EPRI ELECTRIC POWER RESEARCH INSTITUTE

INDUSTRY PROFILE

COMMERCIAL FOOD SERVICE

Demand for commercial food service—food that is prepared outside of the home—has risen steadily in recent years commensurate with increasing disposable incomes and a faster pace of life.

Restaurants make up 80% of foodservice establishments in the United States. Other major foodservice segments include schools, prisons, catering and hospitality, sporting venues, and airports, as well as fast-growing supermarkets, convenience stores, food trucks, and retirement homes. Supermarkets and grocery stores have transformed a portion of their operations from food sales to food service to capture high-margin prepared food sales, thus competing with traditional restaurant sales. Restaurant sales represented 65% of total foodservice sales in 2019 (Figure 1).

In 2020, the COVID-19 pandemic and resulting stay-at-home and social distancing measures forced dine-in restaurant closures and, at least temporarily, elevated demand for take-out and food delivery to an unprecedented level. At-home food preparation also spiked, prompting market shifts that may linger even after the pandemic ends. To stay competitive, restaurants will need to be flexible and to provide prepared food by several means.

Apart from short-term impacts of COVID-19, restaurateurs are constantly responding to changes in customer preferences. A sustainability-driven emphasis on reducing food waste and increased consumer demand for plant protein sources to replace animal protein may impact cooking equipment selection and performance requirements. These shifts can translate into non-energy benefits of certain types of cooking equipment.

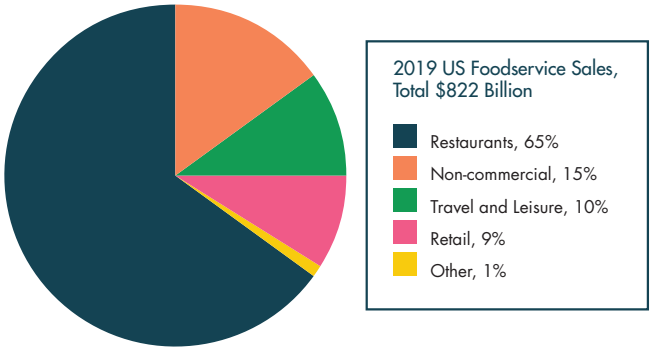

Figure 1. U.S. foodservice industry 2019 sales. Restaurants: limited service (37%), full service (28%). Noncommercial: education (5%), healthcare (4%), refreshment services (3%), business and industry (2%), other (1%). Travel and Leisure: lodging (5%), recreation (2%), other (3%). Retail: supermarkets (4%), convenience stores (3%), other (2%). Data courtesy of Technomic.

FOODSERVICE EQUIPMENT

Commercial foodservice equipment differs from residential equipment in several ways. It is typically larger capacity than that found in the residential market, is operated more hours per year, and must be more robust to handle the demands of a commercial kitchen.

Primary commercial cooking equipment—ovens, cooktops, and fryers—can be powered by electricity or gas. Other foodservice equipment, such as mixers and grinders, refrigerators, and dishwashers typically are electric already. Water heaters, whether electric or gas, are not as large an energy load as primary cooking equipment.

Roughly 20% of all primary cooking equipment in commercial food service is electric, although the market share varies by equipment and facility type. For example, combination ovens (combi ovens) and conventional ovens have a higher share and some quick-service chains are all-electric operations. Geographical differences in energy pricing, where electric or gas utility incentives and marketing programs highlight relative advantages of each energy source, also influence market share. The Electric Foodservice Council (https://www.efcouncil.com/) and the Gas Foodservice Equipment Network (https://gfen.com/) each extoll the benefit of their fuels and the importance of demonstration kitchens for customers to try out equipment and discover what works for them.

CUSTOMER PERSPECTIVE

It is important to understand customer needs and know what customers are hearing about different equipment and energy sources. Customers typically do not consider energy the most important factor when they are shopping for cooking equipment. Ease-of-use, cooking uniformity, heat-up and cool-down time, and initial cost may be more important considerations.

This point is underscored by the fact that food preparation, which includes primary cooking equipment as well as other cooking accessories such as mixers, represents only a portion of an establishment's energy use (e.g. 35% for a full-service restaurant). Furthermore, energy use, which includes cooking as well as lighting, HVAC, and water heating, represents a small slice, only 5%, of foodservice operating costs (Figure 2).

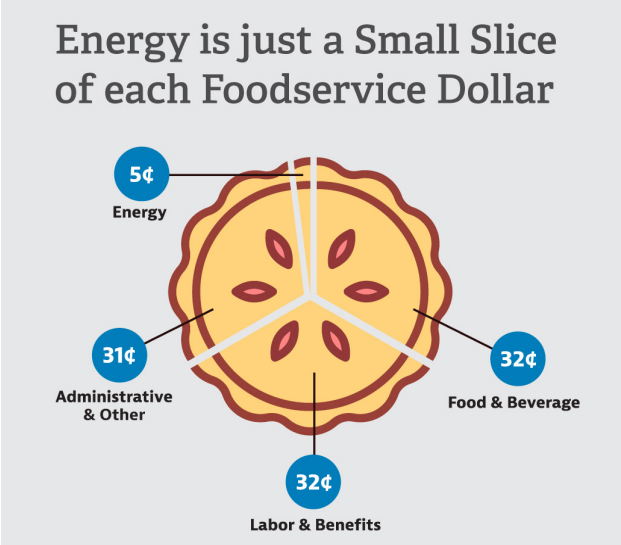

Figure 2. Energy represents just 5% of each foodservice dollar. Graphic courtesy of Alabama Power.

TESTIMONIAL: 7 LEAVES CAFE

With 26 locations in California, Nevada, and Texas, 7 Leaves Cafe is a coffee and tea retailer that uses fresh, colorful ingredients such as pandan leaves, mung beans, taro root, and passion fruit in its extensive beverage menu. Unlike other specialty beverage retailers, 7 Leaves Cafe has incorporated induction cooktops instead of natural gas stoves in many of its stores.

Induction cooktops are aligned with the company's sustainability commitment because they are twice as energy efficient as natural gas stoves. In addition, practical considerations make induction cooking a smart choice. In smaller stores, there isn't room for a full-sized natural gas range, and the smaller, portable induction cooktops can maintain temperatures with a precision not possible with natural gas—a big plus for a restaurant chain that aims to make drinks of the same high quality at every location.

"Before they approached us, they were using natural gas ranges to boil water and cook boba—the chewy tapioca balls that go into many drinks," said Andre Saldivar, senior advisor at Southern California Edison's Foodservice Technology Center. Now, with the electric induction cooktops, Saldivar adds, "They don't have to worry about burning their boba or other ingredients."

ELECTRIFICATION OPPORTUNITIES

Some pieces of primary cooking equipment are particularly well-suited to electrification.

Electric Fryer

Photo courtesy of Giles.

There are different types of electric fryers. Each is designed to accommodate various food frying techniques, such as French fries, which are submerged in oil, and donuts, which float. Pressure fryers are often used for fried chicken. A representative electric fryer size has a capacity of 40 pounds of oil and a 15-kW nameplate.

Electric Combi Oven

Photo courtesy of Rational.

The versatile combi oven serves as both a convection oven and a steamer. It can also be a holding oven for reheating food. With baking, roasting, steaming, and grilling capabilities, a combi oven can replace single-use cooking equipment and provide significant space savings. A representative electric combi oven has a capacity of 10 steam table pans (12”x20”x2.5”) and a 19-kW nameplate.

Induction Cooktop

Photo courtesy of Garland.

The induction cooktop heats magnetic metal cookware that in turn heats the food. High energy efficiency (over 85%) combined with rapid heat-up and cool-down response increase the appeal of induction cooktops over traditional resistance coil cooktops. Since there is no residual heat after the unit is turned off, the user need not remove cookware from the coil. A representative size is a four-coil top with a 20-kW nameplate.

BENEFITS OF ELECTRIFICATION IN THE COMMERCIAL KITCHEN

Benefit	Fryer	Griddle	Combi Oven	Induction Cooktop
Faster preheating and recovery time	✓	✓	✓	✓
Consistent cooking, better quality		✓		
More comfortable workplace	✓	✓	✓	✓
Less maintenance and/or longer life, greater reliability/uptime	✓	✓	✓	✓
Lower first cost			✓	
Precise temperature control	✓			✓
Easier to clean	✓			✓
Safer to use				✓
Low temperature operation	✓			

DID YOU KNOW?

The term, primary cooking equipment, refers to the high-energy-consuming equipment used directly in cooking. Auxiliary equipment refers to low-energy-using equipment, such as coffee pots, small microwaves, and toasters, which typically would have less than 3-kW energy demand (a threshold used by some utilities).

EMERGING TECHNOLOGIES

Cooking technologies are constantly improving in performance and ease of use. Recent innovations showcased by manufacturers at events such as the National Restaurant Association Kitchen Innovations Awards (https://www.nationalrestaurantshow.com/exhibitors/ki-awards) program are described below.

Induction Cooktop Enhancements

Photo courtesy of Vollrath.

Induction technology enhancements include greater emulation of gas range control as cookware is moved away from the heating surface. Sensing technology diminishes the induction power and immediately restores it to a higher level when cookware is returned to the induction range surface.

Electric Countertop Fryer

Photo courtesy of Vulcan.

A recent twist on the conventional floor-standing fryer is a counter version, which provides a separate refrigerated compartment underneath and improves productivity due to ease of access to product.

Electric Steam Griddle

Photo courtesy of AccuTemp.

The traditional electric griddle design, with electric elements mounted below a stainless-steel plate, offers different temperature zones for cooking foods that require different temperatures. A recent innovation, the electric steam griddle, has a sealed chamber under the cooking surface that heats with steam. It produces a uniform cooking surface temperature and features fast recovery time as food is moved around.

MARKET ENABLERS

Emerging technologies will retain the features of existing cooking equipment that users have grown to expect and depend on in a commercial kitchen. Top chefs have established cooking methods and preferences that should not be dismissed. At the same time, emerging technologies will offer features that can improve user experience and productivity. Some of those features include:

1. Self-cleaning capability
2. Safer heating surfaces
3. Small footprint to allow better space utilization
4. Multiple cooking modes
5. Increased automation capabilities with pre-programmed cook times for common recipes allowing for less human intervention
6. Temperature tracking from storage (e.g. freezer/refrigerator) to cooking equipment and service vessel to ensure food safety
7. Minimal use of other resources (such as water and ventilation)

Furthermore, recent decarbonization policy measures that limit or discourage installation of gas appliances are helping to increase the appeal of electric equipment.

MARKET CHALLENGES

Despite advances in electric foodservice equipment, challenges remain. They include the following:

1. Overcoming electrical panel size limitations continues to challenge existing commercial kitchens.
2. People who experienced older equipment such as slow-to-respond electric resistance coil cooktops may have misperceptions that are difficult to overcome.

ADDITIONAL RESOURCES

Energy Star – Commercial Cooking
https://www.energystar.gov/products/commercial_food_service_equipment

Fisher Nickel
https://fishnick.com/

FOR MORE INFORMATION

For more information, contact the EPRI Customer Assistance Center at 800.313.3774 (askepri@epri.com).

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