



CONVENIENCE RETAIL ENERGY USE SURVEY

NACS

Research &
Technology

OVERVIEW

Operating an energy-efficient convenience store can help save money and earn recognition from customers by having a positive impact on the community. As convenience retailers aim to reduce overhead in the quest for more efficient operations, energy costs are often ignored as a primary catalyst for reducing expenses.

To help retailers realize the benefits of reducing energy costs, NACS has partnered with the U.S. Environmental Protection Agency's ENERGY STAR program to create the convenience retail industry's first and only ENERGY STAR Score.



As part of this effort, NACS and ENERGY STAR launched the NACS Energy Use Survey in 2020 to capture convenience store data necessary for measuring store energy use in these areas:

- **General store characteristics such as total square footage, operating hours, store age and store services provided**
- **The number of energy-using store equipment such as refrigeration units, beverage dispensers and prepared food appliances**
- **Energy use from utility bills in standardized measurements for electricity and natural gas as well as water use**



Retailer-provided data from this survey, coupled with the ENERGY STAR rating methodology, will create a score for the convenience retail industry to benchmark energy consumption and provide reliable comparisons to operators.

This report explores the data captured from the NACS Energy Use Survey and highlights potential cost savings from reducing energy use. Retailers can use this information to:

- **Gain internal buy-in on energy reduction efforts**
- **Review tips on how to reduce energy consumption**
- **Benchmark store energy use, store characteristics and store equipment with other retailers**
- **Understand which resources are available for enhancing energy-reduction efforts**

EXECUTIVE SUMMARY

Findings from the NACS Energy Use Survey provide an initial view of where convenience retailers can look for potential energy cost savings.

Other key findings include:



Most convenience retailers surveyed say their company does not believe that lowering energy consumption should be a priority for reducing costs—despite having seen cost savings in the past. Education remains a key priority for retailers to recognize the role energy utilization plays in managing operational costs.



Based on energy use data and average national utility costs, the analysis suggests that **reducing electric, water and natural gas use by just 10% could result in cost savings of approximately \$5,400 per store per year.**



On average, convenience retailers use 110 kWh of electricity and 143 gallons of water per square foot. This figure can help retailers right-size a store's electric and water usage.



Convenience retailers made measurable progress in reducing energy use in recent years as utility expenses did not increase substantially from 2018-2020. NACS State of the Industry benchmark data shows only a \$19 increase in utility expenses on a year-over year basis between 2019 and 2020, and utility expenses as a percentage of gross profit dollars declined from 3.6% in 2018 to 2.8% in 2020.

BUILDING THE CASE FOR ENERGY COST SAVINGS

Reducing energy expenses is not top of mind for most convenience retailers. Many operators assume that trimming utility expenses will only have a marginal impact on reducing direct store operating expenses (DSOE) and dedicate expenditure reduction efforts elsewhere.

Although more than half (58%) of participating firms in the NACS Energy Use Survey realized cost savings in the past by reducing energy consumption, there needs to be a mindset shift if operators want to make headway in lowering energy costs within their stores.

For example, survey participants view the following areas as opportunities for their stores to develop a new understanding of energy use:

- Only 33% of participants say that using less energy is viewed as a top priority for reducing store expenses
- Only 25% of participants say that store employees try to reduce energy consumption



NACS State of the Industry benchmarks show that utilities expenses accounted for \$3,844 on a per store, per month basis in 2020.

Visit convenience.org/soi to learn more.



**ENERGY STAR
certified buildings
average 35% less
energy use than
other buildings.**

Reinforcing the need to reduce energy consumption can be streamlined when coupled with the burden utility costs play in impacting DSOE. [The NACS State of the Industry Report® of 2020 Data](#) shows that utility expenses were the fourth highest DSOE expense, averaging \$3,844 on a per store, per month basis in 2020. This expense accounted for 2.8% of gross profit dollars.

With utility expenses averaging over \$46,000 per store, per year, savvy retailers can identify large cost savings across their business. ENERGY STAR certified commercial buildings (those that score in the top 25%) average 35% less energy use than other comparable buildings. For convenience stores, that could translate to cost savings of up to \$16,000 per store, per year.

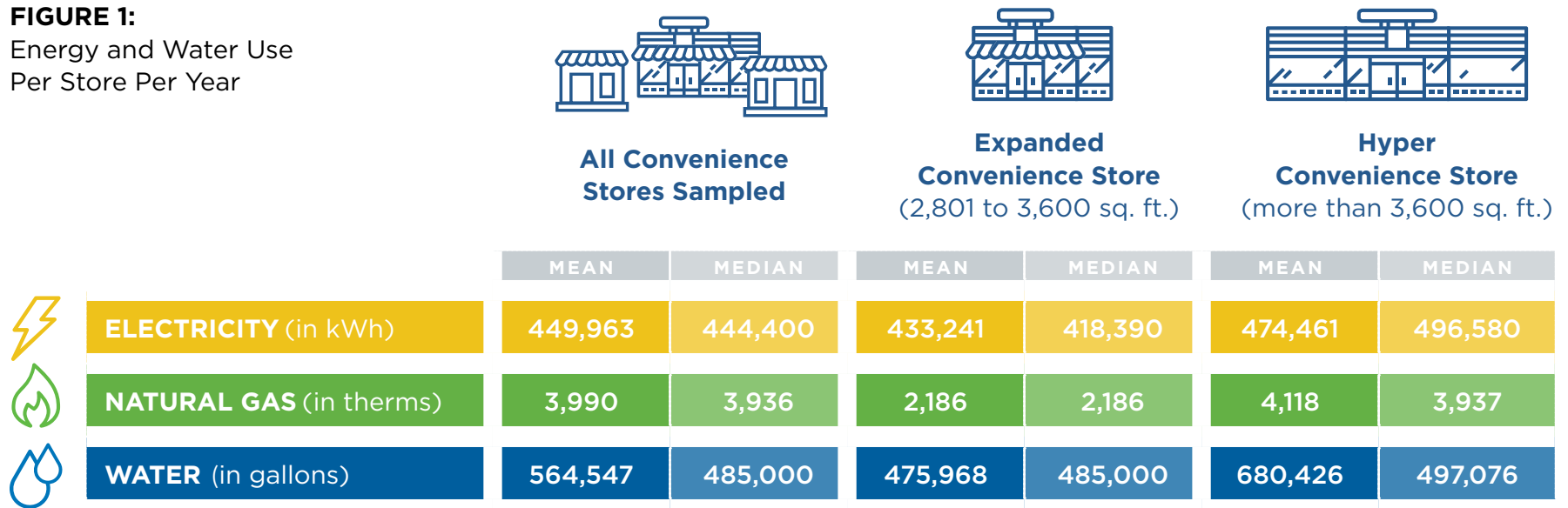
The cost of energy consumption varies significantly across each state, with Alaska, Hawaii, California and states in the Northeast typically having higher costs for electricity and natural gas utilities due to factors such as weather and energy regulations. States in the Southeast and Great Plains regions typically have electricity and natural gas charges lower than the national average. For the purposes of this report, NACS is using the following ENERGY STAR U.S. national average cost figures from April 2021 when referencing the cost for electricity and natural gas:

- **Grid-purchased electricity:** \$0.1035 per kWh
- **Natural gas:** \$0.7448 per therm

Water cost figures at the national level are less readily available; however, a 2015 study by the American Water Works Association and Raftelis Financial Consultants Inc. found that water expenses averaged \$0.0090 per gallon. This data is referenced for calculating approximate convenience retail water costs.



FIGURE 1:
Energy and Water Use
Per Store Per Year



Source: 2021 NACS Energy Use Survey

Figure 1 shows the average energy use for the most common types of utilities on a per store, per year basis as identified in the 2021 NACS Energy Use Survey. The average store size in the survey sample is larger than a traditional convenience store. The average store in the survey sample is 4,289 square feet compared with the 2020 NACS State of the Industry

average of 3,050 square feet. As a result, energy consumption in the survey sample will be higher than a typical convenience store. Additionally, the average store in the dataset is 13 years old and was remodeled seven years ago, making the NACS Energy Use Survey sample newer than the average convenience store.

Larger format convenience stores—defined as stores greater than 2,800 square feet—are using nearly 450,000 kWh of electricity per store, per year on average, or just over 37,000 kWh per month. Water usage varies more so than electricity use on a per store basis due to factors such as made-to-order foodservice, car wash, public restrooms and landscape irrigation, which are not prevalent in all stores.

Most stores in the NACS survey sample (80%) offered made-to-order foodservice and 5% had a car wash on site servicing an average of approximately 300 cars per week. Nearly all stores (99%) had a public restroom and 81% had an irrigated area averaging approximately 20,500 square feet per store.

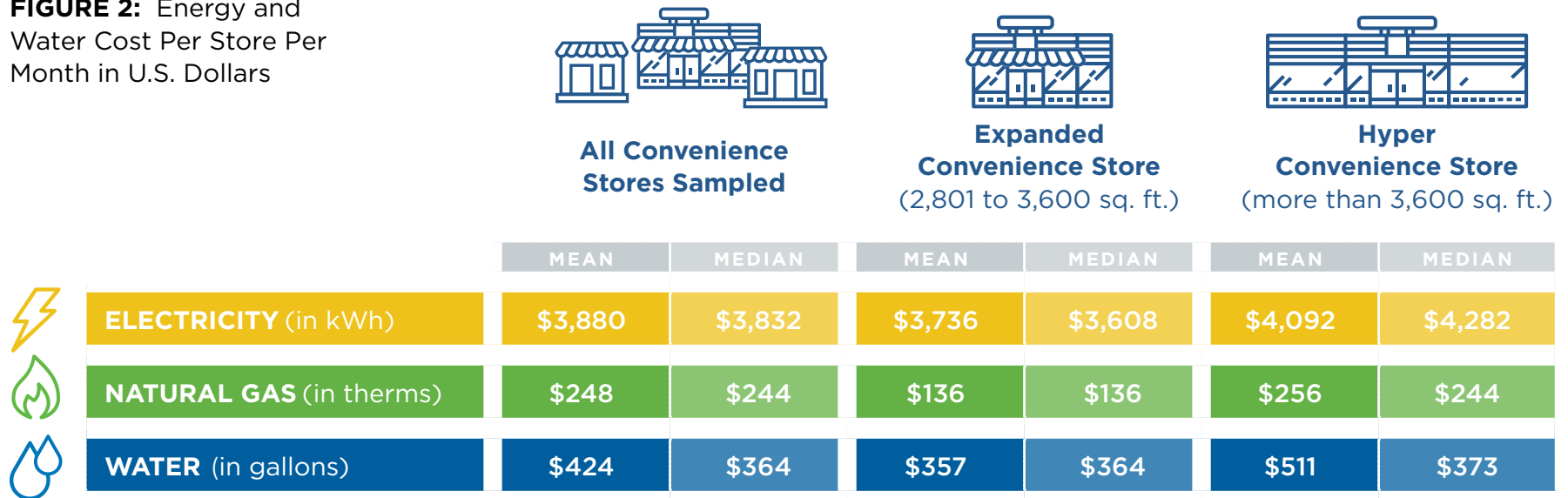
As a result, energy and water use for surveyed stores is somewhat higher than the average convenience store. On average, water use totaled nearly 565,000 gallons per store, per year, or 47,000 gallons per month. Natural gas use totaled almost 4,000 therms per store, per year on average (roughly 330 therms per month).



Figure 2 examines utility expenses based on the previously mentioned ENERGY STAR cost per energy unit (i.e., kWh of electricity, therms of natural gas) and water unit (i.e., gallons of water) coupled with retailer provided energy and water use. The below figures represent an approximate national average of monthly costs for electricity, natural gas and water.

With electricity being the largest portion of energy expenses, convenience retailers have the most room to lower costs by reducing electricity use. The last section of this report provides helpful resources for reducing energy consumption, particularly electricity use.

FIGURE 2: Energy and Water Cost Per Store Per Month in U.S. Dollars



Source: 2021 NACS Energy Use Survey

Reducing electric, natural gas, and water consumption by 35%, matching ENERGY STAR certified commercial buildings savings, could result in the reduction of nearly \$1,600 per store, per month when totaling the cost of all three utilities. Even a 10% decrease in energy use could result in cost reductions of roughly \$450 per store, per month. While reducing energy consumption is typically not a top priority for leadership and can easily be dismissed as unimportant by store staff, cost savings from energy reduction can make a substantial difference to a store's bottom line.

Given store size has a large impact on utility usage, it helps to look at electricity and water use on a normalized basis. [Figure 3](#) provides a breakdown of electric and water use on a per square foot and per store hour basis. These figures can be used as a comparison point for any store size to gauge energy efficiency.





Reducing electric, water, and natural gas use by only 10% could result in cost savings of approximately \$5,400 per store, per year.

FIGURE 3:
Electric and Water Use
by Store Square Footage
and Store Hour



**All Convenience
Stores Sampled**

		MEAN	MEDIAN
	ELECTRICITY USE (in kWh)		
	PER STORE HOUR	51	52
	PER SQ. FT.	110	110
	WATER (in gallons)		
	PER STORE HOUR	56	66
	PER SQ. FT.	143	134

Source: 2021 NACS Energy Use Survey

Each metric is based on dividing the total annual electric and water use, in terms of kWh and gallons respectively, by total store square footage and the number of hours per week that the store is open. Overall, stores use just over 50 kWh per store hour and average 56 gallons of water use per hour. On a per square foot basis, stores use approximately 110 kWh of electricity and 143 gallons of water on average.



Another way to normalize utility use is based on the number of customers and store staff. [Figure 4](#) displays average electric and water use per customer and per store FTE. On average, stores use 1.33 kWh of electricity and 1.59 gallons of water per customer. On an annual basis, stores use nearly 125,000 kWh of electricity and over 160,000 gallons of water per store FTE.

Many convenience retailers have several options for reducing utility costs. Changing store lighting is among the first considerations to minimize energy expenses.

FIGURE 4:
Electric and Water Use by
Customer and Store FTE



**All Convenience
Stores Sampled**

	MEAN	MEDIAN
ELECTRICITY USE (in kWh)		
 PER CUSTOMER	1.33	1.52
PER STORE FTE (Annual)	124,133	95,605
WATER (in gallons)		
 PER CUSTOMER	1.59	1.86
PER STORE FTE (Annual)	161,667	109,919

Source: 2021 NACS Energy Use Survey

Retailers like 7-Eleven have transitioned indoor and outdoor lighting to LED technology. As of December 2019, more than 7,000 7-Eleven stores featured LED lighting, resulting in an estimated annual energy-saving effect of approximately 38,756 kWh per store. ([7-eleven.com](https://www.7-eleven.com))

LED lighting can reduce electricity use by up

to 40%. LED lighting lasts longer, emits less heat and has reduced maintenance costs relative to fluorescent and incandescent lighting. Automatic switches, motion-sensing lighting, dimmers, daylight sensors and sensors that turn off lighting in storage areas, restrooms and other areas when not in use can also reduce electricity costs.

Ensuring HVAC systems are appropriately sized to meet store space requirements can also help improve energy efficiency. It is not unusual for HVAC systems to supply more heating or cooling power than the space requires. Confirming the HVAC system is not running at a higher level than is necessary can help keep energy expenses low. Regular maintenance to HVAC systems such as replacing filters and monitoring for coolant leaks is important for enabling peak performance.

Alternatively, installing fans rather than running air conditioning units can reduce costs in the long term. Covering outdoor HVAC condenser units with shade and having a clear airflow around the unit can improve performance as well.



Visit [convenience.org/energystar](https://www.energy.gov/energystar) for resources on energy efficiency strategies, including a checklist to identify store energy saving opportunities and a workbook with solutions.

STORE AREA AND EQUIPMENT BENCHMARKS

Retailers can save on energy costs by better understanding how store space is allocated and determining the optimal number and types of store equipment.

Additionally, equipment counts can be used for comparison purposes to determine how store energy use is impacted by having a higher or lower count of equipment relative to benchmark.

FIGURE 5:
Average
Percentage
of Store Area
by Type

- Other
- Storage area
- Cold merchandise area
- Customer devoted area
- Office area
- Kitchen area
- Employee area

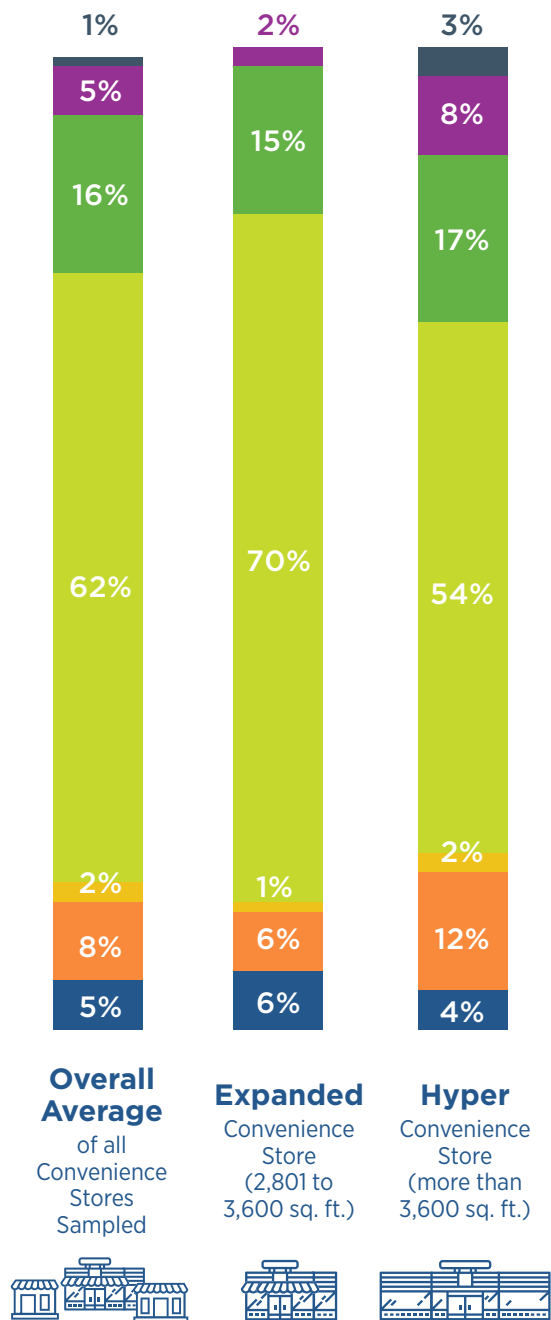


Figure 5 provides a breakdown of the percentage of store area based on how the space is used. Unsurprisingly, customer-devoted space like the sales floor, ordering, seating and restrooms made up most of the square footage.

Customer-devoted space made up a larger percentage of store square footage for expanded convenience stores (2,801 to 3,600 sq. ft.) at 70% of total store area compared with hyper-sized stores (more than 3,600 sq. ft.) at 54%. Hyper-sized convenience locations allocated double the square footage to their kitchen (12%) relative to expanded stores (6%). This indicates that expanded-sized stores in our sample were more likely to be merchandise-focused while hyper-sized store were more foodservice-oriented.

The second largest percentage of square footage for both store sizes was the cold merchandise area (walk-in refrigerators, beer caves, reach-in coolers and freezers) at approximately 16% of total store area.

Source: 2021 NACS Energy Use Survey



The amount of refrigeration, cold merchandise and hot merchandise equipment is slightly higher for hyper-sized stores compared with expanded-sized. [Figures 6, 7 and 8](#) break down the number of various equipment among sampled stores. Refrigeration makes up the largest percentage of electric expenses and can account for up to 40% of total store energy costs. **To keep refrigeration costs low, operators could prioritize units that have all or many of the following criteria:**

- Self-closing doors
- LED lighting
- Motion-sensitive controls
- High efficiency compressors
- ECM (variable speed) fan motors
- Low-energy glass
- Automated anti-sweat heater controls
- ENERGY STAR certification

Some convenience retailers have realized energy cost savings with parallel-rack systems that use two or more refrigeration compressors for cooling, allowing one compressor to run when less cooling is necessary and multiple compressors when additional cooling is needed. Alternating between compressors allows the refrigerator to avoid overtaxing any one of them and improves efficiency.



Overall Average
of all Convenience Stores Sampled

Expanded
Convenience Store
(2,801 to 3,600 sq. ft.)

Hyper
Convenience Store
(more than 3,600 sq. ft.)

FIGURE 6: Average Refrigeration Counts by Store Size

	Overall Average	Expanded	Hyper
Open refrigeration/reach-in cases	1.1	0.8	1.4
Closed refrigeration/reach-in doors	6.1	7.2	5.1
Closed refrigeration/reach-in cases	2.8	4.0	1.4
Closed refrigeration cooler doors	12.4	10.1	15.6
Closed refrigeration cooler cases	1.2	0.9	1.6
Countertop display/buffet refrigerators	0.1	0.0	0.2
Refrigerated countertop display cases	0.1	0.0	0.3
Reach-in chest freezers	0.9	1.0	0.7

FIGURE 7: Average Cold Merchandise Dispenser Counts by Store Size

	Overall Average	Expanded	Hyper
Water-only dispensers	0.3	0.0	0.6
Cold soft drink dispensers	8.9	9.0	9.0
Bowl refrigerated beverage dispensers	0.1	0.0	0.3
Iced tea brewers and dispensers	0.8	0.1	1.7
Frozen beverage dispensers	4.7	5.0	4.4
Ice makers/dispensers	1.3	1.9	0.7

Source: 2021 NACS Energy Use Survey



Overall Average
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Expanded
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(2,801 to
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Hyper
Convenience
Store
(more than
3,600 sq. ft.)

FIGURE 8: Average Hot Merchandise & Cooking Equipment Counts by Store Size



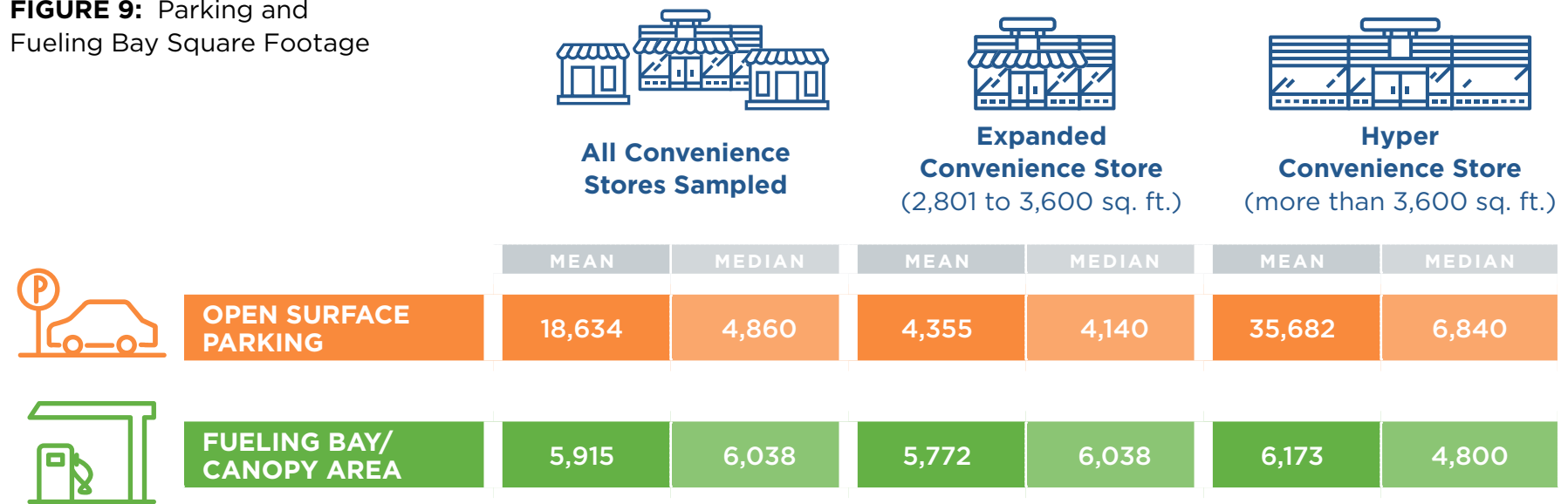
	Overall Average	Expanded	Hyper
Heated merchandiser cases	1.8	1.9	1.7
Nacho cheese and chili dispensers, soup warmers, and electric kettles	0.9	1.0	0.9
Coffee and tea brewers and makers	4.1	4.8	3.3
Coffee and tea warmers	0.9	0.1	1.8
Cappuccino and/or hot chocolate dispensers	5.6	8.7	2.1
Espresso/specialty coffee makers	0.3	0.0	0.7
Hot water dispensers	0.4	0.0	0.9
Hot dog roller grills, broilers or steamers	1.7	1.9	1.5
Griddles or grills	0.0	0.0	0.0
Commercial toasters	0.1	0.0	0.3
Commercial microwaves ovens	1.8	2.0	1.7
Conventional/convection/dual ovens	1.4	1.9	0.9
Rapid cook / speed ovens	1.4	1.0	2.0
Impinger ovens	0.7	1.0	0.4
Fryers (all types)	0.4	0.0	0.8
Heat and hold re-therms	0.7	1.0	0.5
Warmer drawers	0.3	0.0	0.6

Source: 2021 NACS Energy Use Survey

Square footage allocated to open surface parking varies widely among sampled stores, particularly hyper-sized stores. [Figure 9](#) displays the average and median values for open surface parking square footage. The median value of nearly 5,000 square feet of open surface parking should be looked at as a

better approximation for the standard parking area at convenience stores since it is much less impacted by outliers compared with the average figure. Fueling bay/canopy area square footage is more consistent among sampled stores, averaging approximately 6,000 square feet.

FIGURE 9: Parking and Fueling Bay Square Footage



Source: 2021 NACS Energy Use Survey

ENHANCING ENERGY SUSTAINABILITY EFFORTS

Convenience retailers have several resources at their disposal for reducing energy costs. First, ENERGY STAR allows retailers to benchmark their energy use on an ongoing basis through **ENERGY STAR® Portfolio Manager®**. Nearly one-quarter of commercial building space in the U.S. is already actively benchmarked through Portfolio Manager. The tool allows for:

- Easy identification of lower performing stores in terms of energy use
- Identifying energy-saving practices used by other commercial outlets
- Establishing investment priorities by comparing cost savings potential
- Comparing ENERGY STAR scores across stores and the industry

ENERGY STAR® Portfolio Manager® is free to any retailer for tracking energy use across an unlimited number of stores. With the forthcoming convenience retail ENERGY STAR score, retailers will be able to use Portfolio Manager to determine if they qualify for ENERGY STAR certification.

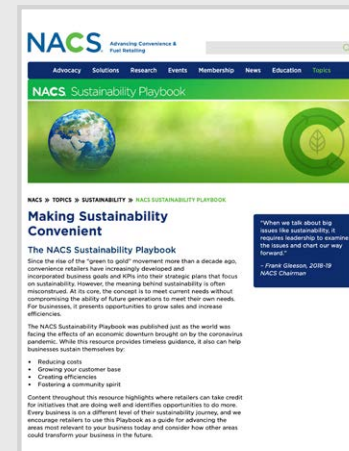
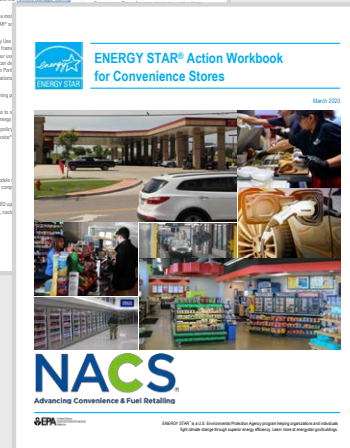
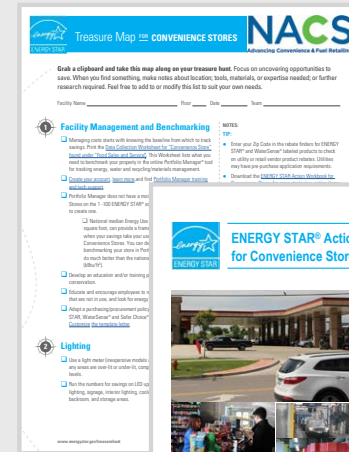


Additional Convenience Retailers Resources

In partnership with ENERGY STAR, NACS developed resources specific to convenience retailers to help identify cost savings:

- The [ENERGY STAR Treasure Hunt for Convenience Stores](#) helps retailers identify quick wins for reducing energy usage.
- The [ENERGY STAR Action Workbook for Convenience Stores](#) helps retailers plan long-term energy efficiency strategies.

More broadly, the online [NACS Sustainability Playbook](#) identifies opportunities for reducing costs and highlights areas where retailers can take credit for sustainability.



SHARING ENERGY SUCCESS STORIES



ENERGY STAR certification generates positive coverage for your business and the convenience retail industry. Using in-store signage, social media and other digital assets, retailers can communicate their company's positive actions to multiple audiences like investors, bankers, employees, prospective employees and customers.

ABOUT THIS RESEARCH

This report is based on survey data from 150 stores representing more than 10 leading convenience retailers that manage more than 5,000 stores across the United States. NACS and ENERGY STAR are targeting a mid-2022 release of the industry score and a reference for retailers to compare utility use for their stores. Once released, stores become eligible for the coveted ENERGY STAR certification as well as ENERGY STAR awards and partnerships.

NACS would like to thank the following retailers for their contributions to the survey and assistance with building the industry's first ENERGY STAR score:

Alsaker Corporation

Casey's General Stores, Inc.

Coen Markets, Inc.

Kum & Go, L.C.

Kwik Trip, Inc.

Maverik

RaceTrac, Inc.

RallyStop

Sheetz, Inc.

Sprint Foods, Inc.

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Advancing Convenience & Fuel Retailing