DOCKETED	
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2022 Building Energy Efficiency Standards Lead Commissioner Hearing for 45-Day Language

Payam Bozorgchami, P.E.

DATE: May 24, 2021

Start Time: 9:00 AM

Pre-Lunch Agenda for Todays Hearing

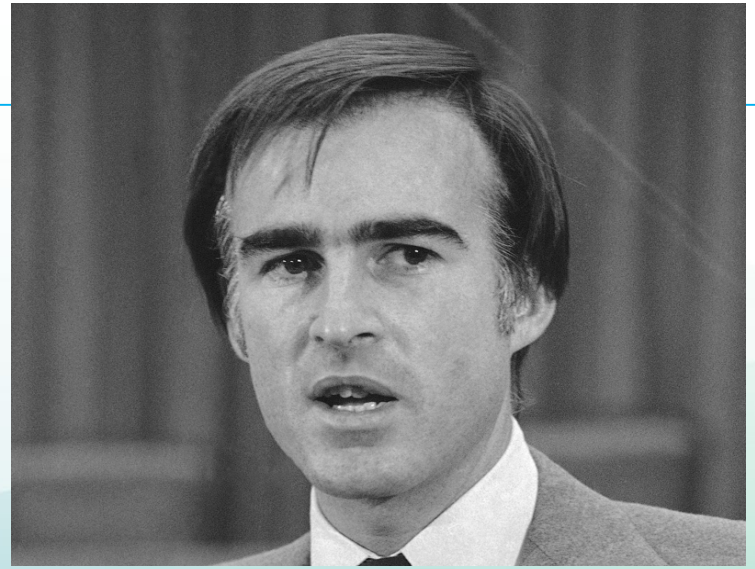
- **How Title 24, Part 6 is Developed**
- **Mandatory**
  - **Section 150.0(n), (s) Through (v),** Energy Storage Systems Ready and Electric Ready
  - **Section 160.9,** Electric Ready Buildings
- **PRESCRIPTIVE SECTIONS of Title 24, Part 6**
  - **Section 140.4(a)2**, Nonresidential Single Zone Space Conditioning System Types
  - **Section 140.10**, Nonresidential PV and Battery Storage Systems
  - **Section 150.1(c)7**, Residential Space Heating and Space Cooling
  - **Section150.1(c)8**, Residential Domestic Water Heating Systems
  - **Section 150.1(c)14**, Residential PV Requirements
  - **Section170.2(c)3A**, Dwelling Unit Space Conditioning Systems Heating System Type
- **Lunch Break (30 minutes)**

Post-Lunch Agenda for Todays Hearing

- **Lunch Break (30 minutes)**
- **Title 24, Part 1, ADMINISTRATIVE REGULATIONS Section 10-115 –** Community Shared Solar Electric Generation System or Community Shared Battery Storage System Compliance Option for On-Site Solar Electric Generation Or Battery Storage Requirements
- **Nonresidential, Hotel/Motel Occupancies**
  - **Subchapter 3,** Covered Processes – Mandatory Requirements
  - **Subchapter 4,** Mandatory Requirements For Lighting Systems And Equipment, And Electric Power Distribution Systems
  - **Subchapter 5**, Performance and Prescriptive Compliance Approaches for Achieving Energy Efficiency (Excluding Sections 140.4(a)2 and 140.10)
  - **Subchapter 6,** Additions, Alterations, and Repairs

Authority & Process

- **Public Resources Code (PRC 25402):** Reduction of wasteful, uneconomic, inefficient, or unnecessary consumption of energy
  - (a)(1) Prescribe, by regulation, lighting, insulation, climate control system, and other building design and construction standards that increase the efficiency in the use of energy and water…
  - Warren Alquist Act Signed into law in 1974 by Governor Ronald Reagan and launched by Governor Jerry Brown in 1975 which mandates updates Building Efficiency Standards and requires the building departments to enforce them through the permit process.

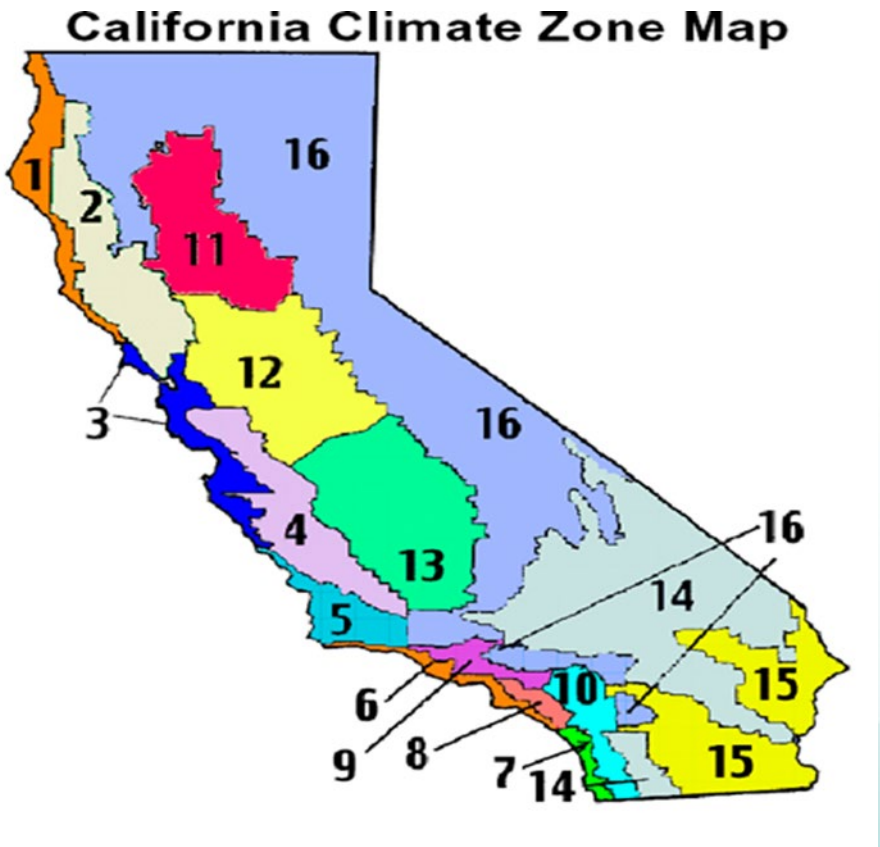


Goals of the California Energy Code

1. Increase building energy efficiency cost-effectively
2. Contribute to the state's GHG reduction goals
3. Enable pathways for all-electric buildings
4. Reduce residential building impacts on the electricity grid
5. Promote demand flexibility and self-utilization of PV generation
6. Provide tools for local government reach codes

California Standards for California Climates

- Focus on CA Climate Diversity
  - Standards set expectations for climate-specific designs
  - CA weather data captures statewide coincident peak demand climate conditions



Coastal - 1, 3, 5, 6, 7, 8

Inland - 2, 4, 9, 10

Central Valley - 11, 12, 13

Desert - 14, 15

Mountains -16

Process Used to Updated Energy Codes

CEC staff, with input from utility partners and industry stakeholders, develop the triennial standards update

Opportunities for participation

- Utility-Sponsored 25 publicly held Stakeholder Meetings
- CEC-Sponsored 18 Staff Workshops

Standards must be cost-effective

- Life-Cycle Costing Methodology
- Time Dependent Valuation (TDV)

2022 Standards Process From Here on to the Effective Date

2022 STANDARDS UPDATE SCHEDULE	
DATE	**MILESTONES**
November 2018 - November 2019	Updated Weather Files
November 2018-December 2019	Metric Development
November 2018-July 2019	Measures Identified and approval
August 2019 to January 2021	Stakeholder meeting/workshop & final staff workshop
May 2020-October 2020	CASE Reports submitted to the CEC
May 24, 27 and 28 2021	**45-day Lead Commissioner Hearings**
June 21, 2021	**Comments for the 45-Day Language due date**
August 11, 2021	Adoption of 2022 Standards at the Business Meeting
July 2021 to November 2021	Staff work on Software, Compliance Manuals, Electronic Documents Available to Industry
January of 2022	Approval of the Manuals (at CEC Business Meeting)
December of 2021	Approval of the Energy Code (at CBSC)
February 2022	Software, Compliance Manuals, Electronic Documents Available to Industry
January 1, 2023	Effective Date

2022 Energy Code Environmental Impact Report

Important Dates	Milestones
May 19	**Draft** Report posted to docket
May 20 – July 8	Public **comment period**
Late July	**Final** Report posted to docket
August	CEC **adoption** (Tentative)

DOCKET NUMBER: 21-BSTD-02

https://efiling.energy.ca.gov/Lists/DocketLog.aspx?docketnumber=21-BSTD-02

Key Web-Links

45-Day Rulemaking Comments to be Submitted to:

https://efiling.energy.ca.gov/EComment/EComment.aspx?docketnumber=21-BSTD-01

NOTE: For this workshop final deadline for written comments is **June 21, 2021** by 5:00 PM

Building Energy Efficiency Program
http://www.energy.ca.gov/title24/

Pre-Rulemaking Comments were submitted to:
https://efiling.energy.ca.gov/EComment/EComment.aspx?docketnumber=19-BSTD-03

2022 Title 24 Utility-Sponsored Stakeholder
http://title24stakeholders.com/

How to submit Written Comments

- **We strongly encourage submitting written comments via e-file.** Comments on the proposed 2021 Energy Code can be submitted to: https://efiling.energy.ca.gov/EComment/EComment.aspx?docketnumber= 21-BSTD-01

- Comments can also be submitted physically or by e-mail, here:

California Energy Commission
Dockets Office, MS-4
Re: Docket No. 21-BSTD-01
1516 Ninth Street
Sacramento, CA 95814-5512
Docket@energy.ca.gov

Final deadline for written comments is June 21, 2021 by 5:00 PM

Questions ?

Heat Pump Baselines

Presenter: Mazi Shirakh, PE and Danny Tam

DATE: May 24, 2021

Lead Commissioner Hearing for 45-Day Language

2022 T24 Standards Building Decarbonization Team

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McHugh Energy
Energy + Environmental Economics (E3)
NORESCO
TRC
Energy Solutions
Statewide IOUs

Building Decarbonization via Building Code (T24 Part 6, Part 11)

Building Standards initiatives to support policy goals:

i. Adopt building energy performance standards – feasible, cost effective

ii. Adopt performance standards baselines that are based on or encourage heat pumps to achieve building energy efficiency

iii. Require PV, storage

iv. Include “reach” codes in Part 11 that local governments can voluntarily adopt to further encourage efficient technologies.

Begin Transition to Heat Pumps

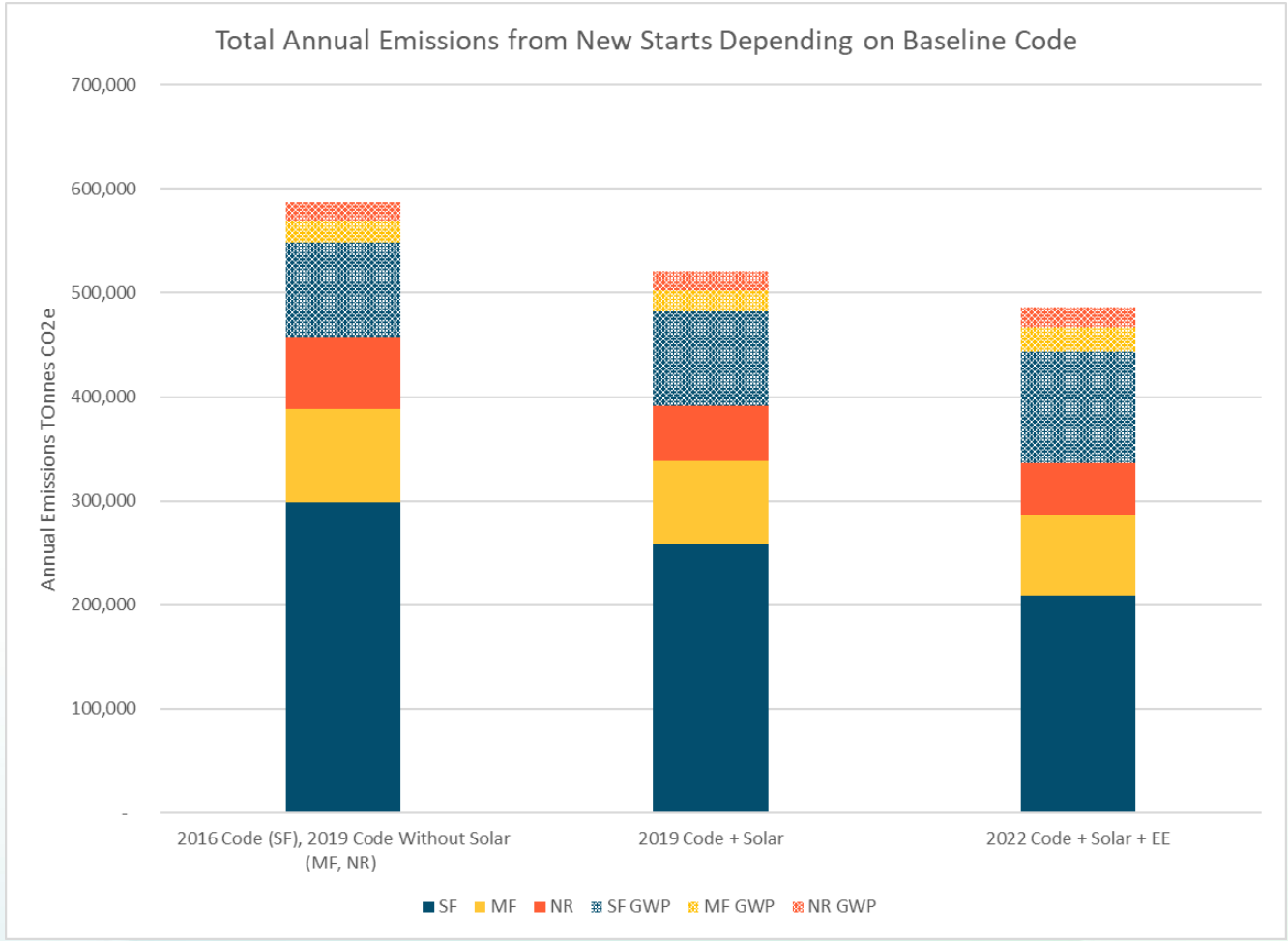
- **Key technology to reduce gas use in buildings**
- **Market needs time to adjust; incremental steps over two cycles:**
  - Very low current market share
  - Limited builder and consumer experience
  - Concerns about creating new supply chain availability and expertise and potential for customer complaints or even litigation
  - Less efficient at cold temperatures – potentially raises energy bills

Inclusion of long-run marginal source energy – in addition to TDV – facilitates switching to low emission technologies, while protecting building envelope and grid harmonization signals.

Title 24 2022 Code Update CO2e Savings

	Direct Emissions Savings			
Building Category	SF	MF	NR	Total
2022 HP Baseline Only	19%	3%	5%	14%
All Updates inc. 2019 Solar	30%	13%	29%	27%

	Direct + GWP Emissions Savings			
Building Category	SF	MF	NR	Total
2022 HP Baseline Only	10%	0%	1%	7%
All Updates inc. 2019 Solar	19%	9%	21%	17%



Source: E3

CEC Can Create Heat Pump Baselines

Heat pumps for space (HPSH) and water heating (HPWH) used in T24 Part 6 as baseline for setting performance standards:

- For low-rise residential, high-rise multifamily and selected nonresidential occupancies
- Heat pumps are efficient devices with COPs in excess of 3, thus decrease both energy consumption and GHGs
- Must be feasible and cost effective

HPSH Baselines – Nonresidential Buildings

Section: 140.4– PRESCRIPTIVE REQUIREMENTS FOR SPACE-CONDITIONING SPACES

- **Add new section (a)2 for single zone space conditioning systems type requirements**
  - Applicable to single zone systems with DX cooling ≤ 240,000 Btu/hr
  - Other system types can comply using performance
  - Not applicable to systems using central boilers or chillers

HPSH Baselines – Nonresidential Buildings

Section: 140.4– PRESCRIPTIVE REQUIREMENTS FOR SPACE-CONDITIONING SPACES

Space Type	Prescriptive System Type
Retail and Grocery Building Spaces CZ 2-15	Heat pump
Retail and Grocery Building Spaces CZ 1 & 16 ≤ 65,000 Btu/hr	AC with furnace
Retail and Grocery Building Spaces CZ 1 & 16 > 65,000 Btu/hr	Dual-fuel heat pump
School Building Spaces CZ 2-15	Heat pump
School Building Spaces CZ 1 and 16	Dual-fuel heat pump
Office, Financial Institution, and Library Building Spaces CZ 1-15	Heat pump
Office, Financial Institution, and Library Building Spaces CZ 16 ≤ 65,000 Btu/hr	AC with furnace
Office, Financial Institution, and Library Building Spaces CZ 16 > 65,000 Btu/hr	Dual-fuel heat pump
Office spaces in warehouse	Heat pump

Heat Pump Baselines – Single Family Buildings

Section 150.1(c)7 - PRESCRIPTIVE REQUIREMENTS FOR SPACE HEATING AND SPACE COOLING
Section 150.1(c)8 - DOMESTIC WATER-HEATING SYSTEMS

- **Add new prescriptive requirement for heat pump space heater in climate zones 3, 4, 10, 13, and 14**
- **HPWH in CZs 1, 2, 5-9, 11, 12, 15, and 16 in standard design**
  - ✓Other system types can comply using performance

Note: 15-Day Language proposal: Switch CZ10 to HPWH

HPSH Baselines – Multifamily

Section: 170.2(c)3A– PRESCRIPTIVE REQUIREMENTS FOR DWELLING UNIT SPACE CONDITIONING SYSTEMS

- **Add new requirement for space conditioning systems type requirements**
  - Applicable to system with direct expansion cooling serving individual dwelling units.
  - Other system types can comply using performance
  - Not applicable to systems using multi-zone, central boilers or chillers

HPSH Baselines – Lowrise Multifamily

- **Section 170.2(c)3Ai - Dwelling Unit Space Conditioning Systems for Multifamily Buildings three habitable stories or less:**
  - For climate zones 1 through 15, the system shall be a heat pump.
  - For climate zones 16, the space conditioning system shall be an air conditioner with furnace.
  - Additionally, for climate zones 4-10, balanced ventilation systems without heat or energy recovery shall have fan efficacy of 0.4 W/cfm or less (160.2(b)2Aivb1).

HPSH Baselines – Highrise Multifamily

- **Section 170.2(c)3Aii - Dwelling Unit Space Conditioning Systems for Multifamily Buildings four habitable stories or greater:**
  - For climate zones 2 through 15, the system shall be a heat pump.
  - For climate zones 1 and 16, the space conditioning system shall be an a dual-fuel heat pump.

HPWH Baseline - Single Family Buildings

Section: 150.1(c)8– PRESCRIPTIVE REQUIREMENTS FOR DOMESTIC WATER-HEATING SYSTEMS

- **Remove existing prescriptive options for gas water heaters**
  - Gas system types can comply using performance
- **Modify existing heat pump water heater (HPWH) options**
  - A 240V HPWH. In addition, compact hot water distribution for CZ1 and CZ16; Drain water heat recovery system in CZ16.
  - A NEEA Tier 3 HPWH. In addition, a drain water heat recovery system in CZ16.
- **Add new option for solar water heating system with electric backup**

HPWH Baseline - Single Family Buildings

- New **Exception 1** for instantaneous gas water heater in Climate Zones 3, 4, 10, 13, and 14. (15-Day Language proposal: Switch CZ10 to HPWH)
- New **Exception 2** for point-of-use instantaneous electric water heater for junior ADU.
- New **Exception 3** for 120V HPWH for dwelling units with 1 bedroom or less.

HPWH Baselines – Schools

Section: 140.5– PRESCRIPTIVE REQUIREMENTS FOR SERVICE WATER HEATING SYSTEMS

- **Add new occupancy section (a)1 for School buildings less than 25,000 square feet and less than 4 stories in climate zones 2 through 15**
  - Water heating system shall be a heat pump water heating system
  - Other system types can comply using performance
  - Exception for instantaneous electric water heater if serving an individual bathroom space

Section: 140.5– PRESCRIPTIVE REQUIREMENTS FOR SERVICE WATER HEATING SYSTEMS –Cont.

- **Add new section (c) for high capacity service water heating systems**
  - Raise the minimum thermal efficiency of gas service hot water heating systems to a weighted-thermal efficiency of 90 percent
  - Applies to capacities between 1 million Btu/h or greater
  - Exception if 25 percent of the annual service water-heating requirement is provided by site-solar or site recovered energy.

Questions?

Prescriptive Requirements for Photovoltaic System and Battery Storage Systems

Presenter: Maziar Shirakh

DATE: May 24, 2021

Lead Commissioner Hearing for 45-Day Language

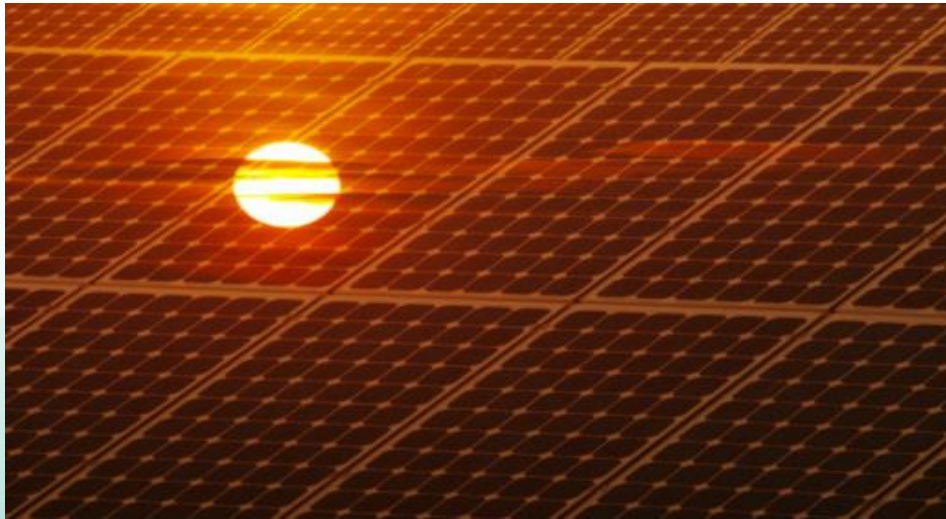
Here Comes the Sun: PV and Battery Storage Requirements – Current 2019 Standards

For the first time, 2019 Standards included prescriptive solar PV systems for lowrise residential buildings:

- Sized to displace the annual kWhs of a mixed-fuel home, conforming with Net Energy Metering (NEM) rules ~ 3 kW average size statewide for single family buildings
- Cost effective in all 16 climate zones, even if exports compensated at avoided cost; large energy bill and CO2 emission savings

Battery storage was an option and could receive compliance credit if paired with a PV system

The 2022 Standards proposes to expand PVs paired with battery storage systems to multifamily and selected nonresidential buildings



I'll Follow the Sun – New PV & Storage Requirements for Multifamily and Nonresidential Buildings

Section 140.10 – Prescriptive Requirements for Photovoltaic and Battery Storage Systems

New requirements for "lean and mean" solar & storage:

i. For high-rise residential four or more habitable stories

ii. Selected nonresidential buildings: **Office, Retail, Grocery, School, Warehouse; minimal requirements (similar to warehouse) for Auditorium, Convention Center, Hotel/Motel, Library, Medical/Clinic, Restaurant, Theater**

New PV & Storage Requirements for Multifamily and Nonresidential Buildings

"Lean and Mean" PV/Battery Storage Systems:

i. Limits hourly exports to 20% of PV generation without batteries, 10% with batteries

ii. Cost effective in most buildings and climate zones even with exports at avoided cost, likely NEM3 scenario

New PV & Storage Requirements for Multifamily and Nonresidential Buildings

Exceptions for:

- Buildings with Solar Access Roof Areas (SARA) less than 3% of CFA
- PV sizes less than 4 kW
- Areas of state with high snow loads
- No PV in multi-tenant buildings without either a Virtual Net Metering (VNEM) or community solar program
- No battery storage in small buildings and tenant lease spaces (<5,000 sf)
- No battery storage for very small system, less than 10 kWh
- No battery storage for offices, schools, and warehouses in climate zone 1

PV & Storage Requirements – Solar Access Roof Areas (SARA)

Section 140.10(a)2 - SARA

The 2022 Standards introduces SARA concept to determine suitable areas available for PV installation; SARA

1. Includes building's roof space and the area of all roof space on covered parking areas, carports, and all other newly constructed structures capable of supporting PVs
2. Does not include any area that has less than 70 percent annual solar access. Obstructions that are external to the building casting shade, and obstructions that are part of the building design and elevation features may be considered for the annual solar access calculations.

Photovoltaics & Storage for Multifamily and Nonresidential Buildings

- Storage helps manage building electricity demand on the grid
  - Provide for demand flexibility to avoid rooftop solar adding power to the grid during periods of low net load (middle-of-the-day); lower electricity bills
  - Contribute to large amount of additional rooftop solar needed to meet SB 100
  - Increase the reliability of the grid during very high peak periods
- Reduce CO2 emissions from buildings
- Helps modern buildings be resilient to wildfires and PSPS events

Section: 150.1(c)14 – PRESCRIPTIVE REQUIREMENTS FOR PHOTOVOLTAIC SYSTEMS

- Clarify PV systems are not required to be larger than what can be installed in the available Solar Access Roof Area (SARA); clarifies what happens when SARA is greater than 80 square feet, but smaller than the area required for full NEM compliance.
- New **Exception 2** for PVs systems that are less than 1.9 kWDC per building
- **Removal of the following exceptions:**
  - Exception 2 (CZ15)
  - Exception 3 (2-story buildings)
  - Exception 4 (3-story buildings)

Section: 150.1(c)14 – PRESCRIPTIVE REQUIREMENTS FOR PHOTOVOLTAIC SYSTEMS – CONT.

- New **Exception 3** for areas with high snow loads.
- Clarifies occupied roof areas – As specified by Title 24, Part 2, section 503.1.4, are not part of SARA
- Clarifies that for low slope roofs all obstructions external and internal to the building, including building design features are not part of SARA
- Clarifies Exception 5 for self-shading for high-slope roofs approved by planning departments prior to 1/1/2020

Less Emissions, Cleaner Air

2022 Standards reduce CO2e emissions by significant amounts:

Heatpump Baseline and PV/Battery Annual CO2e Emissions Savings	mTons/yr	Equivalent Gas Cars Taken Off the Road
1st year	106,775	23,956
3rd year	318,892	71,546
30th year	2,649,252	594,384

Total 2022 Standards Annual CO2e Emissions Savings	mTons/yr	Equivalent Gas Cars Taken Off the Road
1st year	632,873	141,991
3rd year	1,993,930	447,356
30th year	10,771,991	2,416,793

Questions?

Mandatory Requirements for Energy Storage System Ready and Electric Ready

Presenter: Danny Tam

DATE: May 24, 2021

Lead Commissioner Hearing for 45-Day Language

Single Family Energy Storage Systems (ESS) Ready Measures

Section: 150.0(s) – Energy Storage Systems (ESS) Ready

- Requirement for a subpanel with a main service connection of at least 225A or an ESS ready interconnection equipment with 60A minimum backup capacity.
- Identification of at least 4 branch circuits for emergency use
- System isolation equipment/Transfer switch ready

Single Family Heat Pump Water Heater Ready Measures

Section: 150.0(n) – PRESCRIPTIVE REQUIREMENTS FOR SERVICE WATER HEATING SYSTEMS

- **Designated Space for Heat Pump Water Heater:** At least 2.5 feet by 2.5 feet and 7 feet tall.
- **Electric Circuit:** If the designated space is more than 3 feet from the water heater, requires a 240V, 30A circuit with termination 3-feet from the designated location; reserve double pole breaker in main panel
- **Plumbing:** If the designated space is more than 3 feet from the water heater, the hot and cold water lines shall pass through the designated space before reaching the water heater.
- **Condensate:** A condensate drain that is no more than 2 inches higher than the base of the installed water heater, and allows natural draining without pump assistance

Single Family Electric Ready Measures

Section: 150.0(t) – Heat Pump Space Heater Ready: 240V, 30A circuit with termination 3-feet from air-handler; reserve double pole breaker in main panel

Section: 150.0(u) – Electric Cooktop Ready: 240V, 50A circuit with termination 3-feet from cooktop; reserve double pole breaker in main panel

Section: 150.0(v) – Electric Clothes Dryer Ready: 240V, 30A circuit with termination 3-feet from clothes dryer location; reserve double pole breaker in main panel

Multifamily Electric Ready Measures

Section: 160.9(a) – Heat Pump Space Heater Ready: 240V, 30A circuit with termination 3-feet from air-handler; reserve double pole breaker in main panel

Section: 160.9(b) – Electric Cooktop Ready: 240V, 50A circuit with termination 3-feet from cooktop; reserve double pole breaker in main panel

Section: 160.9(c)1 – Electric Clothes Dryer Ready serving individual dwellings: 240V, 30A circuit with termination 3-feet from clothes dryer location; reserve double pole breaker in main panel

Section: 160.9 – MANDATORY REQUIREMENTS FOR ELECTRIC READY BUILDINGS – Cont.

Section: 160.9(c)2 – Electric Clothes Dryer Ready in common areas

Conductors or raceway installed and sized according to one of the following:

- 24 amps at 208/240 volt per clothes dryer; or
- 2.6 kVA for each 10,000 Btus per hour of rated gas input or gas pipe capacity; or
- The electrical power required to provide equivalent functionality of the gas-powered equipment as calculated and documented by the responsible person associated with the project.

Questions?

Title 24, Part 1, ADMINISTRATIVE REGULATIONS
Section 10-115 – Community Shared Solar Electric Generation

Presenter: Bill Pennington

Lead Commissioner Hearing for 45-Day Language

Date: May 24, 2021

Section 10-115 – Community Shared Solar

- **Section: 10-115(a)3 – Participating Building Energy Savings Benefits:** Clarify that $ Benefits Must Exceed Participant Costs
- **Section: 10-115(a)4 – Durability and Building Opt-out:** Option to stop participation if T-24 compliant, onsite PV is installed
  - **Note:** 15-Day Language proposal: CC&Rs include T-24 onsite size
- **Section: 10-115(a)5 – Additionality:**
  - PVs developed for Community Solar;
  - Time gaps filled with other PVs with retired bundled RECs
- **Section: 10-115(a)6 – Location:** On LSE distribution system

Section 10-115 – Community Shared Solar (Cont.)

- **Section: 10-115(a)7 – Size:** 20 MW or less
- **Section: 10-115(a)8 – Original Building Purchaser Option:** Option for onsite PV
- **Section: 10-115(a)9 – Accountability and Recordkeeping:** Annual reporting
- **Section: 10-115(b)3 – Application for Commission Approval:** Public review meeting
- **Section: 10-115(c) – Executive Director Approval of Revised Applications:**
  - New resources,
  - Modification of regulations

Questions?

SUBCHAPTER 3
NONRESIDENTIAL, HOTEL/MOTEL OCCUPANCIES, AND COVERED PROCESSES—MANDATORY REQUIREMENTS

Presenter: Ronald Balneg

DATE: May 24, 2021

Lead Commissioner Hearing for 45-Day Language

Section 120.1 – Ventilation and IAQ

- **Section 120.1(b)**
  - Requirements for high-rise residential ventilation and indoor air quality was moved to the new multifamily section 160.2. (non-substantive change)
- **Section 120.1(c)1-Air Filtration**
  - Clarified to provide explicit language instead of use of a reference to the high-rise residential requirements (non-substantive change)
- **Section 120.1(c)3-Mechanical Ventilation**
  - Revised to better align its provisions with Section 1000.4 of the California Building Code and remove potential conflict between code requirements.
- **Section 120.1(d)5-Occupancy Sensor Ventilation Control Devices**
  - Revised to clarify expected interaction between ventilation and occupancy sensors, allow additional time to signal unoccupancy, and additional time for ventilation to respond to that signal.

Section 120.1 – Ventilation and IAQ

- **Section 120.1(f)-Design and Control for Quantities of Outdoor Air**
  - Revised to clarify the term airflow refers to design airflow rates.
- **Section 120.1(g)-Air Classification and Recirculation Limitation**
  - Added language from ASHRAE 62.1 for air classification and recirculation section.
- **Section 120.1(h)-Ventilation Only Mechanical Systems**
  - Minimum ventilation section was revised to clarify ventilation-only systems are required to comply with Section 120.1(f), the Design and Control for Quantities of Outdoor Air .
- **Table 120.1-A- Minimum Ventilation Rates**
  - Changes to this table clarifies the outdoor air rate is the total outdoor airflow rate and DCV ventilation rates are minimum values.

Section 120.2 – Required Controls for Space Condition Systems

- **Section 120.2(e)3-Occupancy Sensing Zone Controls**
  - Revised occupant sensor zone controls to align with ventilation requirements in Section 120.1 and the occupant sensor ventilation controls devices in Section 120.1(d)5 and clarifies language regarding occupancy sensing zone controls.
- **Section 120.2(i)-Economizer Fault Detection and Diagnostics (FDD)**
  - Expands economizer thresholds for fault detection and diagnostics to 33,000 Btu/hr.

Section 120.4 – Mandatory Requirements for Air Distribution Systems and Plenums

- **Section 120.4(b)-Duct and Plenum Material**
  - Specifies Seal Class A for ductwork required by the California Mechanical Code and the underlying ASHRAE 90.1.
- **Section120.4(g)-Duct Sealing**
  - Makes previous 140.4(l) to mandatory requirements and add California Mechanical Code section 603.10.1 duct testing for those that do not fall under 120.4(g)1.

Section 120.5 – Required Nonresidential Mechanical System Acceptance

- **Section 120.5(a)3A and B**
  - Updates the references for the new duct leakage requirements

Section: 120.6 – Mandatory Requirements for Covered Processes

- **Section 120.6(a) and (b) -Transcritical CO2 Systems.**
  - Applicable to refrigerated warehouses ≥ 3,000 sq ft
  - Refrigerated spaces with a total of 3,000 sq ft served by the same refrigeration system
  - Retail food stores ≥ 8,000 sq ft of conditioned area
  - Air-cooled gas cooler restriction
  - Gas cooler sizing and specific efficiency
  - Supercritical optimized head pressure control
  - Subcritical ambient temperature reset control strategy
  - Minimum saturated condensing temperature setpoint of 60 deg F
  - Heat recovery
- **Section 120.6(a)9-Automatatic Door Closers**
  - Added new automatic door closure requirements for refrigerated spaces ≥ 3,000 sq ft.

Section: 120.6 – Mandatory Requirements for Covered Processes

- **Section 120.6(d)-Mandatory Requirements for Process Boilers**
  - Reduced the excess oxygen concentration requirement for process boilers between 5 to 10 million Btu/h
- **Section 120.6(e)-Mandatory Requirements for Compressed Air Systems**
  - Added new monitoring, leak testing, and pipe sizing requirements and clarifies language for trim compressor, storage, and controls requirements.

Section: 120.6(h) – Mandatory Requirements for Controlled Environment Horticulture (CEH) Spaces

- Added new mandatory requirements for controlled environment horticulture spaces including dehumidification, lighting, electrical power distribution systems, and condition greenhouses.
  - **Section 120.6(h)1 Indoor Growing, Dehumidification**

    Stand-alone dehumidifiers
    - Volumes ≤ 8.0 cubic feet: min integrated energy factor of 1.77 L/kWh
    - Volumes > 8.0 cubic feet: min integrated energy factor of 2.41 L/kWh
    - Integrated HVAC system with on-site heat recovery to fulfill ≥ 75 percent of the annual energy for dehumidification reheat;
    - Chilled water system with on-site heat recovery to fulfill ≥ 75 percent of the annual energy for dehumidification reheat; or
    - Solid or liquid desiccant dehumidification system for system designs ≤ 50°F dewpoint.

Section: 120.6(h) – Mandatory Requirements for Controlled Environment Horticulture (CEH) Spaces

- **Section 120.6(h)2 – Indoor Growing, Horticulture Lighting**
  - For newly constructed indoor facilities with 40 kW of horticultural lighting:
    - Luminaires with removable lamps: Photosynthetic Photon Efficacy (PPE) ≥ 1.9 μmol/J for the **lamps**
    - Luminaires with non-removable lamps: Photosynthetic Photon Efficacy (PPE) ≥ 1.9 μmol/J for the **luminaires**
- **Section 120.6(h)3 – Indoor Growing, Electrical Power Distribution Systems**
  - Electrical power distributions shall be capable of monitoring usage from a measurement device.

Section: 120.6 – Mandatory Requirements for Covered Processes

- **Section 120.6(h)4-Conditioned Greenhouse, Building Envelopes**
  - Greenhouses will have specific requirements for skylights and windows applicable for their use instead of the current warehouse requirements.
  - U-factor of 0.7 or less is the new requirement.
- **Section 120.6(h)6 – Greenhouse, Horticulture Lighting**

  For newly constructed greenhouses with 40 kW of horticultural lighting
  - Luminaires with removable lamps: Photosynthetic Photon Efficacy (PPE) $\geq$ 1.7 μmol/J for the **lamps**
  - Luminaires with non-removable lamps: Photosynthetic Photon Efficacy (PPE) $\geq$ 1.7 μmol/J for the **luminaires**

Section: 120.6 – Mandatory Requirements for Covered Processes

- **Section 120.6(i)-Mandatory Requirements for Steam Traps**

  Added new mandatory requirements for steam traps including fault detection, diagnostics monitoring, strainer installation, blow-off valve equipment, and acceptance requirements.

- **Section 120.6(j)-Mandatory Requirements for Computer Rooms**

  Added new mandatory requirements for reheat, humidification and fan controls added for space conditioning of computer rooms.

Section: 120.10–MANDATORY REQUIREMENTS FOR FANS

- Added a new mandatory requirement, fan energy index (FEI), for each fan or fan array with a combined motor nameplate > 1.0 hp or combined fan nameplate electrical input power > 0.89 kW
  - FEI ≥ 1.00 at design conditions
  - Variable Air Volume shall have FEI ≥ 0.95

Questions?

Lighting Systems Changes for 2022 Nonresidential Subchapter4

Lead Commissioner Hearing

Presenters: Simon Lee, P.E., Electrical Engineer

Date: May 24, 2021

Section 130.0 - Lighting Systems and Equipment, and Electrical Power Distribution - General

Section 130.0(b) Functional areas where compliance with the residential lighting standards is required

- Lighting requirements for high-rise residential dwelling units, dormitory and senior housing dwellings were moved to the new multifamily section, Section 160.5(a).

Section 130.1- Mandatory Indoor Lighting Controls

Section 130.1(a) Manual Area Controls.

- **Section 130.1(a)1** - Readily accessible: Added a provision for "areas of the building intended for access or use by the public" that it may use a manual control not accessible to unauthorized personnel.
- **Section 130.1(a)3 -** Added a provision for scene controllers so that they can comply with the "separate control of different type of lighting" requirement. Considering to modify the scene controllers requirement that scene controllers may comply with this requirement provided that at least one scene turns on general lighting only, one scene turns off all lighting as a group and one scene turns on and off some combination of lighting types.
- **Exception to 130.1(a) -** Revised the egress lighting power provision so that the egress lighting power provided are the same for manual area controls and shutoff controls.

Section 130.1 - Mandatory Indoor Lighting Controls

Section 130.1(b) - Multilevel Lighting Controls. Editorial Changes to list the same requirements as item 1 and item 2. (non-substantive change)

Considering to add an exception to 130.1(b) for classrooms with connected lighting load not exceeding 0.5 watts per square feet to be exempted from the multilevel lighting controls requirement.

Table 130.1-A - Multilevel Lighting Controls and Uniformity Requirements. Revised the listing order so that LED light sources are listed on the top and legacy light sources are listed at the end.

Section 130.1(c) - Shut-OFF Controls.

- **Exception** ~~6~~ 3 to 130.1(c) ~~1~~: Added an exception for stairways designated for means of egress to be exempted from the shut-off controls requirements.

Section 130.1 - Mandatory Indoor Lighting Controls

Section 130.1(c)6 - Partial OFF occupant sensing controls are required for aisle ways and open area in warehouses, library book stack aisles, corridors and stairwells, and offices greater than 250 ~~300~~ square feet.

- Revised the mandatory requirements as applicable to general lighting instead of all lighting types.

Section 130.1(c)6D- Added new requirements for multi-zone Occupancy Sensing Controls for general lighting in Offices larger than 250 square feet.

Section 130.1(c)7- Partial OFF occupant sensing controls. Partial OFF occupant sensing controls are required for specified stairwells and common area corridors, parking garages, parking areas and loading and unloading areas.

- Revised the mandatory requirements as applicable to general lighting instead of all lighting types.

Section 130.1 - Mandatory Indoor Lighting Controls

Section 130.1(d) Automatic Daylighting Controls

- **Section 130.1(d)** Revised automatic daylight controls on controlled lighting power reduction – dimming to 10 percent. Moved secondary sidelit daylit zone requirements from prescriptive section to mandatory section. Secondary sidelit daylit zone language in 140.6(d) would be deleted.
- **Section 130.1(d)2** Added a clarification that linear LED and other solid-state lighting (SSL) light sources in linear form may be treated in increments of 4 feet segments or smaller.
- **Exception 3, 4, 5 and 6:** Revised existing exception and also added new exceptions for the lighting wattage trigger thresholds to include secondary sidelit daylit zones and other daylit zones.

Section 130.1 - Mandatory Indoor Lighting Controls

Section 130.1(f) Control Interactions

- **Section 130.1(f)9.** Added a clarification pointer for the lighting occupancy sensing controls requirements and the occupied-standby mode requirements of space conditioning system of Section 120.2(e). Considering to clarify the applicable lighting occupancy sensing controls to add a clarification pointer to Section 130.1(c)5, 6, and 7.

Section 130.2 - Outdoor Lighting Controls and Equipment

Section 130.2(b) Luminaire Shielding Requirements. Revised the terms and requirements to better align with the use of terminology, such as “shielding” and ANSI/IES TM-15-20, and added ”public art” to the exception.

Section 130.2(c)2 Automatic Scheduling Controls. Revised with editorial changes to improve readability. Deleted the acceptance test language as it is redundant to the existing language in the acceptance test section.

Section 130.2(c)3 - Motion Sensing Controls. Added examples for bilaterally symmetric light distribution as clarifications. Added a new exception for parking lot luminaires with a maximum rated wattage of 78 watts each that are not required to have motion sensing controls.

Section 130.4 - Lighting Control Acceptance and Installation Certificate Requirements

Section 130.4(a). Lighting and Receptacle Control Acceptance Requirements

Made editorial and non-substantive changes to the subsection including item 1 thru 7 as clarifications.

Section 130.4(a)8: Added demand responsive controlled receptacles to be tested for meeting the acceptance requirements in Nonresidential Appendix.

Section 130.5 Electrical Power Distribution Systems

Section 130.5(e) Demand responsive controls and equipment

Added controlled receptacles to the demand responsive controls requirements.

Questions?

SUBCHAPTER 5
NONRESIDENTIAL, AND HOTEL/MOTEL OCCUPANCIES – PERFORMANCE AND PRESCRIPTIVE COMPLIANCE APPROACHES FOR ACHIEVING ENERGY EFFICIENCY

Presenter: Haile Bucaneg

DATE: May 24, 2021

Lead Commissioner Hearing for 45-Day Language

Section: 140.0 – Performance and Prescriptive Compliance Approaches

Removed high-rise residential from building types covered in Section 140.0 and moved to Sections 160.0 and 170.0.

- Nonresidential and hotel/motel buildings.

Section: 140.1 – Performance Approach: Energy Budgets

Photovoltaic and battery storage systems 140.1(a) and 140.1(b):

- Included in energy budget for standard design buildings.
- Included in energy budget for proposed design buildings.

Community shared renewable electric generation and battery storage systems:

- Exception provided for community shared solar, or other renewable electric generation and/or community shared battery storage systems per Section 10-115.

Section: 140.3(a)1A –Exterior Roofs and Ceilings

Nonresidential steep-sloped roofs in Climate Zones 2 and 4 through 16:

- Minimum aged solar reflectance: 0.25.
- Minimum thermal emittance: 0.80.
- Minimum solar reflectance index (SRI): 23.

Table 140.3 – Roof/Ceiling Insulation Tradeoff for Aged Solar Reflectance

~~Nonresidential~~			
Aged Solar Reflectance	Metal Building Climate Zone 1-16 U-factor	Wood framed and Other Climate Zone 6 & 8 U-factor	Wood Framed and Other All Other Climate Zones U-factor
0.62-0.56	0.038	0.045	0.032
0.55-0.46	0.035	0.042	0.030
0.45-0.36	0.033	0.039	0.029
0.35-0.25	0.031	0.037	0.028

Section: 140.3(a)5 –Exterior Windows

Revisions to requirements for vertical exterior windows:

- Exceptions for conditioned greenhouses.
- Exceptions for school buildings less than 25,000 sqft and 3 stories or less.
- Relative Solar Heat Gain Coefficient (RSHGC) equation and application updated for vertical fenestration.

Section: 140.3(a)6 – Skylights

Revisions to requirements for skylights:

- Provided an Exceptions for conditioned greenhouses.

Section: 140.3(a)7 – Exterior Doors

Revisions to requirements for Exterior doors:

- Definition for glazed doors revised to doors that are more than one quarter glass in area.

Section: 140.3(a)9 – Air Barriers

Revisions to exceptions and design requirements for air barriers:

- Exception for relocatable public school buildings relocated for clarity.
- Air barrier boundaries, interconnections and penetrations and associate sqft calculations for all sides of the air barrier required to be included in construction documents.
- Air barrier verification requirements added.

Table 140.3-B – Envelope Criteria for Nonresidential Buildings

Revisions to maximum U-factor for metal-framed walls.

Climate Zone	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Metal Building	0.113	0.061	0.113	0.061	0.061	0.113	0.113	0.061	0.061	0.061	0.061	0.061	0.061	0.061	0.057	0.061
Metal-framed	0.060	0.055	0.071	0.055	0.055	0.060	0.060	0.055	0.055	0.055	0.055	0.055	0.055	0.055	0.055	0.055

Revisions to maximum U-factor and RSHGC for fixed window and curtainwall or storefront.

Climate Zone	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Fixed Window																
Max U-factor	0.36	0.36	0.36	0.36	0.36	0.36	0.36	0.36	0.34	0.36	0.34	0.34	0.34	0.34	0.34	0.36
Max RSHGC	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.22	0.25	0.22	0.22	0.22	0.22	0.22	0.25
Curtainwall or Storefront																
Max U-factor	0.38	0.41	0.41	0.41	0.41	0.41	0.38	0.41	0.41	0.41	0.41	0.41	0.41	0.41	0.41	0.41
Max RSHGC	0.25	0.26	0.26	0.26	0.26	0.26	0.25	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26

Table 140.3-B & Table 140.3-C Envelope Criteria

Table 140.3-B Prescriptive Envelope Criteria for Nonresidential Buildings.

Climate Zone	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Air Barrier	REQ	REQ	REQ	REQ	REQ	REQ	NR	REQ	REQ	REQ	REQ	REQ	REQ	REQ	REQ	REQ

Table 140.3-C Prescriptive Envelope Criteria for Guest Rooms of Hotel/Motel Buildings.

Climate Zone	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Air Barrier	REQ	REQ	REQ	REQ	REQ	REQ	NR	REQ	REQ	REQ	REQ	REQ	REQ	REQ	REQ	REQ

Section: 140.4(a) – Space Conditioning Systems

Nonresidential Single Zone Space Conditioning System

Types:

- Presented during this morning's session.

Section: 140.4(c) – Fan Systems

Fan power budget:

- Replaces Fan power limitation in Section 140.4(c)1.
- Applies to fan array with fan electrical input power ≥ 1 kW.
- Includes healthcare facilities.
- Fan power budget calculation process and associated tables added in Section 140.4(c)1A.
- Fan system electrical input power calculation process and associated tables added in Section 140.4(c)1B.
- Tables 1404.-A, 140.4-B, 140.4-C, and 140.4-D were added to support fan power and fan system electrical input power calculations.

Section: 140.4(d) – Space Conditioning System Controls

Space-Conditioning Zone Controls:

- Remove 20 percent of peak primary airflow for deadband operation.

Section: 140.4(e)1 – Economizers

Requirements for economizers:

- Threshold for economizer requirements revised to 33,000 Btu/hr mechanical cooling capacity.
- Exception for air handlers less than 54,000 Btu/hr and uses a dedicated outdoor air systems.
- Exception for specific air economizer systems serving controlled environment horticulture spaces.

Expected 15 Day Language Changes:

- Exhaust air heat and minimum ventilation airflow rate requirements previously in 140.4(p) will move into Exception 6 in 140.4(e)1.

Table 140.4-D Economizer Trade-Off Table for Cooling Systems

Table 140.4-D:

- Clarification language added to economizer trade-off table for cooling systems.

Section: 140.4(k)8 – High Capacity Space Heating Gas Boiler Systems

Hydronic system measures:

- High capacity space heating gas boiler systems minimum thermal efficiency requirements of 90 percent.
- Hot water distribution design so that hot water entering the boiler will have a temperature of 120 F or less.

Section: 140.4(l) – Air Distribution System Duct Leakage Sealing

Prescriptive requirements for duct leakage will be relocated from prescriptive section to mandatory requirements section.

Section: 140.4(p) – Prescriptive Requirements for Dedicated Outdoor Air Systems (DOAS)

New prescriptive requirements for DOAS:

- Identifies 2 configurations for DOAS.
- Fan efficacy requirements for DOAS unit fan systems.
- DOAS supply air delivery requirements
- DOAS zone equipment operation requirements when the zone is not calling for heating or cooling.
- DOAS supply and exhaust fan multispeed requirements.
- DOAS heating and reheat requirements.

Section: 140.4(p) – 15 Day Expected Changes

Requirements for DOAS:

- Section 140.4(p) applies to all DOAS.
- Remove current A and B configurations.
- Move and consolidate various requirements and exceptions for clarity.

Section: 140.4(q) – Exhaust Air Heat Recovery

New prescriptive requirements for exhaust air heat recovery:

- Similar requirements to ASHRAE 90.1.
- Look up tables added to determine if requirements are applicable.
- Applies to non-critical healthcare facilities.

Expected 15 Day Language Changes:

- Changes in 140.4(q) will be updated to reflect changes to 140.4(p).
- Footnotes for Table 140.4-H and 140.4-G revised to require full design supply airflow to be the total airflow of only the DOAS unit.

Section: 140.5 – Service Water Heating Systems

Nonresidential Occupancies 140.5(a):

- Discussed during this morning's session.

High Capacity Service Water Heating Systems 140.5(c):

- Capacity 1 MMBtu/hr or greater must have a minimum thermal efficiency of 90 percent.
- Exception if 25 percent of annual service water water-heating is provided by solar energy or site-recovered energy.
- Exception if water heaters are installed in individual dwelling units.
- Individual gas water heaters with input capacity at or below 100,000 Btu/hr shall not be included in the calculations.

Section: 140.6(a)2K –Power Adjustment Factor for Demand Responsive Lighting Controls

Lighting Power Adjustment Factor Requirements for Demand Responsive Controls:

- Clarification that lighting is not within scope of Section 110.12(c).
- Updated requirements for demand responsive lighting control requirements to qualify for power adjustment factor.

Section: 140.6(c)3 - Calculation of Allowed Indoor Lighting Power: Tailored Method

Update terms and additional lighting power:

- Change “Ornamental” term to “Decorative”.
- Updated additional allowed power for very valuable display case lighting.

Section 140.6(a)4B – Indoor Lighting

Luminaire classification and power adjustment:

- Update the small aperture tunable luminaires lighting power adjustment factor.
- Update and clarify the physical-dimension qualifying criteria for small aperture tunable luminaires.

Tables 140.6-A, 140.6-B, 140.6-C, 140.6-D, 140.6-G – Indoor Lighting

Updates to values in various lighting tables:

- Updates to lighting power adjustment factors and when adjust factors can be claimed if demand responsive lighting controls are used (Table 140.6-A).
- Updates to lighting power density values for complete building, area category, and tailored methods (Tables 140.6-B, Table 140.6-C and Table 140.6-D).
- Updates to lighting power density tailored method general lighting power allowed-by illuminance and room cavity ratio (Table 140.6-G).

Table 140.7-A & Table 140.7-B for Outdoor Lighting Power Allowance

Updates to Table 140.7-A and Table 140.7-B:

- Align outdoor lighting power allowances with Chapter 17 of ANSI/IES RP-8-18 with Addendum 1.
- Provide one set of lighting power allowance values for parking facilities with asphalt or concrete surfaces.
- New lighting power allowance for general hardscape lighting application with security cameras.
- Revise term “cutoff” to “shielding”.

Section: 140.9(a) – Computer Rooms

Prescriptive space conditioning requirements for reheat, humidification and fan controls will be relocated from prescriptive section to mandatory requirements section.

Section: 140.9(a)1 – Economizers for Computer Rooms

Full Economizing Requirements for Economizers for Computer Rooms:

- Air economizer full economizing temperature threshold of 65° F dry bulb and 50° F wet bulb.
- Water economizer full economizing temperature threshold of 50° F dry bulb and 45° F wet bulb.
- Refrigerant economizer full economizing at 50° F dry bulb.

Section: 140.9(a)3 – Computer Rooms Air Containment

Requirements for Air Containment for Computer Rooms:

- Revise requirement for air containment in computer rooms to 10 kW (2.8 tons) per room information technology equipment design load.

Section: 140.9(a)4 – Uninterruptible Power Supplies for Computer Rooms

Requirements for Uninterruptible Power Supplies for Computer Rooms:

- Add minimum efficiency requirements for alternating current-output uninterruptible power supplies serving computer rooms.

Section: 140.9(c)3C – Laboratory and Factory Exhaust Fan System Power Consumption

Measuring flow rates:

- At least one sonic anemometer or at least two anemometers of other types.
- Fault management system shall log error and time when it occurred.
- Added processes for checking anemometer failures.

Section: 140.10 –Photovoltaic and Battery Storage Systems

Photovoltaic and Battery Storage System

Requirements:

- Discussed during this morning’s session.

Questions?

SUBCHAPTER 6
NONRESIDENTIAL, AND HOTEL/MOTEL OCCUPANCIES – Additions, Alterations and Repairs

Presenter: Haile Bucaneg

DATE 5/24/2021

Lead Commissioner Hearing for 45-Day Language

Section: 141.0 – Nonresidential and Hotel/Motel Occupancies – Additions, Alterations, and Repairs

Remove high-rise residential from building types covered in section 141 and clarify relocatable public school buildings:

- Nonresidential and hotel/motel buildings.
- Relocation or moving of a relocatable public school building is not, by itself, considered an alteration for the purposes of Title 24, Part 6.

Section: 141.0(a)2 – Additions Performance Approach

Exceptions for specific gas water boilers and gas service water heating:

- Exception 5 to Section 141.0(a): A gas hot water boiler system with a total system input of at least 1 MMBtu/h but no more than 10 MMBtu/h added to an existing building is exempt from the requirements of 140.4(k)8.
- Exception 5 to Section 141.0(a): A gas service water heating with a total system input of at least 1 MMBtu/h added to an existing building is exempt from the requirements of 140.5(c).

Section: 141.0(b)1D – Alterations Mandatory Requirements

New Fan Energy Index (FEI) requirement:

- New fan systems serving an existing building shall meet the requirements of Section 120.10.

Section: 141.0(b)2B – Alterations Prescriptive Approach for Roofs

Revisions to requirements for existing roofs of nonresidential or hotel/motel buildings:

- References roofing product requirements in Section 140.3(a)1A.
- References roof/ceiling insulation requirements in Table 141.0-C
- Exceptions for specific conditions for roof recovers, roof replacements or drains.

Table 141.0-B – Roof/Ceiling Insulation Tradeoff for Low-Sloped Aged Solar Reflectance

Aged Solar Reflectance	Climate Zones 6, 7, & 8 U-factor	All Other Climate Zones U-factor
0.62- 0.60	0.043	0.035
0.59-0.55	0.041	0.034
0.54-0.50	0.038	0.031
0.49-0.45	0.034	0.029
0.44-0.40	0.032	0.028
0.39-0.35	0.029	0.026
0.34-0.30	0.028	0.025
0.29-0.25	0.026	0.024

Table 141.0-C – Insulation Requirements for Roof Alterations

Climate Zone	Continuous Insulation R-value	U-factor
1-5, 9-16	R-23	0.037, with at least R-10 above deck
6-8	R-17	0.047, with at least R-10 above deck

Section: 141.0(b)2C – Alterations Prescriptive Approach for Space Conditioning

Requirements for new or replacement space-conditioning systems:

- New additional fan power allowance Table 141.0-D.
- New or replacement space conditioning systems or components are exempt from new heat pump baseline.
- Economizer exemption for single packaged air-cooled commercial unitary air conditioners and heat pump less than 54,000 Btu/hr.

Section: 141.0(b)2D – Alterations Prescriptive Approach for Altered Duct Systems

Requirements for new or replacements ducts:

- References requirements in Section 120.4(a) through (f).
- Duct system sealing and leakage testing requirements revised.

Section: 141.0(b)3 – Performance Approach

Clarification of code language:

- Minor revisions and relocation of code language for clarification.

Section: 141.1(b) – Additions and Alterations Requirements for Computer Room

Requirements for newly installed computer room cooling systems and uninterruptible power supply systems:

- Reference to Section 120.6(j) for mandatory reheat, humidification and fan controls requirements.
- Reference to Section 140.9(a)2 for fan power consumption requirements.
- Reference to Section 140.9(a)4 for uninterruptible power supply requirements.

Section: 141.1(b)1 – Additions and Alterations Requirements for Computer Rooms Economizers

Full economizing requirements for economizers for computer rooms:

- Air economizer full economizing temperature threshold of 55°F dry bulb and 50°F wet bulb.
- Water economizer full economizing temperature threshold of 40°F dry bulb and 35°F wet bulb.
- Refrigerant economizer full economizing at 40°F dry bulb and 35°F wet bulb.

Section: 141.1(c)1 – Additions and Alterations Requirements for Controlled Environment Horticulture

Requirements for equipment serving CEH spaces:

- Reference Section 120.6(h)1 and Section 120.6(h)2 for space-conditioning systems and dehumidification for indoor growing.
- Reference Section 120.6(h)5 and Section 120.6(h)6 for greenhouse building envelope and space-conditioning systems.
- Provide requirements for indoor growing and greenhouse lighting systems.

Questions?

How to submit Written Comments

- **We strongly encourage submitting written comments via e-file.** Comments on the proposed 2021 Energy Code can be submitted to: https://efiling.energy.ca.gov/EComment/EComment.aspx?docketnumber= 21-BSTD-01

- Comments can also be submitted physically or by e-mail, here:

California Energy Commission
Dockets Office, MS-4
Re: Docket No. 21-BSTD-01
1516 Ninth Street
Sacramento, CA 95814-5512
Docket@energy.ca.gov

Final deadline for written comments is June 21, 2021 by 5:00 PM

Thank You!