

optimized to peaks and valleys at each specific location. Even minor adjustments can have a dramatic impact on profitability.

And with food preparation making up one-third of a restaurant's energy costs, the energy savings potential alone could provide a rapid return on investment for the cost of connected kitchen equipment. A chain that installs this energy-efficient footprint also enhances its brand by appealing to today's sustainable-minded consumers.

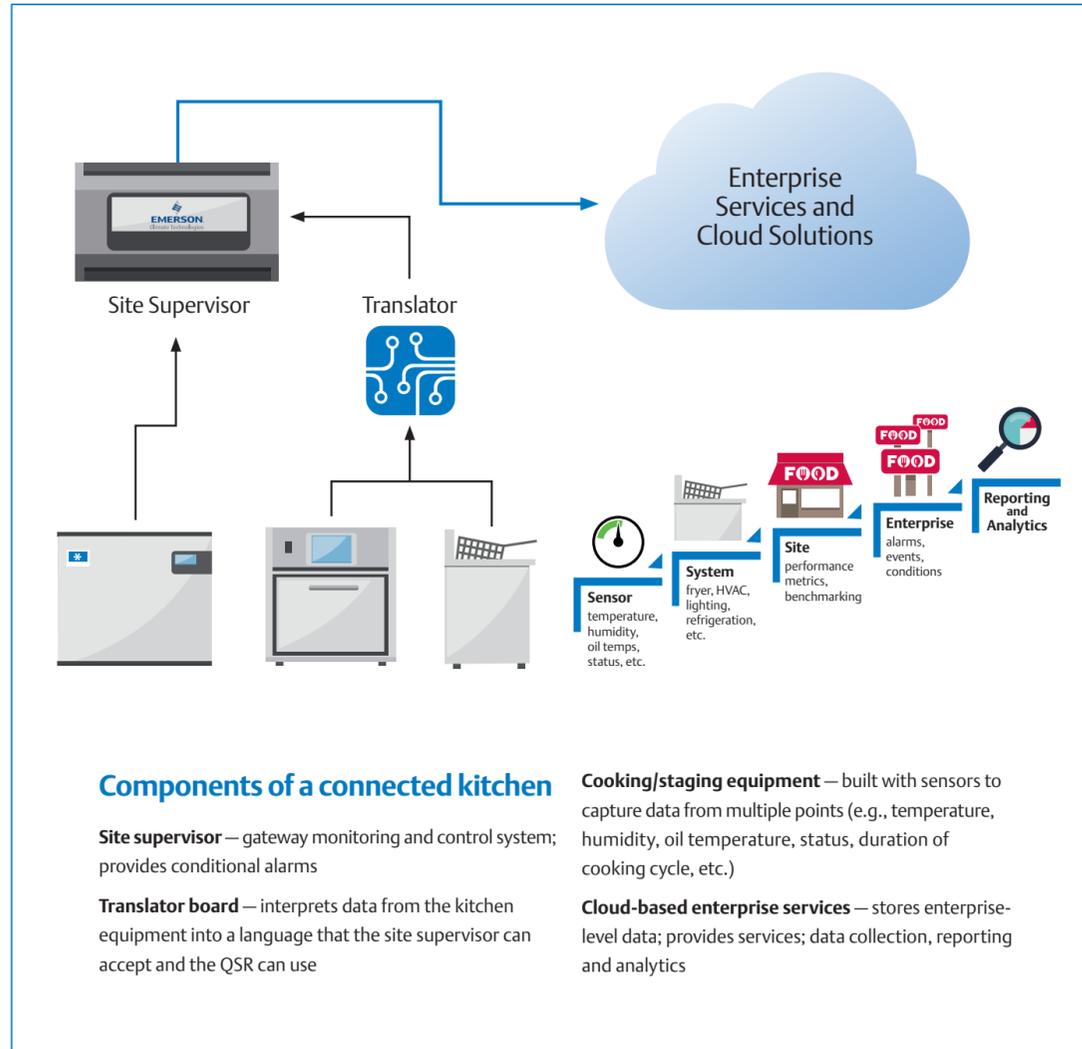
What will you do with your data?

The value of a connected kitchen should be measured on the degree to which chains can leverage the data being captured and transmitted. If you're considering moving to a connected kitchen architecture, there are several important questions to ask.

If your devices could communicate, will they have data that's worth the effort? More importantly, can someone take action on the knowledge gained? Will your IT group be involved? Finally, do you have the

in-store real estate to make room for new equipment? The point is: there are many factors to consider before making the switch.

Whether it's energy savings, operational improvements, improved food quality or brand protection, there are many compelling reasons to install a connected kitchen. And, as leading QSR market OEMs integrate this technology into their equipment and systems, the foodservice industry will likely begin to see wider adoption in the coming years. 🌐



The Case for Connected Kitchens in Foodservice

How technology is enabling restaurants to succeed

Paul Hepperla, Director of New Solutions Development and Enterprise Product Management for Emerson Climate Technologies, explains the emerging trend of kitchen connectivity.



We've all had experiences at fast food or quick service restaurants (QSR) that left a bad taste in our mouths. Maybe the fries were cold, or they tasted like strips of cardboard. The ice cream was more cream than ice. The chicken sandwich was overcooked, or worse, raw. Or, you found yourself staring at the same old menu options that you've seen for what seems like years.

All of these problems can be directly attributed to issues in the food factory, or the equipment and personnel that makes up the food assembly line. In today's competitive foodservice environment, QSRs are only as good as the last meal they've served. It only takes a few of these negative experiences to tarnish a brand's reputation in a consumer's eye. And there are enough options to make it all too easy to permanently avoid a particular establishment (or even franchise) altogether.

What's really at stake in foodservice is the QSR brand's reputation. Today's consumer is increasingly food conscious and more discriminating about their dining choices. Fast casual restaurants that offer fresher, healthier menus continue to gain more market share, while fast food restaurants scramble to tap into their trendier sensibilities. Utilizing technology in a connected kitchen can help both segments achieve their goals.

Already connected in food retail

Connected, communicating kitchens is a relatively new concept in foodservice. In other industries, such as supermarkets, connected equipment and related technologies have been embraced for more than a decade as a means to optimize facility operations.

This technology is often referred to as the Internet of Things (IoT) because it combines machine to machine (M2M) connectivity with Internet and/or cloud services to store enterprise data and leverage that data for analytics. It often

relies on a supervisory system controller as the "brain" that monitors and controls nearly every aspect of a supermarket's operational infrastructure.

Those who have embraced this technology in food retail have reaped its many benefits, including:

- Reducing HVAC, refrigeration and lighting energy costs
- Limiting equipment downtime through preventative maintenance
- Predicting equipment replacement to allow for planned capital expenditures

With these proven results, it's clear that the technology is available to make the concept of connected kitchens a reality. However, most foodservice retailers are doubtful of its feasibility or unaware of its vast potential to help them gain a competitive edge.

Consumer, industry trends drive wider adoption

Changing market conditions in the foodservice industry are helping to build a compelling case for connected kitchens. To start with, 35 percent of total energy consumption in a QSR is directly attributed

to food preparation, representing the largest factor contributing to overall energy usage in a restaurant:

- 35% Food preparation
- 28% HVAC
- 18% Sanitation
- 13% Lighting
- 6% Refrigeration

Restaurant chains can no longer afford to ignore the opportunity to improve energy efficiencies in food preparation.

Perhaps more importantly, consumer demand for healthier, fresher and a greater

variety of food options is forcing QSRs to retool their menu options. To respond to this demand, restaurants will need a much more effective method of rolling out new menu options, especially across a large number of locations. And, they will need ways to ensure that product consistency and food quality don't become casualties of these expanded menu options.

But here's the reality: traditional food factories are currently not equipped to quickly respond to menu changes and expansions. In most QSRs, menu changes take place approximately every six months; and the average cost per change

is \$40,000. Compare that fact to a connected kitchen that can roll out changes across entire regions or districts in near real time — and do so with greater accuracy with feedback on success or failure (see inset) — you can see its transformative potential.

To make this scenario a reality, food-service equipment manufacturers are now integrating controls into their systems. Multi-purpose ovens, grills, fryers, holding stations and the like are all being designed with M2M and IoT connectivity in mind. The ultimate goal is to capture data points from nearly every piece of equipment in the restaurant.

A single-site gateway controller, such as Emerson's ecoSYS supervisory system, provides enterprise-level monitoring of the restaurant and its building systems. This data can be accessed remotely to provide managers with real-time energy and operational analysis, including how food preparation equipment is being used.

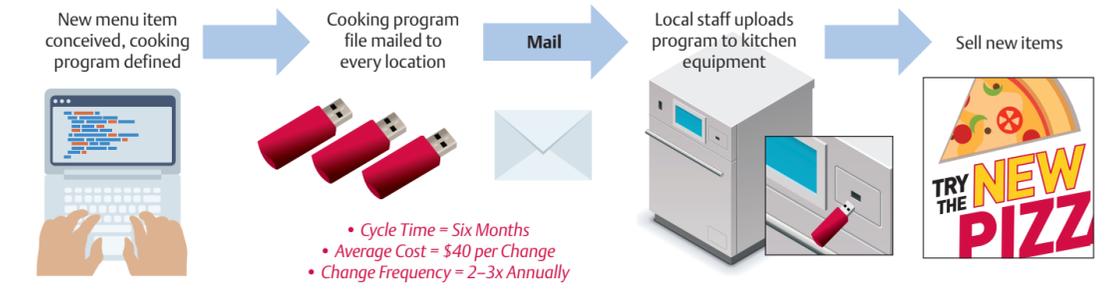
Ushering in a new era of connectivity in commercial kitchens will pose some implementation challenges. First, there's the question of kitchen density — connected equipment must be able to accomplish more within existing space without infringing on the customer experience. Second, the technology must be nimble enough to be deployed without requiring burdensome supporting IT systems. Third, because of the franchisor/franchisee relationship, the offering must be flexible to meet varying requirements.

Ensuring food integrity is the most essential component to preserving consumer loyalty and the brand's reputation. Maintaining compliance with HACCP (hazard analysis and critical control points) food safety methodologies ensures the highest level of quality expected by today's consumers.

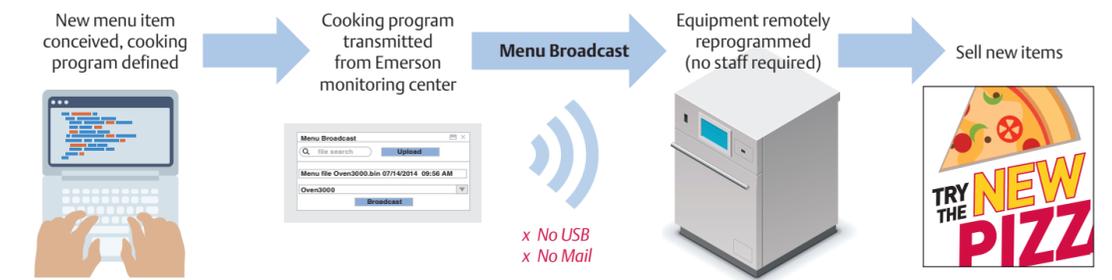
For employees manning the food factory, connected kitchen technology utilizes touch-screen device interfaces similar to the ones used in today's

Menu broadcast: Moves changes from months to minutes

Traditional Way



Connected Kitchen



connected mobile devices. Even so, training will be required to establish familiarity with the new equipment and repeatability in food factory.

Connecting buildings and kitchens to maximize quality and profitability

In a connected restaurant, communicating kitchen equipment and building systems can be monitored and controlled to achieve optimal operating conditions. Information from each data point is aggregated and stored in the cloud where it can be accessed for detailed analytics and reporting. Operations managers can use this data for three primary objectives:

- Preventive maintenance
- Planned expenditures
- Predictive modeling

From a day-to-day standpoint, operations and store managers can rely on the site supervisor to monitor and control HVAC, refrigeration and lighting. Not only do systems send out automated alerts upon detecting "out of tolerance" conditions, they reduce the cost of unplanned service calls. Connectivity also enables precise energy monitoring and implementation of specific demand response and energy-reduction practices.

In communicating kitchens, equipment data points can be used to closely monitor what matters most to the consumer: food quality and consistency. This data can reveal a variety of information that impacts food quality and perception of the brand, including:

- Ovens/grills usage — helps to plan for demand/peak cycles

• Unusual cooking cycles (adding 30–45 seconds) — indicates deviations in menu programming

• Cleaning schedule — reveals when the equipment condition may be affecting food quality

The connected kitchen also ensures menu quality and restaurant uptime by preventing critical points of failure in ovens, holding tables and heated landing pads. And to ensure safety, it even provides HACCP monitoring.

Of course, the ability to broadcast menus over the Internet in real time would open up a new era of unprecedented menu flexibility.

Restaurant chains can utilize operational and equipment use data to make consumption plans that are

Inside the "Connected" Food Factory

Speed without sacrificing quality

To meet customer expectations, casual restaurants and QSRs often deploy an assembly line approach to food preparation. In a perfect world, order fulfillment would take no longer than 45 seconds.

Consistent productivity requires seamless coordination among employees and equipment to ensure repeatability, consistency, flow between stations, and uptime of the equipment like holding cabinets and ovens.

To facilitate efficient food assembly, connected food factories are designed to provide simultaneous monitoring of multiple equipment data points. Requirements of a connected kitchen in a fast food factory include:

- Deploy equipment and menu options quickly
- Monitor and manage equipment usage and status for maximum food quality
- Transmit new cooking programs/menu items with minimal disruption

Menu broadcast and programming flexibility

Today, the process of making menu changes is time consuming and costly. Once the corporate office has created a new item, the cooking program is loaded onto USB drives and mailed to each location. The restaurant's management staff then manually uploads the program to the affected kitchen equipment and trains the food assembly crew. The process can take months, and many times there's no way to ensure proper implementation of the menu change.

In the connected kitchen model, the new menu item (and its associated cooking program) can be broadcasted and uploaded digitally to each location. Kitchen equipment is remotely reprogrammed (no staff is required), and the menu item can potentially be made available to customers in the same day.



**45
SECONDS
for order
fulfillment**

