

Appendix N

Esource Retail Sector Snapshot

the bottom line.

The North American retail industry is large, diverse, and vital to the economy. In 2007, U.S. and Canadian retail sales (including nonfood and food retailers) topped \$4 trillion and C\$400 billion, respectively, with retail trade accounting for 6 percent of gross domestic product in both countries.⁷ Giant chains such as Wal-Mart and Home Depot dominate sales (**Table 1**),⁸ but most retailers are small. In the U.S., more than 95 percent of all retailers have only one store and nearly 90 percent have fewer than 20 employees. In Canada, 72 percent of retail stores employ fewer than 10 people.⁹

TABLE 1: Top 10 U.S.-based retail companies

Wal-Mart tops the list of U.S.-based retail giants. Most retailers are far smaller.

Rank	Company	2007 revenue (million \$)	2007 earnings (million \$)	Number of stores
1	Wal-Mart	378,799	12,731	7,262
2	Home Depot	77,349	4,396	2,234
3	CVS Caremark	76,330	2,623	6,301
4	Costco	64,400	1,083	520
5	Target	63,367	2,849	1,591
6	Walgreens	53,762	2,041	5,997
7	Sears	50,703	826	3,800
8	Lowe's	48,283	2,809	1,525
9	Best Buy	40,023	1,407	1,314
10	Macy's	26,313	893	853

Note: Grocery-oriented chains were excluded from this list.

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The 657,000 retail buildings in the U.S. account for about 11.2 billion square feet (ft²), or 16 percent of all commercial building space (**Table 2**). Of these retail buildings, 443,000 (4.3 billion ft²) are nonmall buildings and 213,000 (6.9 billion ft²) are enclosed or strip malls. More than half of U.S. nonmall retail buildings are smaller than 5,000 ft² and more than

three quarters are smaller than 10,000 ft². Enclosed and strip malls tend to be larger: More than half are over 10,000 ft² and 20 percent are over 25,000 ft². Note that a retail establishment can include more than one building, and a building can house more than one establishment.

TABLE 2: U.S. retail natural gas and electricity intensities, 2003

Enclosed and strip malls tend to be larger and have higher energy intensities than nonmall retail buildings.

Building size (ft ²)	Number of buildings (thousand)	Total floorspace (million ft ²)	Floorspace of buildings using natural gas (million ft ²)	Natural gas intensity (annual ft ³ /ft ²)	Electricity intensity (annual kWh/ft ²)
1,001 to 10,000	431	1,944	1,094	55.2	14.2
Enclosed and strip malls	59 ^a	448 ^a	367	60.0	19.1
Retail buildings other than malls	338	1,363	726	52.7	12.2
10,001 to 100,000	210	5,205	3,572	37.6	190.0
Enclosed and strip malls	110	3,071	2,167	40.4	23.1
Retail buildings other than malls	97 ^a	1,862 ^a	1,406	27.7	12.9
100,001 +	16	4,044	3,205	19.1	21.9
Enclosed and strip malls	10 ^a	2,905 ^a	2,471	20.1	22.0
Retail buildings other than malls	4 ^a	524	734	15.7	21.5
Total	657	11,192^a	7,871	NA	NA
Average	NA	NA	NA	32.5	19.2

Notes: ft² = square foot; ft³ = cubic foot; kWh = kilowatt-hour; NA = not applicable.
a. Some data were withheld because the relative standard error was greater than 50 percent or fewer than 20 buildings were sampled in one or more size categories.

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In 2003, U.S. nonmall retail buildings used 62 billion kilowatt-hours (kWh) of electricity at a cost of \$5.1 billion and 89 billion cubic feet of natural gas at a cost of \$720 million. This amounts to an electricity energy intensity (energy consumption relative to floor space) of about 14 kWh per ft² and a natural gas energy intensity of about 31 cubic feet per ft² per

year. Energy costs for these buildings averaged \$1.19 per ft² for electricity and \$0.25 per ft² for natural gas per year.

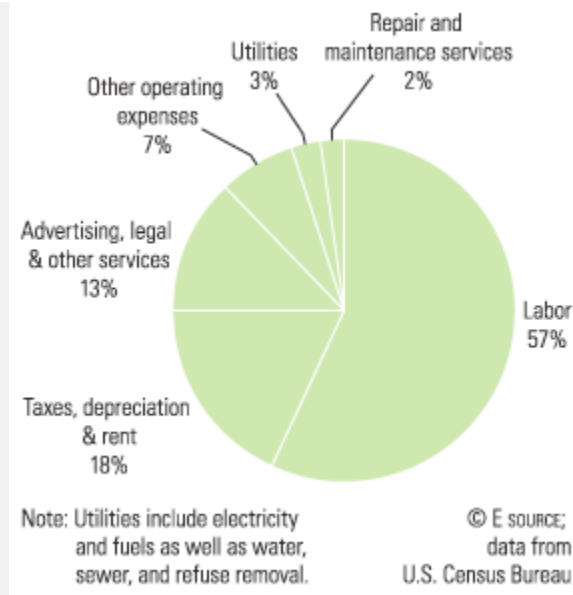
Enclosed and strip malls in the U.S. used 153 billion kWh of electricity at a cost of \$13.8 billion and 167 billion cubic feet of natural gas at a cost of \$1.5 billion. This amounts to an electricity energy intensity of about 22 kWh per ft² and a natural gas energy intensity of about 33 cubic feet per ft² per year. Energy costs for these buildings averaged \$2.00 per ft² for electricity and \$0.30 per ft² for natural gas per year.¹⁰

In Canada, the approximately 80,000 retail establishments account for 71.5 million square meters (770 million ft²) or 11 percent of all commercial and institutional building space. The overall energy intensity of these establishments is 1.55 gigajoules (GJ) per square meter, for an annual energy consumption of 111 million GJ and cost of about C\$2 billion.¹¹ Natural gas and electricity each account for about 45 percent of Canadian retail energy use, with most of the remaining 10 percent attributed to fuel oil.¹²

As of 2003, retailers used 20 percent of the energy consumed by all commercial buildings in the U.S., and energy represented about 2 percent of operating costs for U.S. retailers in 2002 (**Figure 1**).¹³ Retailers use more than 10 percent of the total energy consumed by all commercial and institutional establishments in Canada.¹⁴ Energy costs have a large impact on retail businesses because profit margins typically average only around 2 to 6 percent.¹⁵

FIGURE 1: Retail operating expenses in the U.S., 2002

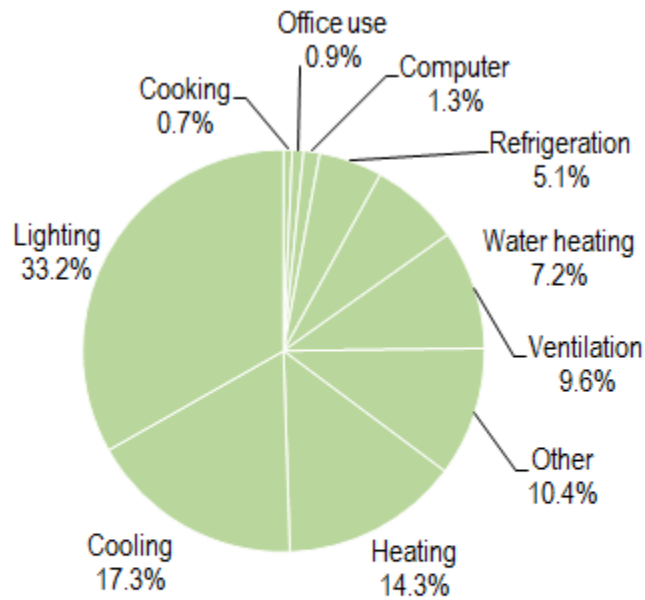
The average operating expenses for retail trade in 2002 are shown. Utility bills, including electricity and fuels as well as water, sewer, and refuse removal, account for about 3 percent of total operating expenses for retailers.



Lighting and heating consume the most electricity and gas for U.S. retailers (**Figure 2, Figure 3**).¹⁶ In the U.S., 97 percent of all retail floor space is heated. Furnaces are the most common type of heating unit and are frequently found in older, smaller retail spaces. Ninety-three percent of all U.S. retail buildings are air conditioned, and packaged units are the most commonly installed cooling equipment in retail space.¹⁷

FIGURE 2: U.S. retail facility electricity consumption by end use

Electricity consumption is shown for different retail facility end uses in the United States. Lighting accounts for 33 percent of retail end uses, followed by heating at 14 percent and cooling at 17 percent.

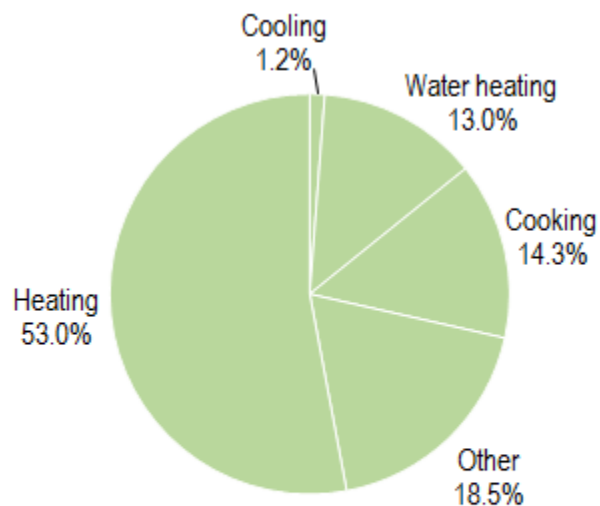


Notes: Total electric intensity (kilowatt-hour per square foot [kWh/ft²], annual basis): 20.0; average consumption per building (kWh): 10,163,285; average enclosed floorspace per building (ft²): 508,492.

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FIGURE 3: U.S. retail facility gas consumption by end use

Gas consumption is shown for different retail facility end uses in the United States. Heating accounts for 53 percent of retail gas usage, followed by miscellaneous uses at 19 percent and cooking at 14 percent.



Notes: Total gas intensity ((kilowatt Btu per square foot [kBtu/ft²], annual basis): 14.1; average consumption per building (kBtu): 7,145,496; average enclosed floorspace per building (ft²): 508,492.

© E Source; data from U.S. Energy Information Administration

Data for Canadian big-box retailers show heating and lighting as the main electricity and gas expenses for those businesses (**Figure 4**).¹⁸ But in addition to these standard costs, both U.S. and Canadian utilities can charge commercial buildings for electricity based on two measures: consumption and demand. The consumption component of the bill is based on the amount of electricity in kilowatt-hours (kWh) that the building consumes during a month. The demand component is the peak demand in kilowatts (kW) occurring within the month, or, for some utilities, during the previous 12 months (**Figure 5**).

FIGURE 4: Canadian big-box retail energy consumption by end use

Energy consumption is shown for big-box retail end uses in Canada. Heating accounts for 47 percent of end uses, followed by lighting at 39 percent and ventilating at 6 percent.

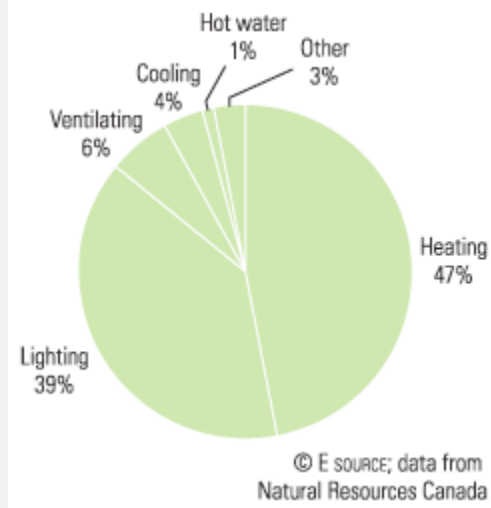
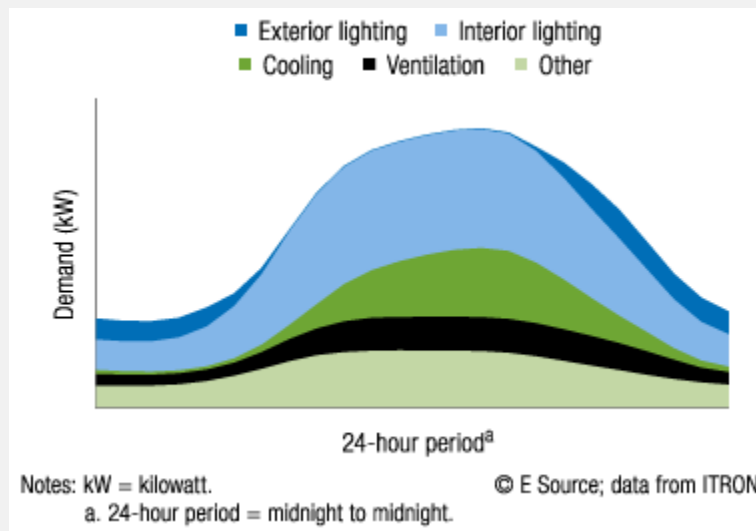


FIGURE 5: Peak loads for U.S. retailers

Hourly energy consumption data show that lighting and cooling present the largest opportunities for reducing peak demand charges in retail buildings.



Industry Hot Buttons and Trends

Retailers are always looking for a competitive edge. Many are turning to energy efficiency and renewable energy initiatives to tap into the advantages of being “green.”

The typical roller coaster of a retailer’s existence has been marked by even more pronounced ups and downs in recent years, including a drop in consumer confidence to levels not seen in almost half a century¹⁹ and volatile energy prices. In this ever challenging environment, no retailer wants to chase customers away with price hikes. Saving energy is an opportunity for stores to cut costs and boost the bottom line. Forward-thinking companies might even convert this opportunity into a competitive advantage.

Green initiatives. Being green is in. It can also be profitable. From solar power to green building materials, many retailers are banking on the cost-saving and image-improving benefits of sustainability initiatives. A survey of retail executives identified the top drivers of sustainability programs: gaining competitive advantage (57 percent), controlling energy costs (38 percent), improving brand value and equity (34 percent), achieving innovation (31 percent), and complying with companywide mandates for environmental performance (30 percent).²⁰ The same survey showed best-in-class green retailers enjoying a range of benefits, including lower energy, transportation, and merchandise costs as well as improved customer loyalty. The growing interest in green retailing is reflected in the appearance of such events as *Chain Store Age* magazine’s Green4Retail Conference, which surpassed attendance expectations during its inaugural run in 2008.²¹

Green store design and retrofits. It’s not just companies with obvious environmental tie-ins (such as outdoor equipment retailers) that are going green. For example, Wal-Mart is making sustainability a cornerstone of its growth plans.²² Among other goals, Wal-Mart is targeting energy-efficiency improvements of 20 percent for existing stores and 30 percent for new stores over the next several years. Energy-efficient technologies are being implemented at experimental and high-efficiency prototype stores, with some making their way into stores nationwide. The technologies include light-emitting diode (LED) lights, advanced daylighting systems, cool roofs, and an integrated water-source heating, cooling,

and refrigeration system.

Simon Property Group, the largest public U.S. real estate company, is also investing heavily in energy efficiency. Simon owns or has an interest in 385 retail properties comprising 262 million ft² in North America, Europe, and Asia, including indoor and outdoor shopping malls and outlet centers. The company sees energy as a controllable cost and is implementing a wide range of energy-saving strategies: installing high-efficiency fluorescent lamps, replacing incandescent bulbs with compact fluorescents, replacing metal halide lights with fluorescents in parking garages, installing new chillers, replacing rooftop HVAC units, upgrading energy-management systems, retrocommissioning, and more. “You name it, we’re doing it,” said Simon’s senior manager of energy-efficiency programs. The company is also exploring the use of solar and wind power.²³

Renewable energy purchases. Many retailers are buying environmentally friendly renewable energy such as solar, wind, geothermal, and low-impact hydroelectric power, even when that energy comes at a premium to conventional sources. For example, Kohl’s Department Stores is becoming the largest single host of photovoltaic (PV) electricity production in North America. Kohl’s entered into a power purchase agreement with solar energy service provider SunEdison. Under this arrangement, SunEdison installs and services the PV systems at no initial cost to Kohl’s, and Kohl’s purchases the electricity from SunEdison. As of 2008, Kohl’s has 60 rooftop PV systems activated at stores in California, New Jersey, Wisconsin, and Connecticut, with a near-term goal of 100 systems.²⁴

Power purchase agreements are not the only option available to retailers who want onsite renewable energy systems. Businesses can buy and install their own systems and reap the benefits directly. Grants, rebates, and tax incentives can enhance the attractiveness of this route. For example, Xcel Energy’s Solar*Rewards Program offers Colorado businesses a rebate for installing PV systems and a renewable energy credit for electricity produced from the systems.²⁵ This benefits Xcel by encouraging solar energy production that helps satisfy the utility’s obligations under Colorado’s renewables portfolio standard. Lists of incentives available nationwide can be found in the [Database of State Incentives for Renewables and Efficiency](#) and E Source’s DSMdat.

In addition to onsite generation, retailers are buying renewable energy from national “green power” brokers and utilities. National brokers sell renewable energy certificates (RECs), which represent electricity generated from an eligible renewable energy source. The U.S. Environmental Protection Agency’s Green Power Partnership is a voluntary program that supports procurement of green power. Several retailers are among the Partnership’s top 50 green power purchasers, including Kohl’s, Staples, Lowe’s, Office Depot, and Coldwater Creek, and many other retailers participate.²⁶

Retailers can also buy renewable energy from utilities via green pricing programs (GPPs). Under these programs, the utility charges a premium for blocks of green power in the form of RECs or locally produced renewable energy that flows into the grid. These utility programs compete with REC brokers for retailers’ “green dollars.” Renewable energy from REC brokers can be cheaper than from GPPs. However, utilities can market GPPs by touting their local benefits and even as a hedge against fuel cost increases if renewable energy purchases are excluded from fuel cost adjustment charges.²⁷

Split incentives. For retailers that lease rather than own their stores—such as mall stores—tenants might pay the energy costs but do not have a long-term stake in the building, which makes it difficult for the retailer to justify investments in efficiency improvements. Meanwhile, the owners have a long-term stake but do not pay the energy bills and, therefore, have little incentive to pay for efficiency improvements.

However, the incidence of the split incentives problem might be overstated. In fact, lessees in the retail market often are involved in the decision-making process about every detail in their stores, including the installation of energy-consuming equipment. For retailers, it is important that their space not only convey the image they want to project, but also that shoppers have a comfortable, pleasant experience.²⁸ Retailers can negotiate a green lease that includes energy performance and efficient equipment requirements.²⁹

Online retail sales growth. Online retail sales are a bright spot in a generally gloomy retail picture. Forrester Research anticipates a 17 percent increase in 2008 online sales to a total of \$204 billion, led by apparel (\$26.6 billion), computers (\$23.9 billion), and autos (\$19.3

billion).³⁰

Many retailers are growing their customer base without increasing facility costs by developing an online presence. They do this both by using the Internet to increase sales in their brick-and-mortar stores and by extending their reach to new web-savvy customers in other localities. However, brick-and-mortar retail stores are not going away, considering that online sales still account for just 4 percent of all retail sales.

Best Bets: Energy Technologies and Strategies

Various energy technologies and strategies meet retailers' needs to increase sales and cut costs. Efficient lighting and HVAC technologies are particularly suitable for improving the shopping experience while saving money.

Energy-efficiency upgrades can increase profitability, boost worker productivity, reduce exposure to energy price volatility, increase sales by creating a more comfortable and attractive shopping environment, and enhance public image. They can also reduce demand charges. However, short payback periods are important to retailers.

Lighting. Lighting is one of the best opportunities for retailers to save money on energy. Lighting that provides appropriate intensity, color rendering, and color uniformity can also increase sales and reduce merchandise returns. Many utilities offer incentives to retail customers who upgrade inefficient lighting. In California, the City of Palo Alto Utilities' Right Lights program offers rebates up to 100 percent of the cost of the installation for small retailers.³¹ Using the most efficient bulb to do the lighting job and installing appropriate controls can save 50 percent or more on lighting costs.³² Various light types provide benefits for retail applications.³³

- **General illumination.** Fluorescent lights are efficient and provide good color quality for general illumination. Replacing T12 fluorescent lamps and magnetic ballasts with high-performance T8 lamps and electronic ballasts can reduce lighting energy consumption

by 35 percent. For big-box stores with high ceilings, ceramic metal halide (CMH) lamps and high-output T5 fluorescent lamps are also high-efficiency options.

- *Accent lighting.* Low-wattage CMH lamps with electronic ballasts are good for accent lighting. T5 fluorescent lamps are suitable for display cases and under-shelf illumination. Additional options for accent lighting include fiber optic lighting and LEDs.
- *Outdoor lighting.* For outdoor lighting, metal halide and high-pressure sodium are more efficient than mercury vapor or incandescent sources. Compact fluorescent lamps and induction lamps are appropriate for some outdoor lighting applications as well.

Retailers can dim or turn off lights when natural daylight is adequate (**Figure 4**), saving energy by reducing the need for electric lights and the heat they create. For example, Costco stores equipped with skylights and daylighting controls are estimated to save 1.5 kWh per ft² (approximately \$23,000 per facility). Natural daylight might also improve retail sales. One study credited daylighting with increasing sales up to 6 percent, with larger effects in stores that had more annual hours of useful daylight. Natural light also improves worker productivity, and even small productivity gains can quickly improve profitability for cash-strapped retailers.³⁴

FIGURE 6: Daylighting at Costco

Costco saves approximately \$23,000 per store annually by using daylight to reduce electricity consumption and air-conditioning load. In addition to reducing energy costs, daylighting has been credited with increasing sales.



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HVAC. Heating, cooling, and ventilation can consume half the energy in a retail store and is therefore a good opportunity for energy savings. For example, utilities can encourage retailers to choose more efficient models when purchasing replacement HVAC equipment.

Demand-controlled ventilation (DCV) systems sense the level of carbon dioxide in the return airstream and use it as an indicator of occupancy. When coupled with variable-speed fan motors, DCV can save heating and air-conditioning (AC) energy by reducing the amount of ventilation air brought into a building when occupancy levels are below design capacity. In a retail building, DCV is most appropriate when a dedicated HVAC system serves the sales floor.³⁵

For small retailers operating in dry climates, evaporative coolers typically use less than 25 percent of the energy a compression system uses, and paybacks range from 6 months to 5

years, depending on the climate.³⁶ One Colorado building materials retailer reported utility bills for the first 6 months of 2008 of \$17,000 in a facility with a conventional AC system and bills of \$6,000 in a similar-sized facility equipped with aging evaporative coolers.³⁷ Newer evaporative coolers are more efficient and can provide even more energy and dollar savings.

Economizers can take advantage of favorable outdoor air conditions to provide free AC, but they require frequent maintenance to ensure proper operation. Economizer failures generally do not result in comfort problems and so may go undetected by a building's occupants for long periods. However, when an economizer fails, it can bring in substantially more outside air than is necessary and drive up heating or AC costs.³⁸

Commissioning and energy-management systems. Commissioning is a systematic analysis and optimization of building system performance. It can save energy and provide additional benefits such as reducing maintenance expenses and enhancing the shopping environment (for example, by optimizing ventilation). Most energy-saving opportunities identified during commissioning relate to HVAC systems, particularly air-distribution systems.

Easy energy-saving commissioning measures include turning the store's HVAC temperature settings down in heating seasons and up in cooling seasons (while maintaining comfort), minimizing HVAC use in peripheral rooms such as stockrooms and offices, and shutting off lights and electronic displays during closed hours. Energy-management systems can aid these efforts. Automated systems such as programmable thermostats, motion sensors, and timers that turn off lights minimize the need for employee vigilance and manage energy use at modest cost. Manual methods such as implementing store-closing protocols for shutting off lights and electronic displays can also be effective and incur lower initial costs.³⁹

Studies have shown that commissioning can reduce energy consumption by 10 to 15 percent—equivalent to about \$8,000 per year for a typical 50,000-ft² retail building—at a commissioning cost of \$0.05 to \$0.40 per ft².⁴⁰ (For a step-by-step process, see the Building Commissioning Association's [Best Practices in Commissioning Existing Buildings](#) [PDF].)

Cool roofs. Recoating or painting a roof with a white or other highly reflective coating can reduce peak cooling demand by 15 to 20 percent, depending on the climate. The Energy Star program provides a [list of suitable roof-coating products](#).

How Utilities Can Reach and Serve the Retail Sector

Utilities can help retailers reap the benefits of improved energy management, leading to increased satisfaction and utility program participation among these customers.

Retailers' desire to save money, enhance their customers' shopping experience, and gain competitive advantage makes them amenable to energy-management strategies that achieve these goals. However, retailers are also busy and under pressure to accomplish a lot with limited resources. Utilities can serve these customers best when they understand their needs. We've consistently heard retailers ask for targeted communication, reliable service, fair rates, appropriate energy-management options, and creative financing.

Targeted communication. Utilities need to communicate about the right topics to the right people. Retailers want to be informed about service interruptions, rate changes, opportunities to save, rebate programs, and billing issues. We spoke with an energy manager at Simon Property Group who recommended assigning a utility representative to help large customers navigate the rebate preapproval process.⁴¹ Retailers with multiple stores often implement prescriptive measures at multiple sites, but the rebate application process can be prohibitive. Utilities rarely provide assistance to simplify processing of a large volume of incentive applications by a single customer with multiple sites. Instead, utilities tend to focus their assistance for incentive applications on large, custom projects.

Proactive key account communications should be geared around timely topics for retailers, whether they are tactical or strategic. For example, key account managers (KAMs) can track retail construction schedules. Retail construction and renovation projects can move quickly,

and it is easy to miss deadlines for rebate opportunities. Increasingly, retailers are looking for information about calculating their carbon footprint and mitigating greenhouse gas emissions. As time goes on, utilities should expect to take on a role as educators about environmental issues and energy-saving technologies.

Large retailers have complex management structures, which can make it challenging for KAMs to build relationships with decision-makers and identify shared interests and objectives. With these companies, utilities should pursue multilevel communication that begins with the corporate energy manager and expands to facility and store managers, regional representatives, and vice presidents of real estate or facilities. Targeting key personnel helps utilities gain broad support for proposals and uncover additional problems that the utility might be able to solve. That said, utilities should avoid becoming dependent on a single contact at a retail company, but should give their retail clients a primary point of contact to keep communications streamlined.⁴²

Midsize retailers have expressed interest in purchasing services from utilities and are likely to view utilities as trustworthy information sources. Utilities should consider leveraging this trust by approaching midsize retailers in the role of energy consultants and agents. Midsize retailers have significant energy costs but might not have the personnel to manage them. For regional, multisite retail customers that do not have energy managers, a few utilities subsidize energy-manager salaries and assist with their hiring and training.⁴³

Most small retail owners are busy people with responsibilities ranging from executive decision-making to janitorial duties. A utility's challenge is to reach these customers with actionable information that outlines both the energy cost savings and the additional benefits of efficiency upgrades in a format that is convenient and easy to understand. An easily navigable page on the utility's web site that focuses on the energy needs of small retailers, or a business call center staffed by customer service representatives well versed in energy efficiency for retail spaces, are appropriate channels for communicating with small retail customers.⁴⁴ (For more on serving SMB customers through the call center, see the E Source report "Soft Skills Training for Difficult Business Calls.") Training is important—one pet-store owner we contacted expressed frustration with her utility because she never spoke to the same person twice, and the customer service representatives weren't knowledgeable and

didn't follow up on her concerns.⁴⁵

Reliable service. Reliable energy service is essential to retailers. Losing power for an extended period means lost sales, lost product (for perishable items), additional costs for equipment rental and labor, and safety concerns. For example, Costco's energy director told us the risk of loss from an extended outage is \$5,000 to \$6,000 per day for emergency generators, \$20,000 to \$60,000 for lost product, \$1,000 to \$2,000 for electrical and refrigeration labor, and up to the average store sales of \$370,000 per day for lost sales. Utilities can better understand their retail customers if they know how service interruptions affect these customers by the minute, hour, or day, and how they manage interruptions. Retailers appreciate advance notice about infrastructure changes that affect reliability and, of course, rapid response to interruptions caused by events such as storms.

Fair rates. Retailers want rates they perceive as fair. However, because rate changes are not fully under a utility's control, communication with retail customers about changes—including fuel cost adjustments—is important. Some utilities have changed from annual to quarterly fuel adjustment charges to better reflect fluctuating fuel prices.

KAMs have told us that their customers want to know about rate changes as early as possible, ideally in time for the customer's strategic budget planning process. They want the notice of changes to be as specific as possible to their account, including a likely cost effect per store. An annual account review for large retailers provides an opportunity for the account manager to engage with the customer and can be a springboard for inserting energy-efficiency investments and operational improvements into the customer's budget and strategy.

Appropriate options. Retailers can spend only a fraction of their time and budget on energy-related concerns, so it is important to reach them with the most appropriate ideas and programs. Time- and money-saving options are always welcome. As one industry observer put it, "Most retailers say they want to be green, but being green must first be cost-justifiable."⁴⁶ Costco's energy director recommended distributing energy-efficiency training via the web to allow greater participation while eliminating the travel time and cost (and travel-related greenhouse gas emissions) associated with in-person training. The