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It's Not Easy Being Green
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The Golden State urges its restaurant industry toward a more sustainable future

Californian restaurants use about 5 to 7 times more energy per square foot than other commercial buildings, according to the California Energy Star program. This figure is driven by refrigeration, kitchen appliances, lighting and HVAC and creates a very high demand on the electricity grid in North America.

According to Assembly Bill 32 in California, by 2020 the Golden State aims to reduce its energy consumption, and in turn its greenhouse gas emissions, to the same levels they were in 1990. To meet this goal, California will need to reduce its greenhouse gas emissions from 456 million metric tons of carbon dioxide or equivalent (MMTCO2e) down to 431 MMTCO2e in the next five years.

Getting Started
The California Energy Commission's energy efficiency standards are put in place to conserve electricity and natural gas. To avoid building new power plants to support demand, California will reduce the demand on the grid using measures laid out in Title 24, Part 6 of the California Code of Regulations.

For example, the 2013 Building Energy Efficiency Standards focus on several key areas to improve the energy efficiency of newly constructed buildings, additions and alterations to existing buildings. They establish a minimum level of building energy efficiency that residential and commercial buildings must meet in lighting controls, windows and HVAC equipment. Developers and restaurant managers in California are responsible for including Title 24-compliant devices when planning upcoming developments, renovations or improvements.

Smarter Temperature Control
In addition to new construction standards, Title 24 also includes requirements for smarter temperature control. During peak hours, the demand for electricity is higher than usual and can overtax the electric grid, which can lead to power outages and costly repairs. Utility providers want to proactively prevent outages and are implementing demand/response events to reduce the energy consumption of everyday appliances. They do this by asking facility managers and owners to reduce the temperature set point in a commercial or residential building.

Among the mandatory requirements for space conditioning equipment is to install smart thermostats. These occupant controlled smart thermostats (OCSTs) must be self-certified by the manufacturer to the Energy Commission and meet the requirements described in Reference Joint Appendix JA5.

OCSTs are thermostats that are controlled by the occupant and have setback capabilities. They can be programmed to create a temperature setback or set forward when the building is unoccupied. For example, the thermostat is set to reduce the temperature set point when the restaurant is not occupied to eliminate wasteful climate control.

In addition to having a programmed schedule, OCSTs must support communication capabilities to automate the demand reduction on the grid. These capabilities must enable demand responsive control by receiving and responding to demand response signals. The communication interface for these requirements consists of two components. The first is physical communication, and the second is logical communication (a messaging format).

Physical communication includes a one- or two-way communication interface enabled by either built-in communication hardware or an expansion slot on the OCST. The energy commission recommends using known communication standards Wi-Fi (IEEE 802.11) or ZigBee (IEEE 802.15.4)

Logical communication interface specifies the messaging format for messages sent to the OCST. The energy commission recommends using standards-based messaging protocol such as Open Automated Demand Response (OpenADR).

OpenADR supports HTTP messaging protocol, which works over Wi-Fi. It provides a standard interface that enables utility providers to send messages to the OCST during times when demand is high, and grid reliability is low. So, utilities are able to automatically adjust the temperature settings of all participating thermostats across California to significantly reduce the strain on the grid and, as a result, energy consumption and greenhouse gas emissions.

JA5 also mandates that OCSTs have a user display and interface. That is, restaurant owners will be notified when such events are in progress, so as not to impact business. Restaurant owners will always have the ability to override these events so as never to inconvenience business or compromise the comfort of patrons and employees.

Standards such as Title 24 are among the most cost-effective methods for California to conserve energy and reduce the demand on the electricity gird during peak hours. Reducing the demand on the grid will decrease greenhouse gas emissions and increase the availability and reliability of energy to the entire state. Restaurant patrons will be among those benefiting from Title 24; they will be comfortable, and restaurants will benefit from energy savings and reduced environmental impact.

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