GEW54-14
202, 604.1, 604.2, 604.3, 604.3.1 (New), 604.4, 611.3.3.5 (New)

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Add new definition(s) as follows:

DEMAND RESPONSE PERIOD: A period of time during which electricity or other fuel loads are modified in response to a demand response signal.

DEMAND RESPONSE SIGNAL: A signal sent by the local utility, independent system operator (ISO), or designated curtailment service provider or aggregator, to a customer, indicating a price or a request to modify electricity consumption, for a limited time period.

DEMAND RESPONSE ZONE: A defined area within the building or building site from which a demand response signal can be received, an area to which a demand response signal can be sent, or an area in which a form of control can be executed.

Critical: A demand response zone serving a process where reset of the zone temperature setpoint during a demand shed event might disrupt the process, including but not limited to data centers, telecom and private branch exchange (PBX) rooms, and laboratories

Non-Critical: A demand response zone that is not defined as critical.

OCCUPANT CONTROLLED SMART THERMOSTAT. A control device that is capable of both receiving and responding to demand response signals with occupant override capabilities.

Revise as follows:

604.1 Establishing an open and interoperable automated demand-response (Auto-DR) infrastructure. ~~Where this section is indicated to be applicable in Table 302.1, buildings that contain heating, ventilating, air-conditioning (HVAC) or lighting systems shall comply with Sections 604.1 through 604.4. A building energy management and control system (EMCS) shall be provided and integrated with building HVAC systems controls and lighting systems controls to receive an open and interoperable automated demand response (Auto-DR) relay or Internet signal. Building HVAC and lighting systems and specific building energy-using components shall incorporate preprogrammed demand response strategies that are automated with a demand response automation Internet software client.~~

~~**Exception:** Auto-DR infrastructure is not required for the following:~~

1. ~~Buildings located where the electric utility or regional Independent System Operator (ISO) or Regional Transmission Operator (RTO) does not offer a demand response program to buildings regulated by this code.~~
2. ~~Buildings with a peak electric demand not greater than 0.75 times that of the standard reference design.~~
3 ~~Buildings that have incorporated onsite renewable energy generation to provide 20 percent or more of the building's energy demand.~~

Where this section is indicated to be applicable in Table 302.1, buildings that contain heating, ventilating, air-conditioning (HVAC) or lighting systems shall comply with Sections 604.1 through 604.4.

Exception: Auto-DR infrastructure is not required for the following buildings and systems:

1. Buildings located where the electric utility or regional independent system operator (ISO) or regional transmission operator (RTO) does not offer a demand response program to buildings regulated by this code.

2. Buildings with onsite renewable energy systems that have a minimum rated capacity no less than 20 percent of the building's peak energy demand.

3. Hospitals and critical emergency response facilities.

4. Spaces used for hazardous materials storage.

5. Building smoke exhaust systems.

6. Manufacturing process systems

7. Buildings with passive or active features that show peak electric energy use reduction of 15 percent or more during demand response periods identified by the code official. Modeled peak energy use shall be determined in accordance with Section 602 and shall demonstrate that the building reduces modeled peak daily electric energy use by not less than 15 percent from the baseline building for the demand response period identified by the code official.

8. Systems serving process loads where constant temperatures are necessary to prevent degradation of plants, animals, or other temperature-sensitive materials.

604.2 ~~Software clients~~ Heating,ventilation and air-conditioning (HVAC) systems equipped with direct digital control (DDC). ~~Demand response automation software clients shall be capable of communicating with a demand response automation server via the Internet or other communication relay.~~

HVAC systems with direct digital control (DDC) to the zone level shall be programmed to allow centralized demand shed for non-critical zones in accordance with the following:

1. The controls shall have a capability to remotely setup the operating cooling temperature set points by 4 degrees F. (2.2 degrees C) or more in all non-critical zones on signal from a centralized contact or software point within an energy management control system (EMCS).

2. The controls shall have a capability to remotely setdown the operating heating temperature set points by 4 degrees F. (2.2 degrees C) or more in all non-critical zones on signal from a centralized contact or software point within an EMCS.

3. The controls shall have capabilities to remotely reset the temperatures in all non- critical zones to original operating levels on signal from a centralized contact or software point within an EMCS.

4. The controls shall be programmed to provide an adjustable rate of change for the temperature setup and reset.

5. The controls shall have the following features:

   5.1. Be accessible to authorized facility operators.

   5.2. Be equipped with a manual control to allow adjustment of heating and cooling set points globally from a single point.

   5.3. Shall direct the space-conditioning systems to conduct a centralized demand shed, as specified for non-critical zones during the demand response period, upon receipt of a demand response signal.

604.3 Heating, ventilating and air-conditioning (HVAC) systems not equipped with DDC. ~~The Auto-DR strategy for HVAC systems shall be capable of reducing the building peak cooling or heating HVAC demand by not less than 10 percent when signaled from the electric utility, regional independent system operator (ISO) or regional transmission operator (RTO), through any combination of the strategies and systemic adjustments, including, but not limited to the following:~~

1. ~~Space temperature setpoint reset.~~
2. ~~Increasing chilled water supply temperatures or decreasing hot water supply temperatures.~~
3. ~~Increasing or decreasing supply air temperatures for variable air volume (VAV) systems.~~
4. ~~Limiting capacity of HVAC equipment that has variable or multiple-stage capacity control.~~
5. ~~Cycling of HVAC equipment or turning off noncritical equipment.~~
6. ~~Disabling HVAC in unoccupied areas.~~
7. ~~Limiting the capacity of chilled water, hot water, and refrigerant control valves.~~
8. ~~Limiting the capacity of supply and exhaust fans, without reducing the outdoor air supply below the minimum required by Chapter 4 of the *International Mechanical Code*, or the minimum required by ASHRAE 62.1.~~
9. ~~Limiting the capacity of chilled water or hot water supply pumps.~~
10. ~~Anticipatory control strategies to precool or preheat in anticipation of a peak event.~~

~~**Exception:** The Auto-DR strategy is not required to include the following buildings and systems:~~

1. ~~Hospitals and critical emergency response facilities.~~
2. ~~Life safety ventilation for hazardous materials storage.~~
3. ~~Building smoke exhaust systems.~~
4. ~~Manufacturing process~~ systems.

Unitary heating or cooling systems, including heat pumps, not controlled by a central energy management control system (EMCS) shall have an occupant controlled smart thermostat in accordance with Section 604.3.1.

EXCEPTION: Gravity gas wall heaters, gravity floor heaters, gravity room heaters, non- central electric heaters, fireplaces or decorative gas appliances, wood stoves, room air conditioners, and room air-conditioner heat pumps.

604.3.1 Occupant controlled smart thermostat (OCST). Occupant controlled smart thermostats (OCST) shall be capable of the following:

1. OCSTs shall include communication capabilities through either:
   1.1. Not less than one expansion port that allows for the installation of a removable module containing a radio or physical connection port to enable communication; or
   1.2. Onboard communication devices.
2. OCSTs shall be capable of both receiving and responding to demand response signals.
3. Event modes shall be capable of being overridden by the occupant.
4. OCSTs, with communications enabled, shall be capable of receiving and automatically responding to demand response signals by adjusting the thermostat setpoint by either the default number of degrees or the number of degrees established by the occupant.
5. In response to demand response signals, the OCST shall default to an event response that initiates setpoint offsets of +4°F for cooling and -4°F for heating relative to the current setpoint.
6. OCSTs shall be capable of manual adjustments to event responses, thermostat settings and setpoints at any time, including during demand response periods.
7. OCSTs shall have the capability to display information to the occupant including, but not limited to, communications system connection status, an indication that a demand response period is in progress, the currently sensed temperature and the current setpoint.

604.4 Lighting. ~~In Group B office spaces, the Auto-DR system shall be capable of reducing total connected power of lighting as determined in accordance with Section C405.5 of the *International Energy Conservation Code* by not less than 15 percent.~~

~~**Exception:** The following buildings and lighting systems need not be addressed by the Auto-DR system:~~

1. ~~Buildings or portions associated with lifeline services.~~
2. ~~Luminaires on emergency circuits.~~
3. ~~Luminaires located in emergency and life safety areas of a building.~~
4. ~~Lighting in buildings that are less than 5,000 square feet (465 m2) in total area.~~
5. ~~Luminaires located within a daylight zone that are dimmable and connected to automatic *daylight controls* complying with Section C405.2.2.3.2 of the *International Energy Conservation Code*.~~
6. ~~Signage used for emergency, life safety or traffic control~~ purposes.

Where buildings have a floor area greater than 10,000 square feet, the Auto-DR system shall be capable of reducing the total connected lighting power by not less than 15 percent. The lighting power shall be determined in accordance with Section C405.5 of the *International Energy Conservation Code*.

Exception: The following buildings and lighting systems need not be addressed by the Auto-DR system:

1. Luminaires or signage on emergency circuits.
2. Luminaires located within a *daylight zone* that are dimmable and connected to automatic *daylight controls* in accordance with the *International Energy Conservation Code*.
3. Luminaires or signage for which a lighting power reduction would endanger patient care, occupant safety or occupant security.

611.3.3.5 Auto D-R Controls For auto-DR lighting controls, the engagement of a shedding event shall be tested for light reduction to preset illuminance levels, and disengagement of a shedding event shall be tested for restoration to their original values.

Reason: The proposed Section 604 supports greater DR participation by simplifying and standardizing the Auto-DR application to HVAC by describing three distinct situations: Energy Management Systems, Direct Digital Control, and Smart Thermostats. This equipment controls HVAC systems in non-critical zones. The systems are also able to communicate the changes in order for the building owner or operator to be compensated for responding to the price signal or demand response period. Section 604 proposed language requires that occupants can override system settings and calls out exceptions for certain types of equipment and sensitive or critical environments. Section 604.3.1 also ensures that the Auto-DR technology slowly return systems to normal operations in order to avoid rebound peaks. Relying on California Title 24's existing approach to HVAC controls and standardized communications protocols, the proposal provides simplified automated demand response (Auto-DR) infrastructure and communications language in Section 604.

Exception 7 addresses areas where passive load reduction can forestall the need for more aggressive demand reduction while at the same time reducing overall building energy use on an on-going basis. The proposed exception would provide an alternate approach to projects that would encourage the adoption of meaningful passive design strategies while also contributing to long-term grid stability. Features and systems that may allow buildings to qualify for this exemption include:

- actively controlled interior daylighting systems,
- thermal mass used actively to manage building internal temperatures as part of a night-ventilation control strategy,
- buildings designed to prevent direct solar penetration in cooling dominated climates,
- other building systems reviewed and approved by the AHJ

Sections 604.3.1 (Rebound Avoidance) is unchanged from the 2012 IgCC. Section 604.4 (Lighting) provisions are unchanged, but the scope extends beyond offices but coverage is reduced to building over 10000 square feet rather than 5000 square feet. Section 611.3.3.5 is added to describe the functional testing requirements for Auto-DR lighting reduction controls. And a row is added to the Commissioning Table 903.1 since that table includes a row for Lighting Auto-DR controls but not for HVAC Lighitng Auto-DR-Controls.

While the market will continue to incorporate auto-DR technology and communications into buildings, it is critical that the proposed language be incorporated into the IgCC to facilitate faster and more cost-effective adoption of DR and pricing programs that address changing electricity consumption demand patterns nationwide. With the proposed language in place, there will be benefits to both building energy consumers and electricity systems, and support provided to the grid that will avoid additional infrastructure expenses. Many states, utility commissions, and independent system operators (ISOs) are considering

or already have DR and pricing programs and are exploring frameworks to accelerate and expand their role. Not only do these programs create system-wide benefits, but responsive demand in buildings has an enormous opportunity to contribute to the grid at a local distribution level, ensuring that the grid has resources at the right places at the right times. By standardizing Auto-DR system controls with this proposal, commercial buildings will become an even greater resource to very broad grid optimization efforts.

Cost Impact: Will not increase the cost of construction.

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