

What's Cooking? Commercial Building Trends in the Food Services Industry

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ABSTRACT

Restaurants are the most energy intensive commercial building for their square footage, according to the 2003 Commercial Building Energy Consumption Survey. Pacific Gas and Electric Company's (PG&E) Food Service Technology Center (FSTC) works with the food services industry to increase its energy efficiency. This paper will discuss commercial building trends—and what is driving those trends—in the food services industry. The discussion is based on the results of a 2007 strategic assessment of the FSTC.

Introduction

The food services industry consumes roughly 2.5 times more energy per square foot than other commercial buildings (2003 Commercial Building Energy Consumption Survey). PG&E has over 38,000 commercial food services electric and/or gas accounts as identified through North American Industry Classification (NAIC) codes.

PG&E's Food Service Technology Center (FSTC) promotes the adoption of energy efficient equipment and practices in the food service industry through the following activities:

- Development of testing procedures for commercial food service equipment that the American Society for Testing and Materials (ASTM) has adopted.
- Testing and certification of a range of commercial food service equipment including cooking, preparation and refrigeration using existing standards
- Educational outreach to market actors and customers in the form of workshops, seminars, trainings and speaker engagements
- On-site energy surveys and design reviews for PG&E customer facilities
- Dissemination of FSTC research and information through study reports, the FSTC website, the publication of a trade newsletter for food service providers, contribution to trade publications such as Food Equipment Reports, and participation in trade associations
- Support and promotion of PG&E food services equipment deemed incentives for specified energy efficient pieces of equipment

Established by PG&E in 1986, the mission, structure, and activities of the FSTC have evolved over time in response to changing market needs and the regulatory environment. From 1986 to 1994, PG&E directly operated the program as part of its Learning Center kitchen. In 1994, PG&E contracted with Fisher-Nickel Incorporated (F-N) to operate the FSTC. F-N has continued to manage the day-to-day operation of the FSTC and the laboratory and training facilities since then.

Study Overview

The purpose of the 2007 strategic assessment of the FSTC was to assess the effectiveness of the FTSC in achieving its goal of accelerating adoption of efficient equipment and practices in the food services industry and to recommend organizational and managerial changes that increase its performance.

The strategic assessment included secondary data review and primary research to support both an internal process review and external market assessment. Primary research included:

- *25 program design and delivery staff interviews:* 15 PG&E staff including senior managers, Customer Energy Efficiency (CEE) program managers, and account services staff; 5 Fisher-Nickel staff; and 4 staff of other California investor-owned utilities (IOUs) including Southern California Gas Company, Southern California Edison, and San Diego Gas and Electric.
- *30 food service industry market actors interviews:* 5 corporate decision-makers for chain restaurants; 5 industry stakeholders that represent energy efficiency organizations and industry associations; and 20 food services supply chain market actors that included 15 equipment manufacturers and 5 local or regional manufacturers' representatives.
- *153 2006–2007 FSTC food services end-users participant telephone surveys:* 45 training participants, 25 site-survey participants, and 84 rebate participants.
- *84 food services end-users nonparticipant telephone surveys:* 43 multi-facility end-users and 41 single facility end-users that have not received services directly from FSTC.

Key Results

This section presents key results from the strategic assessment. We begin with an overview of the food services industry market actors. We then discuss the overall trends in the industry, the FSTC's impacts on these trends, the role of information in the industry and finally additional identified industry needs.

Market Actor Overview

We first overview two key groups of food services industry market actors, manufacturers and end-users, specifically breaking out national chains, and how they work with the FSTC.

Manufacturers. Food services equipment manufacturers range from large conglomerate manufacturers with products in nearly every food service equipment category to specialty manufacturers in particular niches. Many of the interviewees specifically target chains, rather than other segments of the market. All manufacturers sell nationally and some have extensive international presence. The manufacturers' representatives interviewed ranged from those that represent multiple lines of equipment to those that specialize in just one.

The amount of time the manufacturer respondents have worked with the FSTC varied widely. Some have worked in various capacities with the FSTC since its inception or from the early 1990s, whereas others began working with the FSTC in the last 2–7 years. The vast majority of the interviewees said they chose to work with the FSTC because of their reputation and ability to provide independent third party testing and validation. Sometimes this was directly

at the request of a large client (such as large grocery store chain). Other times it was to confirm design and performance claims. Other reasons interviewees gave for choosing to work with the FSTC include that respondents felt the FSTC staff was very knowledgeable about their particular niche, their technical advice was always useful, and the FSTC sees the industry trends and knows where the market is going 5 years hence. Some respondents feel that if they did not work with the FSTC, their competitiveness would be significantly handicapped.

National chains. All of the national chains interviewed have corporate design staff who play an essential role in guiding energy efficiency within their companies. The interviewed national chains vary in the extent to which they use in-house architects and food equipment specialists versus external contractors, although all of the chains use a mix of internal and external staff. Some have large internal teams that do all of the design and specification on everything in the building. They only contract out the actual construction documents to external contractors to manage at the local level. Another fast food chain, on the opposite end of the spectrum, has no internal architects. Some chains were in the middle of the spectrum with small internal teams. Those with smaller internal staff resources said they have come to rely on FSTC's expertise to supplement their staff.

National chain interviewees asserted that in order to make national chains pay attention to energy efficiency, a strong, in-house proponent of energy efficiency is needed. Several interviewees felt that the key is to have internal staff at the corporate level committed to pushing efficiency forward. And in this role, the FSTC has been essential. According to interviewees, the FSTC data and resources help national chain corporate staff get higher efficiency and better equipment. Three of the five interviewees said they face an internal struggle of initial cost versus the long-term cost of the equipment.

Four of the five interviewed restaurant chains do equipment specification at the national level in order to take advantage of economies of scale in purchasing. A fast food chain was the only interviewee that differed from this practice. This fast food chain instead works with manufacturers to develop equipment options. This fast food chain's corporate management has several approved pieces of equipment that franchisees can then pick from to meet specifications. It was reported there is resistance to dropping less efficient pieces from the qualifying list. The interviewee felt that the higher initial cost of more efficient pieces was the main reason that less efficient pieces remained on the list of qualifying equipment.

Another major issue for the chain restaurant operations is corporate restaurants versus franchisees. Corporate chain restaurants are under corporate management. Franchisees have more independent operation and management of stores although "branding" is consistent. The amount of independence allowed franchisees varies among chains, however. In general, franchisees do not have to use the corporate equipment specifications, just the recipe specifications. But they are encouraged to use the equipment specifications and there is also an advantage for franchisees since they can benefit from bulk purchasing discounts. The final say is normally up to the individual franchisee.

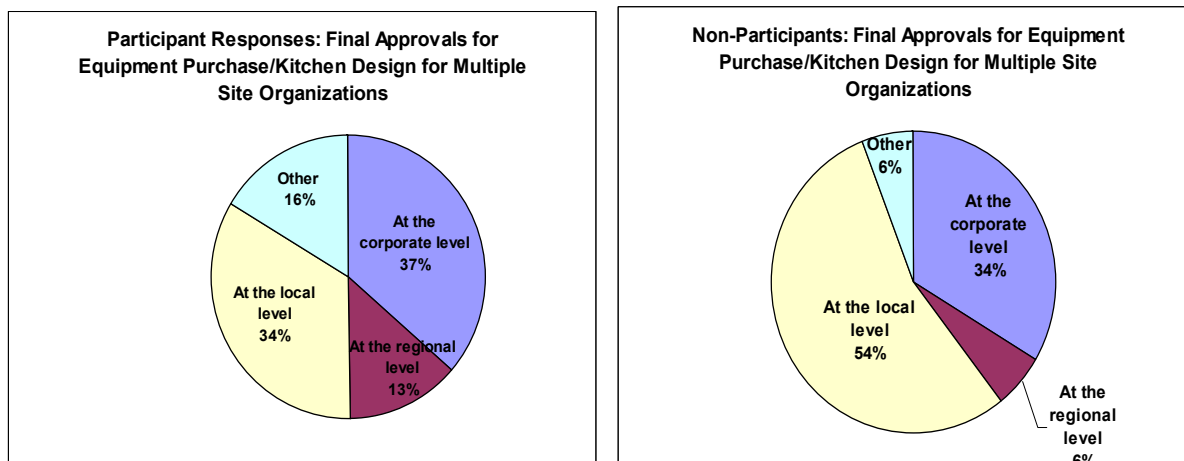
Corporate staff report their role in working with the franchisees is to "*help set the franchisees up to succeed.*" This involves looking at energy efficiency equipment performance, comfort, repair, and maintenance so they have the best product. Corporate staff report most franchisees follow their design recommendations.

End-Users. The customer surveys indicate that about a quarter of PG&E end-users (28 percent of the participant and 28 percent of the nonparticipant respondents) are part of organizations that have multiple locations. Independently owned restaurants are the most represented type of participant. Independent end-users represent half of all interviewed participants. They also are the largest part of the nonparticipant survey respondents suggesting that independents are in fact a substantial part of PG&E’s food services end-users.

Although a range of organizations are represented, full-service sit down restaurants are the most represented type of end-user organization among FSTC participants. This is also the case among the nonparticipant population. The reason there are not more limited service or fast food restaurants among the nonparticipants is because small energy users (less than 50,000 kWh and 5,000 therms) were eliminated from the nonparticipant sample in order to focus on end-users with greater energy savings potential. Small customers have high savings potential collectively, but it is difficult to directly interact with each individual customer with a program like FSTC. The strategic assessment was looking for greater cost-effective savings potential. PG&E’s Mass Market program does outreach to smaller customers. The FSTC is a resource to them through the Mass Market program.

End-users final approvals for equipment are just as likely to be made at the local level as the national or corporate level. For those with multiple sites, the participant and nonparticipant were asked: “Where is the final approval made for purchase of food service equipment or new construction kitchen design?” The non-participants with multiple sites were more likely (over half) to work for organizations with decision-makers at the local level. About one-third of the participants and the non-participants said decisions were made at the corporate level, which may or may not be in California.

Figure 1. Decision-Making Responsibility for Organizations with Multiple Sites



The majority (more than two-thirds) of those program participants who make decisions for multiple locations feel the equipment or kitchen designs they make decisions for in California are more energy-efficient than for their locations outside of California. The nonparticipants were more likely (over 90 percent) to say there was no difference in the energy-efficiency of the equipment or kitchen designs they make decisions for in California compared to their locations outside of California.

The survey results suggest some spillover in that decision-makers who purchased equipment based on participation in FSTC activities made improvements outside of PG&E

service area—53 percent made improvements in California and 39 percent outside of California. These results are based on those with multiple locations who have purchased/specified new equipment since interacting with the FSTC.

Overall Trends

All market actors discussed the growing attention to energy use in the food services sectors. Industry interviewees report there has been a tremendous change in the food services industry—“*a greening of the industry.*”

All market actors discussed that having a platform—a common language—on which to share and compare information has helped move the market toward efficiency. They discussed the FSTC’s role in developing a common language by establishing testing standards and providing equipment testing results that allows end-users to compare equipment in terms of performance and efficiency.

It was reported that ASTM test methods are now close to standard practice in the industry. Most manufacturers report they now use ASTM test methods. There is also considerable awareness and use of ASTM test methods when making equipment purchases, especially by multi-facility establishments.

Prior to the FSTC’s efforts, there were no ASTM test methods for food services equipment. The FSTC’s aims and functions have evolved over the 20 years it has been in operation. The main objectives of its first five years (1986 to 1991) were to develop good services equipment test methods for PG&E’s Research and Development (R&D) Department. It took FSTC those 5 years to get two – griddle and fryers – equipment testing methods ratified. After 10 years, the FSTC had 10 test methods established by 1996. Now there are over 20 pieces of food services equipment with ratified ASTM test methods as a result of FSTC efforts.

Manufacturers. Virtually all the manufacturer respondents said that their product lines have changed and become more efficient over the past five years.

For some this was an evolutionary change as they are constantly improving products. For others this was due in large part to the FSTC equipment testing and the development of ENERGY STAR standards that changed the competitive landscape in specific product categories.

Manufacturers report their marketing is changing with the times too. Some have rolled out new lines touting their efficiency and performance up front, while others have focused on promoting their line of ENERGY STAR approved products with supporting ENERGY STAR materials.

National chains. The majority of the national chains interviewed for the study report that, as a result of working with the FSTC, they have more efficient cooking equipment. All of the interviewed chains report that they have worked with the FSTC to either develop or specify more efficient equipment across all cooking equipment categories.

Manufacturers report that interest in “green” construction (new and retrofit) seems to be increasing, particularly among chains. They believe food services is beginning to recognize the importance of not just the efficiency of kitchen equipment but how better restaurant design and a more efficient envelope can reduce operating costs.

The national chain interviews for the most part confirm these manufacturer reports. All of the national chains report that their internal attention to energy has really increased in the last five years or so. They attribute this to rising energy prices and an increasing awareness of social responsibility as well as efforts of organizations such as the FSTC. Two of the interviewees said that being as energy efficient as possible is now their corporate philosophy.

Manufacturers report the ease with which energy efficient equipment is specified or sold varies depending on the customer. For some end-users, it is a very easy sell because of their niche or as part of an overall society-wide awareness that they tap into. For others, it is more difficult due to change coming hard in the industry or to the organizational and reward structure of companies (purchasing managers vs. facility managers and operations specialists) that run counter to efficiency goals. Finally, others suggested that the culprits are the structure of the food service market with buying groups' "cheaper by the dozen" mentality, and the complex puzzle of combining equipment performance and efficiency with skilled labor, training and restaurant design for outfitting a kitchen.

Three of the five national chains said they are beginning to look at the building shell, but it is still not at the forefront of their thinking. Only one national chain reports they use high efficient HVAC and lighting, but they still need improvement in this area. They report they mainly work with their HVAC and lighting manufacturers—the FSTC to-date has not been a major source of information on building shell for them. Another chain is working with the FSTC now on a store that has make-up air to integrate the shell with the equipment. They will 'test' how it goes with this case and if they will do it again.

Most manufacturers believe the PG&E food services rebates address the primary barrier—price sensitivity—to increased purchase and use of energy efficient equipment. National chains discussed that for corporate stores the PG&E rebates have limited impact. This is because they make national specifications and it would not be cost-effective for them to try and tailor their equipment specifications based on rebates at a regional level. In addition, they discussed that the most important thing is consistency in their equipment because it is set up for consistency in their recipes. They said, however, that rebates could have an impact by influencing their national specifications at the design stage.

FSTC impacts on end-users' practices. Participant end-user results indicate the FSTC is impacting end-users' cooking, lighting and ventilation equipment the most. The FSTC is having less impact in HVAC and water heating equipment.

Forty percent of participants reported they used FSTC resources to make energy changes at their facility or are planning to make changes within the next year. Respondents reported a wide range of how they used what they learned from the FSTC. Reported changes include:

- Changed cooks' habits toward energy use
- Are more aware of energy use
- Specify efficient equipment
- Use energy efficient lighting
- Have more a more energy-efficient facility and in some cases pursuing LEED certification
- Monitor energy use at facility
- Calculate life cycle costs or use cost calculators
- Specify ENERGY STAR eligible equipment

- Specify efficient processes
- Use demand ventilation for energy savings
- Use timers and controls
- Turn off appliances when can

Participants who reported making a specific change as a result of the FSTC were asked if the change involved more efficient equipment, more efficient processes, or both. The largest percentage reported using FSTC resources to purchase more efficient kitchen equipment, but a quarter reported purchasing both more efficient equipment and changing their processes to use less energy.

Participant end-users were asked what types of equipment they had purchased since interacting with the FSTC and the efficiency level of the purchased equipment (Table 1). If participants purchased above-standard efficiency equipment, they were asked the FSTC’s influence on their decision to buy energy efficient equipment. The results indicate the FSTC is impacting end-users’ lighting and cooking equipment the most. It has also been influential in refrigeration and ventilation. The FSTC appears to be having little to no impact in HVAC. The FSTC was also not very influential in increasing the efficiency of water heating equipment purchased.

Table 1. Equipment Purchased since FSTC Interaction by FSTC Participants (n=137)

Type of Equipment	Have Purchased Equipment Since Interacted with FSTC	Reported above average efficiency level of purchased equipment	Reported very high efficiency level of purchased equipment	Mean of influence from resources at the Center*
Cooking equipment	34%	45%	39%	8.0
Refrigeration equipment	32%	32%	54%	6.5
Ventilation equipment	22%	62%	38%	7.2
Lighting equipment	27%	41%	52%	9.1
Heating and air conditioning equipment	6%	67%	33%	1.0
Water heating equipment	20%	32%	68%	6.1

* (1=“not at all influential”, 10=“very influential”). Source: 2006–2007 participant end-user survey

The above results are strengthened by another survey question. Participant end-users were asked which types of information they learned about from FSTC. Over half of participants reported learning about cooking, refrigeration, lighting, and ventilation equipment. Significantly fewer participants reported learning about HVAC and water heating equipment.

National efforts. A prominent theme across all of the market actor interviews is that the FSTC is resulting in national benefits to the food services industry. While market actors discussed that they do think California is the leader in food services energy efficiency at least in some part as a

result of the FSTC, interviewees discussed several national efforts that are increasing the efficiency of the food services industry. These include:

- *ASHRAE codes for food services.* Several market actors discussed that there would be no ASHRAE codes without the FSTC. One industry market actor estimated that 80 percent of the technical resources to develop the specifications for food services are provided by FSTC.
- *ENERGY STAR food services equipment.* Manufacturers identified ENERGY STAR as an extremely valuable national sales tool for them. In addition, FSTC developed the ENERGY STAR best practices tools (on the ENERGY STAR website) for quick service restaurants and full-service restaurants.
- *Recent federal and state changes in codes and standards.* Recent changes in federal standards will mandate levels of food services equipment performance. These include refrigeration and ice-makers in 2010. California's Title 20/24 has also raised the bar for efficiency of base-line performance of food services equipment such as hot food holding cabinets.
- *The national CEE Commercial Kitchen Initiative.* In 2006, the Consortium for Energy Efficiency (CEE) expanded their Commercial Refrigeration Initiative to the Commercial Kitchen Initiative, a suite of cooking and sanitary equipment offerings to combine electric, gas and water savings. The FSTC has provided considerable research and advice to support this effort. PG&E is a member of CEE.
- *The Electric Foodservices Council.* The Council provides a collaborative opportunity for its member electric utilities throughout the US to work with the chain restaurants on efficiency. To support this work, they conduct modified ASTM testing. They report the FSTC laid the necessary foundation for doing this testing.
- *Technical assistance for NAFEM.* The FSTC is part of the National Association of Food Equipment Manufacturers (NAFEM) technical liaison committee. This group is solely responsible for communicating technology updates on equipment to NAFEM members. The FSTC provides an independent third-party perspective to the committee.
- *Food services equipment rebates.* All market actors recognized that California is taking the leadership role in food services rebates. Other utilities throughout the nation are beginning to roll out food services equipment rebates following California's example. These include energy efficiency programs in Wisconsin, Oregon, Washington, New York and Illinois.
- *LEED certification.* FSTC staff sit on the U.S. Green Buildings Council LEED subcommittee that is looking at certification to make sure that they understand how food services is a different entity. In addition, the FSTC is actively helping a food to-order chain become the first ever LEED certified "restaurant." In other words, the LEED certification will take into account the kitchen operations, which have previously been ignored. This will pave the way for other restaurants to become LEED certified.
- www.fishnick.com The FSTC maintains a clearinghouse of information on their website. The data on website users indicates that the food service industry in general benefits from the information. About two-thirds of the website users are based outside of California.

Energy Efficiency Information

Market actors stated that the FSTC is a leading provider of information on food services equipment and processes to the industry. However, the FSTC is not the primary source of information end-users turn to, except for key national chains. This indicates the importance of other market actors in disseminating energy efficiency information to end-users.

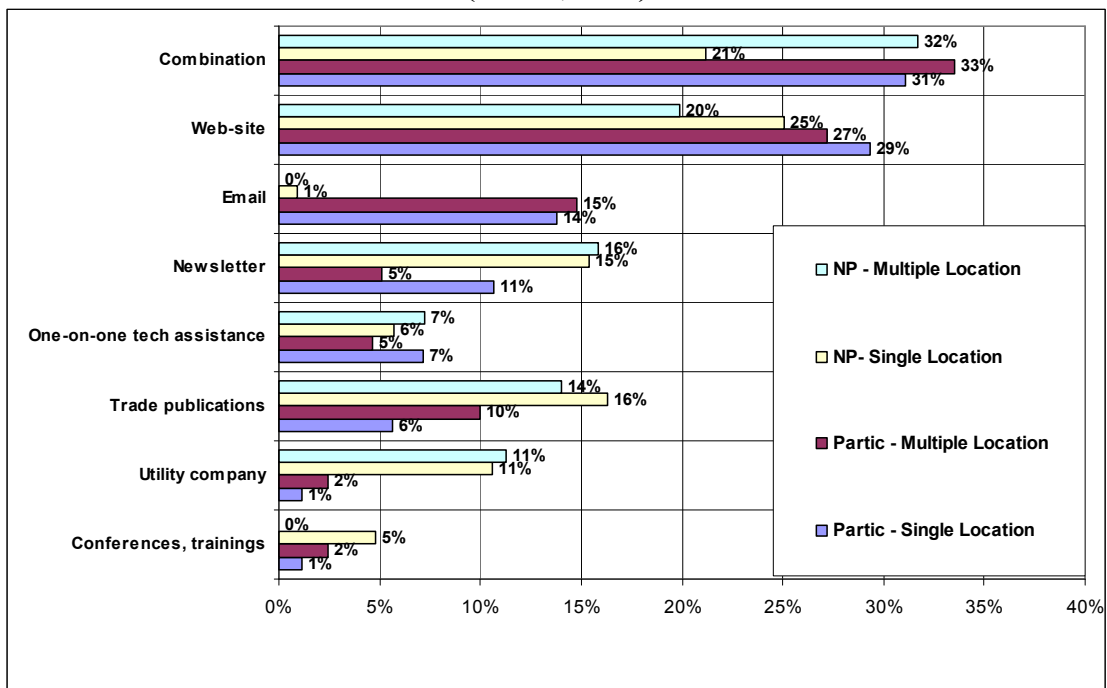
FSTC training activities and the website are the primary venues for information dissemination. The evaluation results indicate these are the two best venues to primarily pursue for information dissemination although others are also important. FSTC information is viewed as objective and fair.

The customer survey indicates there are energy savings resulting from information dissemination for FSTC participants. However, PG&E's food services end-users' lack of awareness of the FSTC is most likely limiting the extent of energy savings impacts of the FSTC's information dissemination.

Primary source of energy efficiency information. The customer survey results show that end-users, especially nonparticipants, are primarily turning to manufacturers and suppliers, the Internet, and trade publications for information about kitchen design or purchasing kitchen equipment to maximize energy efficiency.

The customer survey indicates that the mix of information dissemination is important. The most preferred way to receive information is a 'combination' of sources that include the Internet, manufacturers, trainings, technical assistance, etc. The Internet is the second most preferred way of gaining energy efficiency information for end-users (Figure 2).

Figure 2. How Do You Most Prefer to Get Information About High Efficiency Kitchen Equipment or Design?
(P=153,P=84)



Nonparticipant end-users appear less “plugged-in” than participant end-users. Significantly fewer nonparticipant end-users said their preferred way to get equipment or design information is the Internet or email, and significantly more preferred to get equipment or design information from trade publications, the utility or newsletters. Nonparticipants are similar to participants in terms of business types. However, participants include some kitchen designers and A&E firms that make decisions for food services end-users. This may account for part of the difference in being “plugged in.”

Equipment testing information. Industry and national chain market actors reported extensive use of the FSTC equipment testing results. The FSTC equipment testing plays a critical role for both industry and national chains in providing objective, third party verification.

National chains discussed the largest direct benefit of the information from FSTC equipment testing is the ability to compare food services equipment on performance. They can then use this comparative information to purchase the best equipment. According to interviewees, this was not possible before the FSTC’s work in equipment testing and performance standards.

“The FSTC’s equipment testing has been beneficial to the whole industry. It allows us to rack ‘em and stack ‘em for comparison purposes. No one else is doing this in the industry.”
—National Chain

Several industry and national chain market actors discussed that, in food services, manufacturer testing procedures are newer and historically have not been stringent. Therefore, there is more of a need for third party verification than in other industries with more established practices. Manufacturers report they use the FSTC to improve and/or validate design and efficiency claims.

Energy savings. In terms of energy savings resulting from the FSTC’s information dissemination, staff interviewees note that the food services industry accounts for at least 10 percent of PG&E’s revenue. But it is a difficult industry to move toward energy efficiency because of first costs, fragmentation, and a culture that tends to be slow adopters. Several staff interviewees believe that the FSTC’s information dissemination has raised the level of energy and water efficiency of food services equipment.

FSTC staff estimate 90 percent of manufacturers know about and use FSTC’s information. Market actor interviews confirm these reports. All contacted manufacturers, suppliers and industry stakeholders are very familiar with the FSTC. Virtually all the manufacturer respondents said that their product lines have changed and become more efficient over the past five years as discussed above. Staff and market actor interviewees discussed that much of this is a result of the FSTC working upstream with market actors to change their production based on FSTC equipment testing results. Staff and market actor interviews also reported that the FSTC was primarily responsible for the transformation of certain technologies.

The customer survey indicates there are energy savings resulting from information dissemination for FSTC participants. The majority of training participants said they used FSTC resources to learn more about energy efficiency equipment. Of those, about half then used FSTC resources to make energy efficient improvements. Approximately half of site survey participants said they used FSTC resources to learn more about energy efficient equipment, and of those, sixty percent used the resources to make energy efficient improvements.

Industry Needs

Market actor interviewees suggested the following technology or equipment related activities to better meet industry needs:

- Expand technologies reviewed by FSTC (filter performance testing, ‘grab-n-go’ units). This could result in increase California rebates to other equipment categories (ventilation systems, new energy efficient broiler).
- Expand ENERGY STAR categories for cooking equipment.
- Work more closely with ASHRAE to develop and promulgate standards for more cooking equipment.
- Increase technical assistance.
- Take a more holistic approach—expand beyond efficiency to look at other impacts such as water savings and public health, sanitation and maintenance concerns in the industry .
- Lobby to tighten existing standards to have sufficient “teeth” to make them worthwhile (e.g., California Energy Commission refrigeration standards) or to prevent the sale of sub-standard equipment (e.g., stoves).

National chains identified their biggest technology need is hot water. Without hot water, restaurants have to shut down. Therefore, while they are interested in getting efficient hot water, reliability is paramount. All of the national chains said they are watching FSTC’s efforts in this area closely and two of them are working with the FSTC on a hot water study.

National chains also identified that they would like to have more help from the FSTC on building material efficiency. In general, they report that the FSTC has helped them a great deal with equipment, but not sealing system and building shell issues. National chains also discussed that they could use more assistance with mechanical systems.

One national chain and one industry interviewee said they think the industry’s biggest need is the ability to accurately and effectively model the energy usage in kitchens. These interviewees discussed HVAC-proprietary models and DOE models that are about the shell (heating and cooling, insulation/glazing), but not about the kitchen processes (e.g., cooking, hot water and refrigeration processes). It is reported that in the food services industry, the shell is 40 percent and the kitchen is 60 percent of energy consumption.

Staff and market actor interviews raised the need for a more turn-key approach to end-user technical assistance. The customer survey explored this identified need. The majority of participant and nonparticipant end-users are somewhat or very interested in receiving this type of technical assistance. Single locations are particularly interested in this option as approximately a third of both participant and nonparticipant single locations said they were very interested in this type of assistance.

Most manufacturers feel that while the FSTC is changing the industry positively, in reality the end-user operator still is largely unaware of the benefits of efficient equipment and additional critical information, such as regular maintenance, is key to ensuring the longevity and optimal performance of efficient equipment. They report the lack of that critical information can quickly negate any efficiency gains made.

Conclusion

Interviewees report the FSTC's activities have the market primed for energy efficiency gains. They want PG&E to be able to capture and receive credit for these impending energy savings. At the same time, several industry interviewees discussed that while they believe in the FSTC's impacts, they are difficult to quantify. They said in large part this is because there is so much they do "behind the scenes." Examples of this kind of "behind the scenes" work include equipment testing, working with manufacturers, contributing to publications, and providing education.

PG&E is capturing energy savings now for rebated food services equipment. However, there is no follow-up to site surveys or training to see what customers implement on their own as a result of these FSTC activities. The primary question for follow-up to these activities reported by interviewees is "*What impacts is it having on the decision-making process of the customer?*"

Another identified issue with measuring the energy savings is that there is currently not a baseload case for food services. The FSTC will need to establish a baseload case in order to quantify energy savings according to several interviewees.

Incorporating energy savings as a program metric also raises the question of who the FSTC should target to best capture energy savings. While it is important to equitably serve PG&E customers, the question is raised if the FSTC should target chains more to multiply the effects of FSTC activities and give them greater touch. On the other hand, the end-user survey indicates a large percentage of PG&E end-users are independents. As discussed earlier, the Food Service market is difficult to transform by working strictly with the end-users. The FSTC is effectively addressing this issue by interacting with all parts of the supply chain and initiating changes at multiple levels within the supply chain (manufacturers, designers, etc.) where they can have a broader impact to push energy efficiency technologies and behaviors. But there is still work to be done to get customers to pull energy efficiency technologies and behaviors. There is evidence that FSTC's work on a national level with CEE and other organization has assisted in addressing several of these issues and brought them to focus on a national scale.

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