



**TITLE 24, PART 6**

**2025 CODE CYCLE**



# Demand Control Kitchen Ventilation (DCKV)

Codes and Standards Enhancement (CASE) Proposal  
Nonresidential | Commercial Kitchens



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May 18, 2023

Utility-Sponsored Stakeholder Meeting  
Round 2



# Agenda

Overview of Code Change Proposal

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Summary of Stakeholder Feedback

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Cost-effectiveness, Energy Savings and Statewide Impacts

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Data Gaps and Additional Feedback Requested

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Next Steps





# Code Change Proposal

- Code Change Proposal
- Code Change Language
- EEEJ considerations

# Recap on Proposed Code Change

- This measure moves existing prescriptive DCKV requirement from one of four options to a mandatory requirement of DCKV and in addition to one of three remaining options.
- The total hood(s) design airflow for all kitchen/dining facilities operating under the same roof is considered to evaluate the 5,000-cfm threshold. This includes food courts, and cloud kitchens. Standalone restaurants with total design hood exhaust airflow below 5,000-cfm are excluded.

# Draft Code Change Language - Additions

## SECTION 120.6 – Mandatory Requirements for Covered Processes

(l) A kitchen/dining facility having a total Type I and Type II kitchen hood exhaust airflow rate greater than 5,000 cfm shall have a demand ventilation system(s) on at least 75 percent of the exhaust air. Such systems shall:

1. Include controls necessary to modulate airflow in response to appliance operation and to maintain full capture and containment of smoke, effluent and combustion products during cooking and idle; and
2. Include failsafe controls that result in full flow upon cooking sensor failure; and
3. Include an adjustable timed override to allow occupants the ability to temporarily override the system to full flow; and
4. Be capable of reducing exhaust and replacement air system airflow rates to the larger of:
  - A. 50 percent of the total design exhaust and replacement air system airflow rates; or
  - B. The ventilation rate required as specified by Section 120.1(c)3.

# Draft Code Change Language - Deletions

## SECTION 140.9 – Prescriptive Requirements for Covered Processes [a-c]

### 2. Kitchen ventilation.

~~ii. Demand ventilation system(s) on at least 75 percent of the exhaust air. Such systems shall:~~

~~a. Include controls necessary to modulate airflow in response to appliance operation and to maintain full capture and containment of smoke, effluent and combustion products during cooking and idle; and~~

~~b. Include failsafe controls that result in full flow upon cooking sensor failure; and~~

~~c. Include an adjustable timed override to allow occupants the ability to temporarily override the system to full flow; and~~

~~d. Be capable of reducing exhaust and replacement air system airflow rates to the larger of:~~

~~(i). 50 percent of the total design exhaust and replacement air system airflow rates; or~~

~~(ii). The ventilation rate required as specified by Section 120.1(c)3.~~

~~iii.ii.~~ Listed energy recovery devices with a sensible heat recovery effectiveness of not less than 40 percent on at least 50 percent of the total exhaust airflow; or

~~iv.iii.~~ A minimum of 75 percent of makeup air volume that is:

a. Unheated or heated to no more than 60°F; and

b. Uncooled or cooled without the use of mechanical cooling.

# Impact on EEEJ Citizens and Communities

- Review focused on the potential impact on three main DIPs identified: small businesses, public institutions, and foodservice workers.
- Given the 5000cfm threshold for DCKV to become a requirement, it is unlikely to have much impact on small businesses.
- Facilities that are likely to reach the 5000cfm threshold and also be new construction are generally institutional, such as cafeterias, hospitals, universities and hotels.





# Summary of Stakeholder Feedback

- Summary of Feedback Received
- Measure Evolution
- Potential Barriers and Solutions

# Summary of Feedback Received

- General support for adoption of DCKV technology for new construction
- Lack of clarity in code language for defining a “kitchen/facility”
  - Code language has since been updated
- Concerns for end users adopting the “least expensive” solution as opposed to most effective solution for their specific site resulting in missed savings opportunity.
  - Rebate programs/incentives and future code updates to address these concerns.
- Different thresholds/or penalties applied for gas and mixed lineups.
  - ASHRAE research and Fundamentals Handbook shows that heat gain for appliance lines does not vary for fuel type.

**Please review the draft code language and let us know if you have comments or recommendations. Did we forget any feedback/concerns?**

# Evolution of the Measure

The main change to the scope of this measure is the transition from a prescriptive requirement to a mandatory requirement.

# Barriers and Solutions

No major additional barriers to discuss for the proposed measure since the last stakeholder meeting.

# Cost Effectiveness and Energy Savings

## *Methodology and Assumptions*

- Energy Savings Methodology and Results
- Cost Impacts Methodology and Results
  - Incremental costs
  - Energy cost savings



# Preliminary Energy Savings Estimates Per Sq Ft

<b>Annual Electricity Savings (kWh/yr)</b>	2.65
<b>Annual Natural Gas Savings (kBTU/yr)</b>	8,000
<b>Peak Demand Reduction (W)</b>	0.00
<b>Annual Source Energy Savings (kBTU/yr)</b>	10.42

## Key Assumptions:

- One 5000 cfm hood per building kitchen

\*Results shown for restaurants, though also calculated for small schools, large schools and hospitals.

# Incremental Cost Per Sq Ft

*Over 30 Year Period of Analysis*

Incremental First Cost	\$2.87
Incremental Maintenance Cost	\$0.00
<b>Total</b>	<b>\$2.87</b>

Total incremental cost over 30 year period of analysis: **\$2.87/sq ft new construction**

Cost data came from:

- Rebate Program Claims Data
- Manufacturers

# Cost Effectiveness

Climate Zone	Benefits <i>Life Cycle Energy Cost Savings + Other PV Savings (2026 PV\$)</i>	Costs <i>Total Incremental PV Costs (2026 PV\$)</i>	Benefit-to-Cost Ratio
1	\$58.76	\$2.87	20.5
2	\$58.76	\$2.87	20.5
3	\$58.76	\$2.87	20.5
4	\$58.76	\$2.87	20.5
5	\$58.76	\$2.87	20.5
6	\$58.76	\$2.87	20.5
7	\$58.76	\$2.87	20.5
8	\$58.76	\$2.87	20.5
9	\$58.76	\$2.87	20.5
10	\$58.76	\$2.87	20.5
11	\$58.76	\$2.87	20.5
12	\$58.76	\$2.87	20.5
13	\$58.76	\$2.87	20.5
14	\$58.76	\$2.87	20.5
15	\$58.76	\$2.87	20.5
16	\$58.76	\$2.87	20.5

# Statewide Impacts

## *Methodology and Assumptions*

- Statewide Energy Impacts  
Methodology and Results



# Statewide Economic Impacts Methodology

The Statewide CASE Team estimates annual statewide impacts by multiplying **A x B x C**:

- A. Per-sq.ft. energy impacts (discussed in previous section)
- B. number of sq.ft. of new construction/additions/alterations of each applicable building type
- C. portion of affected sq.ft. in each climate zone

## Example:

Per Unit Impacts			Affected New Construction				Statewide Energy Impacts			
Savings type	Savings per square foot		Climate Zone	Large Office sq ft	Assembly sq ft		Climate Zone	Elec Savings (GWh)	...	GHG savings (MT CO <sub>2</sub> e)
Electricity	[X] kWh		1	100	20		1	20		1,500
Peak demand	[X] Watts		2	1,000	1,500		2	50		3,000
Natural gas	[X] Therms		...				...			
GHG emissions	[X] Tons CO <sub>2</sub> e		16	5,000	3,000		16	100		2,000

# 2026 Construction Forecast

Construction Forecast Building Type		Newly Constructed Floorspace Impacted (%)	Existing Floorspace Impacted (%)
<b>Residential</b>	SF500	0%	0%
	SF2100	0%	0%
	SF2700	0%	0%
	Low-rise Garden	0%	0%
	Loaded Corridor	0%	0%
	High-rise Multifamily	0%	0%
	Mid-rise Multifamily	0%	0%
<b>Nonresidential</b>	Large Office	0%	0%
	Medium Office	0%	0%
	Small Office	0%	0%
	Large Retail	0%	0%
	Medium Retail	0%	0%
	Strip Mall	0%	0%
	Mixed-use Retail	0%	0%
	Large School	1.1%	<1.1%
	Small School	11.7%	<11.7%
	Non-refrigerated Warehouse	0%	0%
	Hotel	0%	0%
	Assembly	0%	0%
	Hospital	4.1%	<4.1%
	Laboratory	0%	0%
	Restaurant	25%	<25%
	Enclosed Parking Garage	0%	0%
	Open Parking Garage	0%	0%
	Grocery	0%	0%
	Refrigerated Warehouse	0%	0%
	Controlled-environment Horticulture	0%	0%
	Vehicle Service	0%	0%
Manufacturing	0%	0%	
Unassigned	0%	0%	

# Affected space types across building prototypes

- Restaurant-Kitchens
- Hospital-Kitchens
- Small School-Kitchens
- Large School-Kitchens



## Poll

Do you agree with the prototypes used for the statewide impact assumptions?



# Data Gaps and Additional Feedback Requested

- Additional Data Needs
- Feedback Requested

# Data Gaps & Additional Feedback Requested

- Are there any incremental costs we missed?
- Do you agree with the modeling assumptions/prototypes used? Can you provide better data/insight for the kitchen assumptions made?
- Are there any additional changes you would like to see to the proposed code language?



# Discussion and Next Steps

# We want to hear from you!

- Provide **any last comments or feedback** on this presentation now verbally or over the GoTo Webinar Questions Pane
- More information on pre-rulemaking for the 2025 Energy Code at <https://www.energy.ca.gov/programs-and-topics/programs/building-energy-efficiency-standards/2025-building-energy-efficiency>

**Comments on this measure are due by May 31, 2023.** Please send comments to [info@title24stakeholders.com](mailto:info@title24stakeholders.com) and copy CASE Authors (see contact info on following slide).

# Thank You

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