Retail Partners)



Green Power is a subset of renewable energy and represents those renewable resources (solar, wind, biogas, biomass, low-impact hydro and geothermal) that provide the highest environmental benefit.

(Source: EPA)

Conventional power resources include fossil fuels (coal, natural gas and oil) and nuclear energy (uranium). The environmental cost of using fossil fuels, which emit greenhouse gases and other pollutants, comes from mining, drilling and extraction. Although nuclear power emits no greenhouse gases, it does require mining,

extraction and long-term storage of radioactive waste.

Many of the companies surveyed for this Toolkit purchase some or all of their power from green suppliers. Choosing to purchase green energy is unlikely to be solely a cost-based decision.



Power...



Retailers that choose to purchase green energy may do so because of specific market demands or site restrictions that may make generating their own power impossible.

Microgeneration

Generating your own power is an attractive solution to rising energy costs. Walmart has taken this concept to its highest level and has created its own electric company, Texas Retail Energy. And Tesco notes that on-site power generation prevents the loss of power that occurs between a generating plant and a store. At present, however, it is not possible to provide clear guidelines on whether micro generation presents a workable strategy for the typical convenience store because climate, local conditions and electricity prices vary so greatly.



Solar Power

Convenience stores can harness solar energy by installing photovoltaic (PV) cells on roof shingles or by using solar collectors. PV cells convert sunlight directly to electricity through semiconductors. Solar collectors absorb sunlight and provide low-temperature heat used for hot water or space heating. Perhaps the best place for convenience stores to use solar panels is on the gas station canopy. But as with most green initiatives, cost is a factor.

A Nice N Easy representative said: "I know the technology is about there, but we want to be leading edge, not bleeding edge."

A Zarco 66 representative agrees: "The ROI is not there yet in renewables. But we're doing it because it's the way of the future."

The relative cost of electricity obviously makes a considerable difference to ROI calculations. Solar power is much more attractive in areas where a suitable climate coincides with high electricity costs. Tax incentives, such as the Investment Tax Credit (ITC), can make solar power more attractive as well.

Tesco's Fresh and Easy Neighborhood Market distribution center has one of the largest solar panel roofs in the United States. The company also installed solar panelling over the entire roof of its Rama 1 store in Thailand and it has tried smaller-scale solar panels at experimental eco-stores.

Wind Power

Suitable sites for wind power depend on amount and level of wind speeds, effects on the landscape, proximity to homes and noise levels. All systems powered by wind energy also require the capacity to store power or backup access to conventional electricity.

Tesco is strongly committed to wind power and has experimented successfully with wind turbines at several trial sites. At one store, a combination of wind turbines and PV shingles resulted in a 10 percent energy reduction.

Tesco is constructing wind turbines, including Ropatec Vertical Axis Wind Turbines, in store parking lots. The company also uses rotary roof turbines and traditional gazelle turbines to power cash registers and lighting. At current electricity rates in the United Kingdom, Tesco expects a 60-year payback.

Combined Heat and Power

Combined heat and power (CHP) employs an engine or power station to simultaneously generate heat and electricity. Conventional power plants eject excess heat into the environment. CHP captures that heat for domestic or industrial heating. CHP biomass boilers generate power by burning renewable fuels such as wood chips or pellets. In general, European retailers have shown more interest than U.S. retailers in biofuel boilers. Fuel storage requirements make biomass boilers suitable only on large sites.

Marks & Spencer gets most of its energy from utility companies operating CHP stations and estimates that CHP produces 44 percent fewer emissions than conventional power sources. ASDA is experimenting with CHP, but feels the payback period of nearly 15 years is too long. ASDA feels similarly about biomass boilers. Tesco is using sustainable fuels such as straw and woodchips to generate electricity on site, and Wal-Mart is testing biofuel boilers.

Geothermal Heat Pumps

A geothermal heat pump operates on the principle that temperatures a few feet below the surface of the ground are stable throughout the year. The pump extracts heat from the ground in winter and returns it in summer. Compared with conventional systems, geothermal heat pumps have a longer life span, use approximately 30 percent less energy and operate more quietly. However, at about 20 years, ROI remains too long for some retailers.

New Construction





New Construction

“The design takes advantage of natural light via clerestory windows facing west. To reduce heat loss, we installed a minimum number of windows facing north and east. The designer integrated lobbies and windshield elements, as well as staff amenity areas with good natural light and privacy. The warehouse area on the first floor gets natural light from a number of high windows.”

— Musgrave

New construction creates the opportunity to design a facility from scratch, with state-of-the-art energy efficiency and maximum consumer appeal as priorities. Organizations in Europe and the United States provide green building codes, offer guidelines for the design and construction process, or certify green initiatives.

The International Energy Conservation Code (IECC) is a model code adopted by many state and municipal governments in the United States that establishes minimum design and construction requirements for energy efficiency. These standards are useful, but do not focus on integrated design, the interrelationships between lights, HVAC, insulation and so on.

BRE Environmental Assessment Method (BREEAM) evaluates buildings against a set of criteria and scores them as pass, good, very good or excellent.

Leadership in Energy and Environmental Design (LEED) recognizes sustainability efforts in five key areas: sustainable site development, water savings, energy efficiency, materials selection and indoor environmental quality. Some retailers, especially small operators, find the certification process overly bureaucratic and demanding; a small percentage of LEED-certified stores are convenience stores.



Energy Star sets the international standard for energy efficient consumer products and also certifies commercial HVAC, refrigeration, lighting, store equipment and buildings. Energy Star rates a building's energy efficiency on a 100-point scale; a score of over 75 earns Energy Star eligibility. A building must maintain its efficiency rating for one year to receive the

Energy Star designation. Energy Star-designated buildings are on average 30 percent more efficient than similar, nondesignated buildings and 6 percent more efficient than fully compliant IECC buildings. Energy Star also offers free training and online tools.

Green Solutions for New Construction

The following section provides a brief overview of green concepts and materials. Although these elements focus on new construction, there are applications for remodels as well.

Solar orientation refers to designs that allow buildings to take advantage of sunlight and shade. Properly oriented buildings will use energy more efficiently, particularly the energy used for heating and cooling. In cooler locations, building designs specify more windows facing west and

fewer or smaller windows facing north and east. In warmer locations, building specifications call for fewer windows to the south and west and more to the north and east. In cool, wet Ireland, for example, Musgrave designed its SuperValu Ennistymon supermarket (see below) with maximum glass to the west and minimum openings to the north and east.



Windows deliver both light and heat, resulting in solar gain inside a building. Strategies to manage this problem include double- or triple-paned glass, inert gas, tints or films, insulated frames, blinds, shades and canopies.

Ventilation can help reduce the load on air conditioning and make heated spaces more comfortable. In cooler locations, natural ventilation may be sufficient to avoid the need for air conditioning throughout most of the year. Solar-powered fans, ceiling fans and roof cowlings can maximize the benefits of natural ventilation.



New Construction...

Cool roofs have a white elastomeric, polyurethane or acrylic coating that reflects solar heat and can lower a building's cooling load by an average of 8 percent. Applied like paint, the coating is suitable for use on low-sloped roofs and can last from 10 to 20 years, depending on coating quality and thickness. Nice N Easy installed white rubber roofs instead of black tar roofs. They estimate the extra cost at about \$3,000 on a roof costing from \$22,000 to \$25,000.

Green roofs are covered with vegetation planted in soil over a waterproof membrane. These roofs may also include root barriers and drainage and irrigation systems. Green roofs offer an attractive alternative to traditional roofs and enhance urban living. In addition, they assimilate water (which helps with stormwater management), absorb air pollution, collect airborne particulates, store carbon, protect roof materials from ultraviolet radiation, reduce noise and provide insulation. Green roofs are more expensive to install than standard roofs and are often installed as part of public-private building projects.

Sustainable building materials can be renewed over a fairly short term. This category also includes locally sourced materials, which companies use to reduce delivery costs. Using sustainable building materials is key to reducing a company's carbon footprint and is a clear indicator to customers that the company is eco-friendly. Sainsbury's new eco-store incorporates wood into its design (the store has planted 400 trees to replace the 200 used in construction). Timber is the major design feature of Tesco's new convenience store format.



Tesco uses timber as a sustainable design element.

Recycled materials include demolition waste from existing buildings. Some companies have ground this waste for use as parking lot substrate or backfill. Marks & Spencer turned an old floor into traffic cones. Because not all demolition material is suited for new construction, companies separate it into categories for other recycling use to keep as much as possible from entering the waste stream.

Energyefficient and low-toxicity materials include materials that reduce energy consumption or that are made more efficiently, such as eco-cement, which is 40 percent fine ash. This category includes paints, adhesives and sealants that emit low levels of volatile organic compounds (VOCs).

Air leaks can steal a surprising amount of energy. Techniques to reduce air leaks include pressure-testing for drafts after sealing a newly constructed building and designing lobbies with double sets of doors.

Water is saved in customer service areas with high-efficiency restroom fixtures such as sensor-activated faucets and flush valves. Rainwater retrieval systems allow retailers to recycle water to irrigate landscaping, flush toilets and operate carwash equipment. Stores can also reduce water consumption with low-cost, low-tech solutions such as toilet dams and low-volume faucets. Using a broom instead of hoses to clean outside areas, limiting sprinkler use, and planting vegetation that requires little water are also water-saving options.

Landscaping can also be an energy efficient strategy with xeriscape (installing plants that require minimal water) and using native plants.

Gas Stations





Gas Stations

The average canopy size over the fuel island has been increasing steadily over the past two decades (see Table 6.1). City ordinances may require canopies to blend in aesthetically, so they are often built with sloped roofs to match the store or surrounding architecture. These trends work against environmental needs. Larger canopies allow less daylight to enter and therefore require more use of electricity for lighting. In response, some operators are building smaller, higher canopies, installing skylights and using LED lighting.

Zarco 66



Surface Treatments

To better absorb storm water and reduce runoff, retailers can install porous concrete or asphalt. These materials also reduce pooling and freezing of water in forecourts and parking lots. Some systems combine conventional paving materials with porous gaps at the corners filled with screening material such as limestone. This approach allows water to percolate through the soil.

Alternative Fuels

In the United States, E-10 (a 10 percent ethanol/gasoline mix) is becoming a standard fuel in many states, with the highest concentration of ethanol stations in the Midwest. Consumers and vehicle manufacturers are becoming increasingly interested in energy saving vehicles. In 2007, more than 6 million E-85 (85 percent ethanol/15 percent gasoline) vehicles were on U.S. roads. Ethanol-based fuels require a dedicated storage tank and specific leak detection procedures.

Table 6.1

CANOPY SIZE INCREASE, 1990-2005

ARCHITECTURAL ELEMENT	1990	2005
Average size	1,170 square ft	2,848 square feet
Average number of columns	3.6	4.7
Average fascia height	35.9 feet	35 feet

(Source: Petroleum Equipment Institute)

Most retailers selling ethanol do so in response to market demand and find that even with growing interest in protecting the environment, some customer education is necessary. For example, Zarco 66 saw initial customer reluctance even though its renewable fuels helped promote the local corn-growing economy. The company addressed these market obstacles with press coverage and pump display screens. At the recently opened Green Gateway station in Kansas, Zarco 66 sells a range of alternative fuels and biofuels.

Of course, the current high price of conventional fuel makes consumers much more receptive to information about alternative products. Fuel prices also make the option of adding electrical vehicle charging stations more attractive to retailers. As with ethanol, however, companies need to assess market demand and ROI first.

Vapor Recovery

Stage II vapor recovery is mandatory in the European Union and in some U.S. states. Most operators who have had to conform to this requirement view it as a cost of doing business. Some, however, see environmental and customer-service benefits. A Harry Tuffin representative said: "Basically, there is no smell of fuel on the forecourt. We get a minuscule amount of fuel back into the tank, so it's not really that it has a big impact for us. It's the impact for the environment. Without the vapor, it seems cleaner and nicer on the forecourt." Vapor recovery is a contentious issue because operators perceive that the recondensed vapor benefits the distributor at their expense. Tesco, for example, uses a system made by Torex that condenses vapor at the pump and returns it to the customer's tank, allowing the retailer to benefit by approximately 0.1 percent of product sold.

Communicating Your Green Message





Communicating Your Green Message

"We always knew that our plan had to be much more than a "head office" initiative to succeed.

We wanted it to produce a culture shift, and that is starting to happen. More employees and suppliers now view our plan — 'Plan A, because there is no Plan B' as an asset that helps us all to innovate and to do things differently and better."

— Marks & Spencer

You can gain great public relations benefits by explaining your environmental policy to customers and staff; suppliers; local, state and federal governments; NGOs and your local community. Marks & Spencer has pioneered the move to widen communication of sustainability to include what is perhaps the most important company stakeholder — the customer. Its "Plan A" (because there is no "Plan B") campaign is a marketing tool that incorporates openness to customers and clear facts and figures for stakeholders.



Good communication requires careful planning and implementation. A well-thought-out communication plan:

- Identifies key audiences
- Determines the information each audience needs
- Adapts the message to audience needs and expectations

"When we speak with team members about sustainability initiatives, they get excited. They come up with ideas and are proud to work with a company interested in doing the right things for the environment. It helps with recruitment of new team members."

— Giant Eagle

The Importance of Staff Involvement

Greening your business has to be much more than a top-level decision. To succeed, you must create a culture of innovation with green and energy efficient thinking expressed at every level. When you effectively communicate green initiatives to staff members, they are much more likely to accept changes and cooperate with new systems, procedures and technology.



Communicating Your Green Message...

Employees also play a key role in effective consumer communication. If they believe in your green initiatives, they will communicate their enthusiasm effortlessly to customers. A 2007 Ipsos Mori market research poll found that 72 percent of consumers were more likely to believe staff than an environmental brochure or advertisement. The following are key areas to focus on when training employees:

■ Increase general energy awareness

Most people are unaware of how their everyday actions at home and work affect energy use. To improve staff awareness:

- Include energy awareness information and company energy policies in new employee orientation programs.
- Create energy awareness posters for break rooms or employee bulletin boards
- Encourage employees to participate in Earth Day events
- Publish user-friendly information on energy use, environmental impacts and energy saving options on your Web site or Intranet site.
- Include energy tips with pay statements
- Encourage employees to share best practices in everyday operations

■ Improve facility energy awareness

Even managers may have little understanding of a facility's energy performance or impact on the organization and the environment. To improve facility energy awareness:

- Provide summary statistics, such as overall energy and equipment operating costs and environmental information related to energy use.

- Post charts that compare energy use at a store level and show progress over time.
- Provide information on the energy performance of equipment or processes that employees regularly use.
- Encourage staff to share best practices in cleaning and monitoring equipment.

■ Provide employee incentives

Although retailers have noticed that employees enjoy getting involved in energy-saving projects out of a sense of pride, they point out that incentives are also an effective tool. To motivate staff, consider the following:

- Develop a recognition program to reward the accomplishments of individuals, departments and facilities.
- Provide appropriate rewards for energy saving ideas (for example, CFLs, wind-up radios or bicycles).
- Designate "energy champions" — staff members who are responsible for overseeing a checklist of energy saving issues.

■ Provide management incentives

The most effective way to help managers focus on energy saving is to make them accountable for energy use and to provide incentives for meeting energy use goals. At Giant Eagle, for example, store managers are responsible for a utilities budget with goals set for improvements in energy consumption. The company ties managers' compensation to process, technological or common sense improvements.

To train managers in energy awareness:

- Teach them about key drivers of energy conservation and how to analyze energy bills.
- Provide training on new operating methods or

- procedures designed to reduce energy use.
- Provide administrative training that supports energy management.
- Provide specialized training on using and maintaining energy-efficient equipment.

Customers and the Media

Grocery retailers have embraced a range of customer-focused initiatives. The following are typical successful programs.

■ Recycling

Europe currently recycles or composts 27 percent of its waste. By comparison, the EPA estimates that the recycling rate in the United States was around 32 percent in 2006. Retailers are recycling an increasing proportion of store-generated waste, including paper, cardboard, oils and fats, pharmaceuticals, confidential paper, electronic goods, hazardous materials and plastics. Typical recycling efforts that involve customers include the following:

- Installing recycling bins for consumer use.
- Rewarding customers with "green points" for participating in a store's recycling program.
- Offering a small monetary incentive for returning recyclable bottles.

Zarco 66 places recycling bins next to its trash containers and finds that they are popular with customers. When Tesco introduced recycling machines that automatically sort and compact glass, metal and plastic, it doubled the amount of waste recycled.



Communicating Your Green Message...



Zarco 66 places recycling bins next to trash containers and markets biofuels as locally grown.



■ Reusable Bags

In Europe, grocery bags are at the top of the grocery industry's green agenda and in some cases, the government's. Ireland's government imposed a 15-cent levy on disposable plastic bags in 2002, and use fell from 328 to 21 bags per customer annually. Retailers can realize huge cost savings when they stop providing free bags and have reported no adverse effects on sales after implementing bag-reduction initiatives. Typical retailer programs to encourage reusable bags include the following:

- Offering to donate funds to charity for each plastic bag customers decline.
- Rewarding customers choosing reusable bags with loyalty card points.
- Promoting reusable bags at points of purchase.
- Promoting reusable bags in advertisements and sales flyers.
- Giving away reusable bags for a limited time to generate interest.

■ Local Products

Offering locally grown or produced products is an important new area for convenience retailers. As transportation costs rise, more retailers are promoting local purchases with shelf labels stating how many miles products have travelled to the store.

Zarco 66 markets biofuels as locally grown. A representative said: "Sitting where we are in the center of the United States, we're watching fuel prices go up and moving our money out of our area. The only way to keep that money local is to offer a locally produced energy source."

You can drive traffic and loyalty to your business if you communicate your green efforts in an authentic, simple and transparent manner that is aligned with your core strategy and brand values. This is a particularly important area for companies that want to replace the idea of convenience stores as "selling gas and creating trash," with more positive images.

Before deciding how to let your customers know what you are doing, examine your aims and achievements by asking these questions:

- What are you trying to achieve as a business by telling your environmental story?
- What have you already done?
- What do you still need to do?
- What is the competition doing?
- What do your customers already know about the issues?
- What is important to your customers?

Retailers use a variety of approaches to inform customers about their environmental projects. Most display information boards prominently in the store. They also include information about biofuels on their fuel dispenser screens. Some companies place messages or interactive energy calculators on their Web sites. Other techniques include installing wind turbines or solar cells in areas visible to customers.

A representative from Green Valley Grocery said: "The awning is covered in solar cells, so customers get a subtle reminder that Green Valley is going green. We're trying to make it not all behind the scenes. We want everyone to know."

You must take care when creating your green message to avoid "greenwashing." That happens when consumers feel that a company's messages about its environmental practices, products and services are misleading.

A classic example of greenwashing is when hotels ask guests to reuse towels in the interests of the environment, when it is clear that the priority is reducing laundry costs.



Tesco's environmental message.



Communicating Your Green Message...

"From a marketing standpoint, it would be good if we could say yes, we are green and yes, we are taking initiatives and doing things to help reduce our carbon footprint and doing something for the community at the same time.

I think our customers are very conscious of it these days."

— Quick Chek

Likewise, customers will react negatively to businesses that try to establish environmental credentials with only a few token gestures. Stores should be sensitive to practices that undercut their green message. Customers are quick to point out the irony in promoting a green message while allowing wasteful practices such as running televisions all day.

The following steps can help you avoid greenwashing your message:

- Don't say that you have "gone green." If your green program is a work in progress, say so, and give customers updates.
- Invite customers to provide input and ideas for your green program.
- Do a visual audit of your store. See it they way a customer would. Are you talking green but wasting energy? Have you set up recycling stations?

Environmental programs and projects can generate good (and free) publicity. To attract media coverage of your green news:

- Maintain transparency: Give clear messages about what you've done and what you still need to do.
- Provide context: Describe benefits to your business and community.
- Do your homework: Prepare press kits with facts and figures.
- Offer exclusives: Talk to one media source.
- Be accessible: Invite journalists to company tours.

- Get recognition: Enter contests or programs that recognize your efforts and get the results published.

Another excellent tool for attracting media coverage is special events. To get the most mileage from your special event, follow these tips:

- Create a planning group to think through and manage event logistics such as parking, trash management, comfort stations, and so on.
- Tie your event to an environmental occasion such as Earth Day.
- Collaborate with other organizations that can help promote your event and widen its appeal.
- Invite your customers and give them a chance to get involved by volunteering.
- Involve children. Have special activities geared to children, which will encourage parents to attend.
- Send press releases and invite media to attend.
- Choose a location that's easy to find and will accommodate your activities.
- Encourage employees to participate.
- Make it fun. Choose a strong theme and make sure it is an event you would want to attend.
- Provide giveaways. Make sure they are environmentally themed, such as reusable grocery bags.
- Avoid sales pitches. You want people to relate the event to your company, but don't use it to drive sales.
- Thank everyone who helped put on your event.



"We have a green pledge prominently displayed in the store which talks about carrier bags, food waste, and all the initiatives that we have on. And we will update that pledge as and when we go on to the next stage."

— Budgens Crouch End

Regulation and Partnerships





Regulation and Partnerships

“We have a solar array on site, and our canopies have built-in solar panels that produce energy and provide shade. We produce a little more than half of our energy needs from that solar array. We'll pay off our solar panels in six years and tax credits will give us the payback on installation costs.”

– SeQuential

In large companies, investors are starting to view a company's carbon footprint as an environmental liability. Legislative and regulatory pressure is mounting for emissions reduction to reduce future exposure to taxation and penalties.

In the United States, emissions, waste and packaging regulation is increasing. The EPA, under the Clean Air Act, is working toward regulation of greenhouse gas emissions. The Western Climate Initiative is planning to lay the foundation for an international cap and trade program that would involve both the United States and Canada. Legislation may also come in at the state level. California has already enacted environmental legislation to bring the state into near compliance with the provisions of the Kyoto Protocol, the international agreement on emissions limits.

In the current environment, it is important for businesses to seek mutually beneficial partnerships with government agencies, utility companies, charities and other nonprofits and suppliers.

■ Government agencies

Working closely with government agencies is the best way to avoid regulation coming as an expensive and unpleasant shock. Keeping up to date with regulatory development and updating store systems gradually on a workable timetable is a wise strategy. Large companies can bring

considerable resources to their aid. Walmart, for example, is sponsoring engineering experts to perform an energy audit across a wide spectrum of stores. Smaller operators can get assistance from Energy Star.

■ Utility companies

Learning what services utility suppliers have to offer is a vital first step for any retailer considering updating store equipment, lighting, refrigeration or HVAC equipment. Working with the local utility also helps ensure that your plans meet legislative mandates. Utility companies are also an invaluable source of free energy audits, energy saving advice and rebates for energy saving equipment.

■ Alliances and associations

The U.S. Department of Energy has established a Retailer Energy Alliance (REA), designed with both company budgets and energy savings in mind.

■ **Charities and other nonprofits** Establishing a close working relationship with a school or environmental charity is an excellent way to get good publicity for environmental projects and events. You may choose to partner with a local charity or an environmentally focused organization such as the World Wildlife Fund. Many retailers tie their environmental programs to charitable ones, for example, donating funds to charity every time a customer purchases a reusable grocery bag.

■ Suppliers

Retailers know the value of bringing suppliers on board in their green efforts. Suppliers can have a large impact on the types of materials used, especially in packaging.

Walmart encourages suppliers to become aligned with its sustainability goals by giving them preferred supplier status.

Tesco works with its suppliers on sustainability development and testing carbon footprint labelling on its store brand. Large-scale suppliers may also have services or products to offer.

The Coca-Cola Company is a proactive recycler and focuses on such areas as water stewardship, sustainable packaging, recycling, energy conservation and climate change.

Case Studies





Tesco

Tesco, an international retail chain that dominates the grocery market in the United Kingdom with more than 30 percent market share, is expanding exponentially into the convenience store market with Fresh and Easy stores in the United States. Faced with escalating energy costs, increasing emissions regulation and research that indicates more than 60 percent of consumers consider it the responsibility of big companies to stop global warming, Tesco has made a business wide commitment to environmental responsibility. The company sums up the way it operates as "Better, Simpler, Cheaper, Greener."

As a first step, Tesco analyzed its carbon footprint and found that the most significant causes of emissions were grid electricity (60 percent), refrigerants (19 percent) and diesel (12 percent). Tesco adopted the following goals:

- Achieve a 50 percent reduction in electricity use per square foot by 2010.
- Achieve a 50 percent reduction in its carbon footprint by 2020.
- Divert 80 percent of construction waste from landfills.
- Achieve a 50 percent reduction in the carbon emissions needed to deliver a case of goods by 2012.
- Create new stores with, on average, half the carbon footprint of a 2006 store by 2020.

To reduce grid electricity consumption, Tesco plans to develop renewable energy use and cut energy use in refrigeration, HVAC and lighting. The company has also worked on improving its

carbon footprint by reducing its use of artificial refrigerants and using more energy-efficient transportation.

Tesco has conducted extensive research at several trial sites where the company implemented the following strategies:

- Energy audits to identify energy-saving measures that stores can implement quickly and easily.
- Energy-saving solutions and new technologies in refrigeration, HVAC, and lighting.
- Low-carbon new construction, including the use of sustainable materials and energy-efficient transportation of materials to construction sites.
- Micro generation of power from renewable energy sources.
- Natural refrigerants.

At two stores, Tesco managed to radically reduce energy consumption in a short time with fairly simple housekeeping measures. Diss, a 25,000-square-foot store, cut energy use by 29 percent in 10 weeks; and Swansea, a 60,000-square-foot store, cut energy use by 36 percent in three months by doing the following:

- Using energy efficient lightbulbs.
- Ensuring that refrigeration is effective.
- Performing regular maintenance on energy related systems.
- Tightening up daily procedures that waste energy.

- Using energy management tools to monitor energy consumption.
- Training staff in energy conservation.
- Installing doors on display cases.
- Installing night blinds on chillers.
- Installing cold-stop curtains.
- Turning off unneeded lights.

Each store has an energy champion who maintains an energy checklist and reports energy use and improvements to management. The company includes energy management in managers' goals and ties bonuses to energy-related improvements.

Tesco established trial sites at Wick, Shrewsbury and Livingston to focus on reducing carbon footprint. At its 50,000-square-foot site at Wick on the Scottish coast, Tesco succeeded in cutting the store's carbon footprint by 50 percent.

All construction materials were delivered by ship, and construction plans called for installation of the following:

- A system to capture cold air from refrigerators and send it to the storeroom
- Roof skylights to capture natural light
- Water-cooled refrigeration units with LED lighting
- Highly insulated, energy-efficient ovens controlled with timers
- Wind turbines and photovoltaic roof cells that generate enough energy to power the cash registers



Case Studies...Tesco

- Timber framing from a sustainable source in Sweden
- Lower roof spaces to reduce energy demand
- Rooftop rainwater collection units that direct rainwater to toilets and car washes

In building a new eco-store at Shrewsbury, Tesco reduced the carbon footprint by 60 percent. The store incorporated the following:

- Carbon dioxide refrigerants
- A geothermal system to support refrigeration and air conditioning
- LED refrigerator lighting.
- Recycled rainwater from roof filters for use in the car wash
- A lobby to improve insulation

At its eco-friendly store in Livingston, Tesco expects rainwater harvesting and waste heat recovery to generate savings of £17,000 (about \$23,000 U.S.) annually. Tesco took what it learned from these three projects to develop a format for all newly built supermarkets.

Located in Cheetham Hill, the first store built to this new format, which is set to open in January 2009, was built with a value-engineered timber structure and features natural ventilation generated by roof cowls. Tesco incorporated energy efficient construction methods such as combining deliveries with waste removal, using alternate methods to road transportation, using alternative fuels and recycling materials.

The company has also looked at alternative forms of power, including sustainable fuels such as straw and wood chips, wind and solar power and geothermal systems. Tesco uses sustainable fuels to generate power onsite



LED refrigerator lighting.

and employs wind to power cash registers and lighting. It has identified aquifers under 160 stores that are useful for all size formats, and is working to determine the best system for widespread use of geothermal power. At present, the company finds solar power too expensive.

Refrigeration accounts for a third of Tesco's direct carbon footprint. Existing refrigerants are not toxic, so Tesco has always tolerated a small amount of leakage. But hydrofluorocarbon refrigerants emit 3,000 times more potent greenhouse gases than carbon dioxide. No off-the-shelf solution is currently available. Tesco's response is to take the following steps:

- Stop the leaks
- Develop the use of natural refrigerants
- Educate the industry
- Test a carbon dioxide-based system
- Use doors on refrigerators in convenience stores
- Expand use of cold air retrieval
- Create a refrigerated cold zone around refrigerators to maintain efficiency

Tesco feels that tangible evidence of environmental thinking and action embedded in the store's image communicates its message most effectively to customers. It is working toward a universally accepted and commonly understood measure of the carbon footprint in association with the Carbon Trust, the BSI Group and the U.K.'s Department for Environment, Food and Rural Affairs.

Tesco offers visual evidence to customers of its eco-friendly blueprint in the store design and products and services offered. The stores:

- Use timber in store design, which consumers like for its warmth
- Avoid conspicuous waste, such as leaving banks of television sets on all day
- Install wind turbines on store buildings and in parking lots
- Install automated recycling machines
- Offer CFLs for sale at a low cost
- Use crates instead of bags for home delivery
- Use electric battery-powered vans for home delivery
- Reduce the amount of packaging on branded and store brand products





Case Studies...Tesco



- Label store brand packages to indicate whether customers can reuse, recycle or compost them
- Increase the percentage of recycled store waste
- Offer reusable retail-ready packaging
- Reduce the number of grocery bags given out and reward customers with loyalty club card points for every bag reused
- Replace current bags with larger, stronger bags to reduce number of bags required
- Offer biodegradable recyclable bags and "bags for life"

Tesco conducts extensive research and development to include initiatives with suppliers. The company has learned that even small changes, such as reducing the metal content in bag holders, can produce big results (see images below).



Tesco's Convenience Stores

In June 2008, Tesco opened the first of its new standalone convenience stores, Tesco Express, in Hinckley. Moving forward, these convenience stores will feature 15 percent recycled materials and incorporate the following green initiatives:

- A deep roof overhang to prevent solar gain
- A thermally efficient building to reduce heating requirements
- A timber frame made from Glulam spruce beams and interiors of Latvian birch
- Extensive customer messaging
- A carbon dioxide-based refrigeration system
- Doors on all fresh and frozen refrigeration units
- Underfloor heating powered by waste heat from the refrigeration plant
- A door air curtain powered by waste heat from the refrigeration plant
- Solar lighting pipes to offices and ancillary areas
- Maintenance-free wind catchers to provide natural ventilation and reduce reliance on HVAC
- Skylights combined with a dimmable lighting system
- A system to retrieve and recycle rainwater to irrigate landscaped areas
- Parking lot lighting sensors

In addition, the company recovered aggregates from existing buildings demolished on the site for use as parking lot underlayment and aerated pavements and paths using the lowest carbon

dioxide emissions available. Tesco estimates that this store will have approximately 30 percent lower carbon emissions than its standard stores.



Tesco Express.



Skylights.



Solar lighting pipes.



Rutter's Farm Stores

"You've got to walk before you run.

We are working with some practical ideas. Some of them can save you money, but not all of them. Some of them require a significant investment to save you money, but not all of them. Some of them the customers will never know about, and some of them will be very obvious to them — like the recycling container."

— Scott Hartman, Rutter's Farm Stores

Rutter's is a convenience retailing chain located in central Pennsylvania that has made a strategic commitment to becoming green. The company is building a new generation of stores to meet customer expectations, which include concern for the environment and interest in local products. These new stores incorporate carpeting, wood, and tile to create a warm "home away from home" atmosphere and accent lighting to create a visually varied and tempting shopping experience. The stores address customer concern for hygiene with hand sanitizers and provide a full range of other services, such as onsite car washing.

Responding to customers' desire for an entertaining shopping experience, Rutter's offers sophisticated food service and in-store cooking stations. These initiatives have in general resulted in a good ROI.

Rutter's sees its environmental initiatives as a useful balance to the normally negative environmental image of a gas station. It finds that staff and customers, particularly younger customers, respond positively to environmental projects.

The company has a number of green initiatives. Some involve building or infrastructure improvements. Others are designed specifically for the consumer.

Customized recycling containers placed prominently on the store's front porch allow customers to sort their recyclables by type. There is also a separate dumpster for store waste cardboard.



White solar reflective roofs should result in a 20 percent savings on energy bills.

Energysufficient lighting includes T-5 bulbs with fewer bulbs per fixture, targeted spotlights, and pendants that drop light directly over food to go and coffee areas. These lights make displays more appealing and attract customers to specially lit areas. Rutter's has had photo sensors on outside lighting for some time and reports a ROI of about three years. To minimize lighting costs under gas station canopies, the company has reduced canopy width from 30 feet to 24 feet. Carwash buildings are made of glass to capture maximum natural light.

Walk-in refrigerator doors incorporate cool LED lights, which are more efficient and have





Case Studies...Rutter's

“The customers’ comments have been positive. You have a base out there that will choose a retailer for its green initiatives, and that is just something we’re committed to.”

— Rutter's Farm Stores

a longer life than fluorescent lights. Rutter's used doors from Styleline, which do not require heaters to prevent fogging. The company estimates a combined annual savings of \$2,150 from the doors and lights.

Motion detectors are installed to reduce lighting in restrooms.

Fuel is made from recycled frying oils.

Air curtains on back doors improve energy efficiency and prevent insects from getting into the store.

An energy management system currently controls refrigeration and HVAC and eventually will control lighting, as well. The system monitors temperatures and humidity to keep both at optimum levels. At present, the company does not have an ROI calculation, but estimated equipment costs at about \$12,000 for a 5,200-square-foot store.

Zoned heating, air conditioning, and humidity control allows the company to avoid oversizing the system to meet high demand in the summer. Separate controls manage temperatures for the food preparation area, the sales floor and backrooms, and the seating and main checkout areas.

Renewable power is currently under consideration. Rutter's has found that a geothermal approach would give a ROI of 20 years and is considering solar technology instead.

Motion-sensing faucets control water use in restrooms. The store also reclaims about 80 percent of carwash water.

Local products are part of the store's strategy to meet customer expectations and reduce delivery drive times. Generally, Rutter's identifies local as being within one hour or less of its stores.





Musgrave Retail Partners

“We believe that the most powerful way in which we can make sustainability sustainable for retailers is by identifying the economic opportunities it provides. To this end, we are only recommending technologies that are cost efficient over the life cycle of the building and have a proven ROI.”

— *Derek Hannick, costs and sustainability manager, Musgrave Group*

The Musgrave Group is a private family-owned business that has been operating since 1876. It has a distribution and retail franchise business in Ireland, the United Kingdom and Spain. With more than 3,000 franchised retail stores, Musgrave is the fifth largest food retailer in the British Isles.

The Musgrave Retail Partners Ireland division operates SuperValu, a full service grocery store, and Centra, which focuses on delicatessen food and coffee. Both brands combined account for more than 25 percent of the Irish retail market. The company has adopted a strategic approach with a goal of making changes that both benefit the environment and reduce costs for its retailers.

The company aims to reduce carbon emissions and energy consumption by 30 percent for its Irish core operations. As a service to its retail partners, Musgrave is continually researching sustainable technologies and making recommendations. Following are some examples:

Standard construction specifications

developed for use in new construction and remodels. Musgrave recommends using cost-effective sustainable materials such as eco cement and renewable framing and eco-practices such as incorporating lobbies in larger stores and sealing to reduce air leaks. The company also encourages using local materials and building suppliers to minimize its carbon footprint. The Ennistymon SuperValu store plans specified local sourcing: most of the paving

Table 9.1

TYPICAL PAYBACK PERIOD FOR A 14,000-SQUARE-FOOT SUPERVALUE STORE

SUSTAINABLE TECHNOLOGY TYPE	POSSIBLE ENERGY COST REDUCTION %	REALISTIC TARGET %	SIMPLE PAYBACK IN YEARS	COMMENTS
Geothermal heating & cooling	2-4 %	N/A	9.3	Not feasible to install when adopting the use of heat recovery from refrigeration
Use of rejected heat from refrigeration	6-14%	10%	5.4	Can be designed for water heaters or for space heating
Wood pellet boiler	1%	N/A	10.0	High level of maintenance and management of fuel
Combined heat & power (CHP)	10-14%	N/A	12.0	Currently being researched
Small wind turbine	0.50%	N/A	20.0	Poor payback at present and intermittent initiatives required
Intelligent lighting	1-3%	2%	3.0	Very practical
Intelligent building management systems (BMS)	4-8%	6%	4.0	Strict housekeeping/energy management initiatives required
Solar water heating		0.50%	3.3	Water heating only
Natural ventilation	0.5 - 3.0%	1.75%	9.5	Site specific
Off peak power usage	0.5%	0.50%	5.4	Limited application
High efficiency motors in plant	0.5-10%	75%	3.0	Good practice at original installation

Total Target Based on Mechanical and Electrical Sustainable Technologies.

A target of 21.5% reduction in Energy use and carbon emissions is achievable by introducing new technologies verses a project that was built without these technologies being introduced.

21.5%

materials came from a source located within 10 miles of the store. The store's front wall is clad in insulated limestone panels.

The company has commissioned research to investigate sustainable technologies such as heat exchangers that use refrigerator-ejected

heat, energy management systems, solar power heating, natural ventilation, off-peak power use, high efficiency motors, geothermal heating, CHP units, wind turbines, and wood pellet boilers (see Table 9.1).



Case Studies...Musgrave Retail Partners

Table 9.1 Typical Payback Period for a 14,000-Square-Foot SuperValu Store

LED lighting is now standard for all refrigeration units. The Marley Park Centra store has installed HID lighting with batwing fixtures for the aisles and spotlights for areas such as the deli, bakery, wines, promotional displays and the service counter. The store expects 40 percent savings on energy bills.

Musgrave's building specifications include orienting windows to take advantage of natural light and heat and using motion sensors, time clocks, and photocells to reduce lighting costs significantly. The company also uses switching controls to meet demand for specific times of operation (see Table 9.2).



Table 9.2

PRESCRIBED LIGHTING LEVELS FOR DAILY OPERATIONS

OPERATIONAL PERIOD	LIGHTING LEVEL
Deliveries	20%
Pre-opening	60%
Opening	100%
Clear down	60%
Closing	20%

(Source: Musgrave Group)

Refrigeration can account for up 40 to 50 percent of electricity consumption in a typical store, but energy savings of some 20 percent are possible.

The Crosshaven Centra store implemented the following cost-saving measures:

- Installed an energy monitoring system
- Replaced existing lighting with energy-efficient T-5 lighting
- Replaced old fan motors with high-efficiency electronically commutated fan motors
- Installed inverter-driven condensing units
- Installed strip curtains on cold room doors.
- Turned off noncritical units at night
- Deep-cleaned refrigeration cases annually to maximize air flow
- Performed routine maintenance on air conditioning
- Installed doors on refrigeration units where appropriate

Table 9.3

ENERGY SAVINGS IN MUSGRAVE'S ENNISTYMON STORE

SYSTEM	ENERGY CONSUMPTION REDUCTION (%)
Lighting	35%
HAVAC	20%
Hot water	95%
Refrigeration	20%
Overall Energy Consumption of Store reduction	27%
Carbon Footprint Reduction	120 tons (approximate)

(Source: Musgrave Ennistymon Store)

HVAC systems in Ireland's colder climate capture heat from store refrigerators. The Ennistymon SuperValu installed a heat exchanger to transfer refrigerator-ejected heat to the store's main heating system.

To heat the store, the system carries heat to ceiling-mounted units, which can activate two domestic-size gas boilers for additional heat when required. The fully automatic system provides a substantial amount of free heat, uses no additional refrigerants and provides hot water as well. The store can set back the temperature overnight to reduce energy consumption further (see Table 9.3).



Case Studies...Musgrave Retail Partners

Staff training and housekeeping form a core component of Musgrave's store-level initiatives. The company works closely with Sustainable Energy Ireland, a government agency, to develop customized staff training programs.

Suppliers must meet Musgrave's environmental criteria for waste packaging and manufacturing materials. The company continually challenges suppliers to identify new sustainable solutions and to become more efficient and environmentally friendly.

Water is recycled for use in external cleaning, landscape irrigation, and car washes in some stores. Musgrave also includes water recycling in its construction specifications.

Reusable bags are at the top of the grocery industry's green agenda in Europe and Ireland. Ireland's government imposed a 15-cent levy on disposable plastic bags in 2002, and use fell from 328 single use bags to 21 bags per customer annually. Retailers can realize huge cost savings if they no longer provide free bags (see Table 9.4).

Table 9.4

EFFECT OF CHARGING VERSUS NOT CHARGING FOR BAGS

STORES IN IRELAND (BAG LEVY APPLIES)

2007 approximate retail sales	Σ3.5 billion (approx. \$4.65 billion US)
Carrier bags used and paid for	40,000,000
Bags per Σ100 of retail sales (approx. \$133 US)	1.14
Bags per Σ87.50 of retail sales (approx. \$166 US)	1

STORES IN GREAT BRITAIN (BAG LEVY DOES NOT APPLY)

2007 approximate retail sales	Σ3.5 billion (approx. \$4.65 billion US)
Carrier bags given away	513 million
Bags per Σ100 of retail sales (approx. \$133 US)	20.52
Bags per Σ4.87 of retail sales (approx. \$6.48 US)	1 bag

(Source: Musgrave Retail Partners.)

Retailers have reported no adverse effects on sales after implementing bag-reduction initiatives. The following are typical retailer programs to encourage use of reusable bags:

- Offering to donate funds to selected charities for each plastic bag customers decline.

- Rewarding customers choosing reusable bags with loyalty card points.
- Promoting reusable bags at points of purchase and in sales flyers.



Budgens

“Everything we do is for the people who live here. We listen to them in focus groups and over the phone. They e-mail me suggestions and requests. This is the store they want it’s their store.”

— Andrew Thornton, Budgens Crouch End

Budgens Crouch End is a 9,000-square-foot franchised store in North London. The store offers 15,000 lines and has a weekly turnover of £185,000. Local competition is strong. Budgens shares the neighborhood with a Tesco Express and a Marks & Spencer Simply Food, but has managed to attract a good segment of a market that is prosperous and interested in environmental issues. Budgens appeals to this market with popular environmental initiatives, involvement in the local community, and locally produced products.

Budgens owner Andrew Thornton is successful in hatching plans to attract media. For example,



Pennies for plastic.



in 2007, the store rolled out a plan to donate one cent to a local school for every plastic grocery bag declined by customers. Children participated by building a model of a well-known local feature, which rose gradually as donations increased.

The Pennies for Plastic plan cut plastic bag use by about half, and the store eventually stopped providing free bags entirely. It sells reusable bags purchased from EcoBags, an American company that supplies canvas and string bags made in India. Budgens trained its checkout employees to explain the plan to customers and tactfully handle customer complaints, which were few. The store considered the initiative cost neutral because it donated the money it saved on the cost of the bags to charity.

The following are additional initiatives the store pursues:

Recycling includes all store-generated cardboard, plastic and food waste, which a nearby organic farm uses to produce compost or bio methane. Thornton believes that less than 5 percent of total store waste goes to landfills. The store is also testing a plan to allow customers to leave excess packaging for recycling.

Products produced locally respond to customers' demands and give Budgens a competitive advantage. The store offers everyday basics such as fresh produce and bread as well as ethnic foods and high-margin cheeses, and many of these products have labels that describe how far they travelled (i.e., carbon footprint).



Case Studies...Budgens

Community involvement allows the store to improve its customer loyalty. The store sponsors charitable races and participates in popular local initiatives such as the Crouch End Project, [IMAGE 97], which aims to improve the local shopping environment.

Publicity includes a regular newsletter that celebrates new store developments and local events. Thornton has been extremely successful at generating publicity, both locally and nationally, and has won fans at the local newspaper and among customers who applaud the store's sustainable efforts and community-mindedness.

Staff training plays an important part in making the store a friendly place that serves as a focus for the local community. The store trains employees to make eye contact, greet customers and offer assistance. A fulltime customer service manager is always available on the sales floor.

Lighting improvements include replacing incandescent bulbs with compact fluorescents in the bakery, adding extra lighting to the refrigeration area and replacing outside floodlights with 60-watt cluster lights, which save about 240 watts and provide a whiter, crisper light.

Refrigeration and HVAC improvements are under consideration. Budgens commissioned a report from Simply Green Consultants, which recommended the Daikin Conveni-Pack system combined with an eSight energy monitoring system and suggested phasing in new equipment to spread out costs.



Nice N Easy Grocery Shoppes

“We made a pledge to be a green company three years ago and we want to be certified as green. There are some standards you have to meet.”

*— John MacDougall, President and CEO,
Nice N Easy Grocery Shoppes*

Nice N Easy Grocery Shoppes is a chain of stores in upstate New York that sell gasoline. Approximately half the stores are franchisees, with the rest serving as testing grounds for new ideas. The company opened its first green store in Cicero in 2007 and plans to open a second green store in Lee. Electricity costs in the area are among the highest in the continental United States, and the primary goal of the green store format is to reduce energy consumption, with marketing as a secondary objective.

Consumers in this mostly rural area feel the high price of oil more acutely than most, as they must drive long distances for jobs and services. With long, cold winters, people in this area use a comparatively large amount of heating oil. President and CEO John MacDougall notes that customers struggling to buy gas and heat their homes need to feel reassured that his company is doing its best and is on their side. Nice N Easy expects to be the first retailer in the area to sell biodiesel and has other green initiatives in the works.

Energy use is handled by the Emerson Einstein energy management system (EMS), which employs some 40 sensors throughout the store to monitor temperature, humidity, lighting, refrigeration and HVAC. The EMS adjusts levels automatically in response to sensor readings.

The company uses the Hussmann Protocol integrated refrigeration system, which reduces heat and noise in the store. Unlike individual compressors sized and operated based on maximum demand, the Protocol system uses only the energy required at a particular time. At night, for example, when demand is lower, the system can operate on a single compressor. During the day, a second compressor comes on to share the load. A third, standby compressor comes on only if one of the others fails. To ensure even wear, the system's computer automatically alternates the compressors.

HVAC problems were causing the air conditioning to run excessively. The company solved this problem by reducing refrigerator motor heat, reducing store heat with more

efficient lighting and tinted windows and introducing cool air from the outside with economizers, which open automatically in response to outdoor temperature.

Energy efficient lighting includes LED lights both inside and outside stores. The company finds that fewer LED bulbs are required to generate the same amount of light as incandescent bulbs. LED lighting in refrigerators reduces heat and the load on the refrigeration system.

New construction plans incorporate such energy saving techniques as installing white rubber roofs in favor of black tar roofs. In addition, designs make the most use of natural light with large windows.





Giant Eagle

Giant Eagle is a past recipient of the EPA's Energy Star Retail Partner of the Year Award. Founded in 1931, it is a major food retailer and food distributor with approximately \$8 billion in annual sales and has grown to be the number one supermarket retailer in western Pennsylvania, Ohio, north central West Virginia and Maryland, with 161 corporate and 62 independently owned and operated supermarkets. In addition, Giant Eagle operates more than 140 GetGo convenience stores and gas stations. Not all the initiatives used in supermarkets are suitable for convenience stores. However, the company phases in suitable changes when it remodels these stores.

Giant Eagle enhances its customers' shopping experience by offering high-quality foods and in-store products and services such as dry cleaning, catering, banking, photo processing, gifts and flowers. It is a leader in green store design and currently operates three LEED-certified supermarket locations. The Brunswick, Ohio, store became the nation's first LEED-certified supermarket in 2004, and the company's Shadyside Market District received LEED Silver Commercial Interior certification in 2007.

New construction underscores Giant Eagle's commitment to using sustainable materials.

The company has a green housekeeping plan for cleaning and maintenance products and reports that new stores use 20 percent less energy than comparable, conventionally



designed supermarkets.

Contractors recycle most construction waste, and many new stores include the following:

- White roofs designed to deflect heat and reduce storm water runoff
- Sustainable-harvested wood certified by the Forest Stewardship Council
- Recycled content such as fly ash in concrete and drywall made from coal plant waste
- Concrete slab floors that virtually eliminate costly floor maintenance
- Low-VOC adhesives, sealants, paints, carpeting and wood products
- Low-irrigation landscaping
- Insulation and skylights

Energy management systems monitor HVAC and refrigeration to ensure that they run efficiently. The company can compare energy efficiency across stores and focus on stores that are less efficient. In newer stores, the EMS also monitors carbon dioxide levels to bring in fresh, outside air when needed.

Natural lighting in newly built stores includes skylights, solar tubes and bigger windows.

Photo sensors dim electric lights when natural light is sufficient to light the store. The company has integrated energy efficient lighting standards into the design process since 1994, and LED exit signs have been standard for the past 10 years. Stores built since 2003 have occupancy sensors in restrooms and stockrooms.



Case Studies...Giant Eagle



Wind power is part of the company's energy savings plan; currently it purchases 17 million kilowatts per year. Giant Eagle joined the EPA's Green Power Partnership in 2006 and purchased enough wind power to earn a spot on the agency's top 10 retail partners list for the third quarter of 2006.

Recycling includes store-produced cardboard and plastic (including plastic film). The company recycles used cooking oil for biodiesel, other food by-products for animal feed and lubricants and plastic bags returned to stores by customers.

In 2007, Giant Eagle diverted batteries, cameras, cell phones, fluorescent lamps and the following materials from the waste stream:

- Paper (557,200 pounds)
- Cardboard (112,800,000 pounds)
- Plastic film and grocery bags (2,508,400

pounds)

- Rigid plastics (754,000 pounds)
- Used cooking oil and meat by-products (3,320,000 pounds)

Staff programs focus on environmental awareness and employees respond positively to green issues, developing new ideas and expressing pride in working for a company that is environmentally responsible.

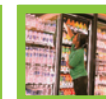
Giant Eagle regularly communicates about environmental issues with its employees via posters, e-mails, educational materials, energy awareness months and reminders to practice energy-saving habits. As part of the EPA's "Change a Light, Change the World" campaign, the stores encourage employees to replace at least one incandescent light in their homes with a CFL. Store managers have responsibility for utility budgets, and all supermarket-size stores

assign an energy point person who identifies energy conservation measures on site, monitors energy use and recycling, and helps facilitate employee training.

Customer communication includes a number of approaches, such as weekly circulars, in-store signage, brochures, guided tours of LEED-certified locations, in-store audio and press releases.

Appendices





Appendix A: Contributing Retailers

The following retailers contributed information for this report.

ASDA

U.K. supermarket and retailer
(part of the Walmart group)

BP

Worldwide fuel and convenience stores

Budgens Crouch End

(Case Study)
U.K. independent convenience store franchise
(member Musgrave Retail Partners)

Budgens Dersingham

U.K. independent convenience store franchise
(member Musgrave Retail Partners)

Giant Eagle

(Case Study)
U.S. supermarket (Pennsylvania)

Green Valley Grocery

U.S. convenience store (Nevada)

Harry Tuffin

U.K. independent supermarket chain and fuel stations

Marks & Spencer

International supermarket and retailer (U.K.)

Musgrave Retail Partners Ireland

(Case Study)
Supervalu and Centra markets

Nice N Easy Grocery Shoppes

(Case Study)
U.S. convenience store (New York)

Power Mart

U.S. convenience store (Illinois)

Quick Chek

U.S. convenience store (New Jersey)

Ricker Oil

U.S. convenience store (Indiana)

Rutter's Farm Stores

(Case Study)
U.S. convenience store (Pennsylvania)

SeQuential

U.S. solar-powered biofuel gas station and convenience store (Oregon)

Tesco

(Case Study)
U.K. supermarkets and convenience stores

W H Smith

International convenience store chain (U.K.)

Walmart

International supermarket and U.S. retail chain

Zarco 66

U.S. convenience store (Kansas)



Appendix B: Online Resources

REFRIGERATION RESOURCES

Styleline Refrigerator Doors
<http://www.styleline.com/>

Anthony International Doors
<http://www.anthonydoors.com>

Hussman
<http://www.hussmann.com>

Energy Star Commercial Solid Door Refrigerators and Freezers
http://www.energystar.gov/index.cfm?c=commer_refrig.pr_commercial_refrigerators

HVAC RESOURCES

Light Commercial Air Conditioners and Heat Pumps Purchasing and Procurement Language
http://www.energystar.gov/index.cfm?c=heat_cool.pr_proc_light_commercial

Energy Star Qualified Models
http://www.energystar.gov/index.cfm?c=bulk_purchasing.bus_purchasing#comhvac

American Society of Heating, Refrigerating and Air-Conditioning Engineers
<http://www.ashrae.org/>

LIGHTING RESOURCES

Energy Star guide to Lighting
http://www.energystar.gov/index.cfm?c=lighting.pr_lighting

Guide to energy efficient lighting
<http://www.lrc.rpi.edu>

Light tube suppliers
<http://www.solatube.com/>
EMS Resources

Emerson Climate Technologies
<http://emersonretailsolutions.com/cstores/index.asp>

Parasense
<http://www.parasense.com/>

Energy Control Systems Inc.
<http://www.energycontrolsystems.com/cent.htm>

POWER RESOURCES

Database of State Incentives for Renewables and Efficiency (DSIRE)
<http://www.dsireusa.org/>

Green Power Locator
<http://epa.gov/greenpower/pubs/gplocator.htm>

EPA Guide to Purchasing Green Power
http://www.epa.gov/greenpower/documents/purchasing_guide_for_web.pdf

Chicago Climate Exchange
<http://www.chicagoclimatex.com/>

U.S. Solar Energy Organizations
<http://www.seia.org/>

Energy Star geothermal pumps
http://www.energystar.gov/index.cfm?c=geo_heat.pr_geo_heat_pumps

Wind turbines
<http://www.ropatec.com/>

NEW CONSTRUCTION RESOURCES

U.S. Green Building Council
<http://www.usgbc.org/>

Energy Star Commercial Building Design Guidance
<http://www.energystar.gov>

BRE Environmental Assessment Method
<http://www.breeam.org>

Commercial and Construction Recycling Services
<http://www.evergreenlv.com/>

ROOFS

Roof Coating Manufacturers Association
<http://www.roofcoatings.org>

Cool Roof Product Information
http://www.epa.gov/hiri/strategies/level3_roofproducts.html

Energy Star Guide to Reflective Roofs
http://www.energystar.gov/index.cfm?c=roof_prods.pr_roof_products

Energy Star Reflective Roof Calculator
<http://www.roofcalc.com/RoofCalcBuildingInput.aspx>

TAX INCENTIVE INFORMATION

National Renewable Energy Library
<http://www.nrel.gov/>



Appendix B: Online Resources (continued)

American Institute of Architects: High Performance Building Tax Incentives in the United States

http://www.aia.org/adv_sustainability_taxincentives

WATER EFFICIENCY

Xeriscaping

<http://www.ciwmb.ca.gov/Organics/Xeriscaping/>

Stormwater Authority

<http://www.stormwaterauthority.org/>

FUEL RESOURCES

Zarco 66

<http://www.zarco66.com/earthfriendlyfuels.html>

National Biodiesel Board

<http://www.biodiesel.org/>

Clean Diesel Fuel Alliance

<http://www.clean-diesel.org/>

Hybrid Vehicles

<http://www.hybridcars.com/>

COMMUNICATIONS RESOURCES

Energy Star educational tools

http://www.energystar.gov/index.cfm?c=challenge.challenge_toolkit#spread_word

Association of Postconsumer Plastic Recyclers

<http://www.urrc.net/new/pages/index.html>

Earth 911

<http://earth911.org/recycling/>

National Recycling Coalition

<http://www.nrc-recycle.org/>

Waste Management Recycling Services

<http://www.recycleamerica.com/>

REGULATION AND PARTNERSHIPS RESOURCES

State federal and non governmental organizations

Database of Federal, state and non-governmental organizations

<http://www.dsireusa.org/links/index.cfm?CurrentPageID=4&EE=1&RE=1>

Energy audits

<http://www.energysmartgrocer.org/>

State and federal tax incentives

Commercial lighting tax deduction

<http://www.lightingtaxdeduction.org/>

U.S. Department of Energy Tax Incentives for Energy Efficiency

http://www.eere.energy.gov/states/alternatives/tax_incentives.cfm

State incentives database

<http://www.dsireusa.org/>

Tax Incentives Assistance Project

<http://www.energytaxincentives.org/>

PARTNERSHIPS

U.S. Department of Energy Retailer Energy Alliance

<http://www1.eere.energy.gov/buildings/retailer/>

Energy Star Partners

http://www.energystar.gov/index.cfm?c=partners.pt_index