



**BSR/ASHRAE/IES Addendum ca
to ANSI/ASHRAE/IES Standard 90.1-2022**

Public Review Draft

**Proposed Addendum ca to
Standard 90.1-2022, Energy
Standard for Sites and Buildings
Except Low-Rise Residential
Buildings**

**Second Public Review (August 2025)
(Draft Shows Proposed Independent Substantive
Changes to the Previous Public Review Draft)**

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FOREWORD

This addendum is a second public review of proposed changes to the Additional Efficiency Requirements located in Section 11. This ISC includes the following changes.

- 1. Reduces the required energy credits in Table 11.5.1 from what was originally proposed.*
- 2. Increases the allowable Renewable and Load Management credits that can be used from 60% to 70%*
- 3. Proposes changes to Lighting Credits L02, L03 and L06 to align with changes included in other addendum*
- 4. Proposes changes to L05 in response to a CMP submitted to the Committee regarding life safety issues*
- 5. Proposes changes to G08 and G09 to make the requirements easier to understand and allow for greater flexibility.*
- 6. Proposes changes to W11 to address concerns related to the use of chemical dishwashers and to expand the credit to low-temperature dishwashers that utilize heat recovery.*

Using just energy cost savings and no cost of carbon considerations the package is deemed cost effective using the economic criteria established by the 90.1 Committee. We use a weighted Scalar Ratio because different credits have different equipment lives.

[Note to Reviewers: This public review draft makes proposed independent substantive changes to the previous public review draft. These changes are indicated in the text by underlining (for additions) and ~~striketrough~~ (for deletions) except where the reviewer instructions specifically describe some other means of showing the changes. Only these changes to the previous draft are open for review and comment at this time. Additional material is provided for context only and is not open for comment except as it relates to the proposed substantive changes.]

Addendum ca to 90.1-2022

Modify Section 3.2 as follows

AC-Coupled: electrical connections between electrical sources, electrical storage, and electrical loads using alternating current.

DC-Coupled: electrical connections between electrical sources, electrical storage, and electrical loads using direct current.

Electric Vehicle Power Export Equipment (EVPE): ~~Equipment that manages the export of electrical power, stored in electrical vehicles, to a building, site or electrical grid. EVPE and EVSE may be combined in one piece of equipment and be synonymous with the term bidirectional EVSE. See NFPA 70/NEC Article 625.~~ The equipment, including the outlet on the vehicle, that is used to provide electrical power at voltages greater than 30V AC or 60V DC to loads external to the vehicle as the source of supply.

Modify Section 3.3 as follows

DC direct current

Modify Section 11.5.1 as follows

11.5.1 Energy Credits Required. Projects shall achieve the total number of credits required in Table 11.5.1-1 based on the *building* use type and climate zone. ~~Not less than five credits shall be from measures described in Section 11.5.2.6 (R01) and 11.5.2.8 (G01-G10).~~ Buildings shall comply as follows:

Modify Table 11.5.1 as follows:

Table 11.5.1-1 Energy Credit Requirements by Building Use Type

Building Use Type ^a	Climate Zone																		
	0A	0B	1A	1B	2A	2B	3A	3B	3C	4A	4B	4C	5A	5B	5C	6A	6B	7	8
Multifamily ^b	89 78	93 72	94 71	95 71	89 67	88 66	76 57	83 62	76 57	85 63	84 63	76 57	83 62	88 66	73 55	90 68	86 65	84 63	91 68
Health care ^c	80 60	72 54	80 60	79 59	79 59	75 56	77 58	73 55	81 61	76 57	71 53	76 57	69 52	70 53	80 60	75 56	73 55	77 58	74 56
Hotel/motel	105 79	100 75	94 71	93 70	84 63	78 59	75 56	75 56	72 54	68 51	71 53	59 50	67 50	68 51	59 47	73 55	64 48	71 53	71 53
Office ^d	104 78	101 76	103 77	110 83	98 74	98 74	100 75	97 73	92 69	99 74	99 74	92 69	102 77	102 77	90 68	107 80	103 77	109 82	105 79
Restaurant ^e	102 77	98 74	93 70	94 71	89 67	81 61	89 67	82 62	68 51	93 70	82 62	77 58	94 71	87 65	86 65	102 77	94 71	114 86	122 92
Retail	117 88	116 87	112 84	114 86	105 79	97 73	90 68	90 68	70 53	85 64	77 58	64 50	81 61	77 58	62 47	78 59	77 58	71 53	69 52
Education ^f	97 73	100 75	113 85	110 83	112 84	110 83	107 80	114 86	104 78	105 79	117 88	102 77	103 77	118 89	94 71	110 83	110 83	114 86	110 83
Warehouse ^g	95 71	92 69	105 79	98 74	104 78	107 80	91 68	109 82	113 85	105 79	117 88	106 80	89 67	99 74	102 77	82 62	98 74	88 66	75 56
Other ^h	52 39	50 38	50 38	50 38	47 35	46 35	44 33	46 35	42 33	46 35	45 34	41 31	45 34	46 35	41 31	48 36	45 34	47 35	47 35

Modify Section 11.5.2 as follows

11.5.2 Energy Credits Achieved. Projects shall comply with the following:

- a. Energy credits achieved for the project shall be the sum of measure energy credits for individual measures included in the project.
- b. Where a project contains multiple *building* use types, credits achieved for each *building* use type shall be weighted by the *gross floor area* of each *building* use type group to determine the weighted-average project energy credits achieved.
- c. The combined renewable (R01) and load management (G01 through G10) energy credits achieved through Section 11.5.2.6 and 11.5.2.8 shall be no less than 10% and limited to no greater than 60% of required energy credits by Section 11.5.1.
- d. The combined envelope (E01 and E02), HVAC (H01 through H08), service water heating (W01 through W11), energy monitoring (P01), lighting (L01 through L06) and equipment (Q01 through Q03) energy credits achieved through credit measures in Sections 11.5.2.1 through 11.5.2.5 and 11.5.2.7 shall be no less than 30% of the energy credits required by Section 11.5.1.
- e. Credits are available for the measures listed in Section 11.5.2.1 through 11.5.2.8 and the base energy credit values are specified by Tables 11.5.3-1 through 11.5.3-9 by *building* use types and climate zone.
- f. Measure *energy* credits achieved shall be determined in one of three ways, depending on the measure:
 - a1. The measure *energy* credit shall be the base *energy* credit for the measure, where no adjustment factor or formula is shown in the measure description (e.g., ECH02_base).
 - b2. The measure *energy* credit shall be the base *energy* credit for the measure, adjusted by a factor or formula as stated in the measure description in this section. Where adjustments are applied, each measure *energy* credit shall be rounded to the nearest whole number (e.g., ECH02_adj).
 - c3. The measure *energy* credit shall be by direct formula as stated in the measure description in this section, where each measure credit shall be rounded to the nearest whole number (e.g., ECH02_calc).

Modify Section 11.5.2.3.8 and Table 11.5.2.7.2-3 as follows,

Table 11.5.2.7.2-3 Efficiency Requirements for Energy Credits: Commercial Dishwashers^a

Machine Type	High-Temp Efficiency Requirements		Low-Temp Efficiency Requirements		Test Procedure
	Idle Energy Rate ^b	Water Consumption ^c	Idle Energy Rate ^b	Water Consumption ^c	
Under counter	≤0.30 kW	≤0.86 GPR	≤0.25 kW	≤1.19 GPR	ASTM Standard F1696-20 ASTM Standard F1920-15
Stationary single-tank door	≤0.55 kW	≤0.89 GPR	≤0.30 kW	≤1.18 GPR	
Pot, pan, and utensil	≤0.90 kW	≤0.58 GPR	NR	NR	
Single-tank conveyor	≤1.20 kW	≤0.70 GPR	≤0.85 kW	≤0.79 GPR	
Multiple-tank conveyor	≤1.85 kW	≤0.54 GPR	≤1.00 kW	≤0.54 GPR	
Single-tank flight type	Reported	$GPH \leq 2.975x + 55.00$	NR	NR	
Multiple-tank flight type	Reported	$GPH \leq 4.96x + 17.00$	NR	NR	

*NR=no requirement

- Energy and water requirements from ENERGY STAR Program Requirements for Commercial Dishwashers – Eligibility Criteria (Rev. September – 2021)
- Idle results should be measured with the door closed and represent the total idle energy consumed by the machine including all tank heater(s) and controls. Internal or external booster heater energy consumption shall not be part of this measurement unless it cannot be separately monitored.
- GPR = gallons per rack; GPSF = gallons per square foot of rack; GPH = gallons per hour; x = square feet of conveyor belt (i.e., width × length)/min (max conveyor speed) × x = maximum conveyor speed (feet/min as verified through NSF 3 certification) × conveyor belt width (feet).

11.5.2.3.8 W11: Low-Temperature Advanced Commercial Conveyor and Flight-Type Dishwashers. To achieve this credit conveyor and flight-type dishwashing equipment in commercial kitchens shall be low temperature dishwashers that apply a chemical sanitizing solution for final sanitation and that comply with the applicable efficiency requirements specified in Table 11.5.2.7.2-3. Such equipment shall use pumped fresh water rinse, use an automatic soil removal device, have an integral system diagnostics and controls interface, be specified on the construction documents submitted for permitting, and be installed prior to the issuance of the certificate of occupancy and comply with one of the following:-

- Be a low temperature dishwasher that applies chemical sanitizing solution for final sanitation.
- Be a high temperature dishwasher that uses not less than 180F(82C) water for final sanitation, has an energy recovery device to preheat incoming cold water for wash and rinse cycles, and has a cold-water-only supply connection.

Modify sections 11.5.2.5.2, 11.5.2.5.3, 11.5.2.5.5 and 11.5.2.5.6 as follows

11.5.2.5.2 L02: Continuous Dimming and High-End Trim or Lumen Maintenance Control. To achieve this credit, 75% or more of the installed interior lighting power shall have luminaires configured for continuous dimming and control devices configured for high-end trim or lumen maintenance and shall comply with the following:

- Construction documents for permitting shall specify the maximum initial and tuned set points for each luminaire control group of luminaires at the time of permitting.
- Set point configuration setting shall be accessible only to authorized personnel, and shall comply with one of the following:-
- Luminaires, to be installed with control devices configured to use high-end trim, shall have initial Initial lighting power shall be reduced by 15% or more from full output.
- Luminaires, to be installed with control devices configured to use lumen maintenance control without lighting sensors, shall be configured to limit the initial maximum lumen output or maximum lighting power to 85% or less of full light output or full power draw. For hotel and multifamily building use types, the gross lighted floor area shall not include dwelling units or guest rooms.
- Manual control devices shall not increase the lighting power above the maximum set point.

For hotel and multifamily building use types, the gross lighted floor area shall not include dwelling units or guest rooms. Where general lighting in less Less than 75% but not less than 50% of the installed interior lighting power gross lighted floor area shall receive receives high-end trim, the base credits from the tables in Section 11.5.3 shall be prorated as follows:

$$EC_{L02_adj} = \frac{LUM_{tuned}}{75\%} \times EC_{L02_base}$$

where

EC_{L02_adj} = energy credits achieved for lighting ~~high-end trim or lumen maintenance control-load management~~

LUM_{tuned} = percentage of installed interior lighting power using luminaires ~~with continuous dimming and control devices~~ configured for high-end trim or lumen maintenance, where $50\% \leq LUM_{tuned} \leq 75\%$

EC_{L02_base} = L02 base energy credit value specified by Section 11.5.3

11.5.2.5.3 L03: Occupancy Sensor Control Areas. To achieve this credit, *buildings* shall comply with one of the following:

- a. Section 9.3, “Simplified Building Method Compliance Path,”
- b. Where a space type in Table 9.5.2.1-1 or Table 9.5.2.1-2 specifies ~~Add2-ADD2 for occupancy sensor reduction or occupancy sensor~~ shutoff control, *occupancy sensors* serving the space shall be installed and configured as follows:
 1. ~~Automatic-Occupancy sensors shall shutoff or all lighting in each control zone light reduction shall occur~~ within no more than 15 minutes of all occupants leaving each such control zone.
 2. ~~For spaces with multiple control zones or occupancy sensor reduction control, occupancy sensor shutoff shall occur within 15 minutes of all occupants leaving the space.~~
 3. ~~For spaces with one control zone, occupancy sensor shutoff control shall be used.~~
 4. ~~All areas of the project with occupancy sensor reduction or occupancy sensor shutoff control shall have one control device for every 600 ft² of gross lighted area. The occupancy sensor shutoff control zones shall not average more than 600 ft² (56 m²) and no single zone more than 900 ft² (84 m²).~~

Exception to 11.5.2.5.3: *Occupancy sensor* shutoff control is not required for stairwells.

11.5.2.5.5 L05: Lighting Control for Multifamily Buildings

- a. ~~Common areas and utility rooms shall have automatic full OFF control in accordance with Section 9.4.1.1(h). Stairwells, lobbies, and corridors shall have occupancy sensors with reduction in accordance with Section 9.4.1.1(g). Controls shall reduce general lighting in the space by 66% or more of lighting power within 15 minutes of all occupants leaving the spaces.~~
- b. All non-dwelling unit spaces not listed in 11.5.2.5.5(a) shall have occupancy sensor shutoff in accordance with section 9.4.1.1(h).
- c. Each *dwelling unit* shall have a main control by the ~~main primary~~ entrance that turns off not less than 75% of permanently installed interior luminaires all the lights, and all switched receptacles in the *dwelling unit*. Not less than two switched receptacles shall be provided in living and sleeping rooms or areas and clearly identified. All switched receptacles shall be located within 12 in. of an unswitched receptacle. The main control shall be permitted to have two controls, one for permanently wired lighting and one for switched receptacles. The main controls ~~should~~ shall be clearly identified as “lights ~~master main~~ off” and “switched outlets ~~master main~~ off”.

Exception: ~~Alternatively, where all permanently wired lighting is~~ Lighting controlled by *occupancy sensors* in accordance with Section 9.4.1.1(h), ~~only switched outlets are required to be master switched.~~

11.5.2.5.6 L06: Reduce Interior Lighting Power. To achieve this credit, the building shall use Section 9.3, “Simplified Building Method Compliance Path,” or the *installed interior lighting power*, ~~less excluding~~ any additional lighting permitted by Section 9.5.2.2, shall be 95% or less than the *interior lighting power allowance*, ~~less excluding~~ any additional lighting permitted by Section 9.5.2.2. In multifamily, dormitory, hotel, and motel *buildings*, the credit shall be calculated for all areas excluding *dwelling units*, ~~dormitories~~, dormitory living quarters, fire station sleeping quarters, and guest rooms. Energy credits shall not be credited more ~~greater~~ than 2 times the L06 base energy credit specified by Section 11.5.3 and shall be determined as follows:

Modify sections 11.5.2.8, 11.5.2.8.8 and 11.5.2.8.9

11.5.2.8 Load Management Systems. Energy credits for load management measures in Sections 11.5.2.8.1 through 11.5.2.8.10 are available ~~in any combination~~ to projects in *buildings* that have at least one or more of the following:

[...]

11.5.2.8.8 G08: Electric Vehicle Charging Load Management. To achieve this credit, buildings ~~shall have~~ with parking facilities with 40 kW or more of load dedicated to electric vehicle charging ~~shall have~~ and automatic controls activated by a utility demand response signal, peak price period time control, or local building monitoring which shall be configured to reduce electric vehicle charging load by not less than 10% of the active load dedicated to electric vehicle charging. This measure is not permitted to be used in combination with measure G09. Credits ~~credits~~ shall be prorated as follows:

$$EC_{G08_adj} = \frac{EV_{CL_red}}{1.0} AF \times EC_{G08_base}$$

$$AF = \left[\frac{EVCC_{Prop}}{(GCFA \times EVCD_{Base})} \right]$$

Where:

EC_{G08_adj} = energy credits achieved for electric vehicle charging load management

~~EV_{CL_red} = electric vehicle charging load reduction, kW~~

EC_{G08_base} = G08 base energy credit value specified by Section 11.5.3

AF = ratio of proposed charging capacity to base credit charging capacity. When calculating EC_{G08_adj} , AF shall be no less than 1.0 and shall have a maximum value of 3.

$EVCC_{Prop}$ = proposed electric vehicle charging capacity in watts, W

$GCFA$ = gross conditioned floor area, ft² (m²)

$EVCD_{base}$ = Base (default) EV charging capacity density 0.1 watts per square foot (watts per square meter) of gross conditioned floor area for warehouses, 2 watts per square foot (watts per square meter) of gross conditioned floor area, for all other building types, W/ft² (W/m²)

11.5.2.8.9 G09: Electric Vehicle Power Export. To achieve this credit, ~~warehouses and multifamily buildings shall have~~ with parking facilities with 40 kW or more of load dedicated to electric vehicle charging ~~and shall have:~~

- Electric vehicle power transfer equipment configured to export power from electric vehicles ~~into the building's power supply and,~~
- Automatic controls, activated by utility demand response signal, peak price period time control, or local building monitoring, shall enable electric vehicle power export by 10% or more of active load dedicated to electric vehicle charging ~~and be configured to use stored energy during on peak periods to reduce building peak period demand.~~

~~For projects with more than 40 kW of electric vehicle power export or projects that enable electric vehicle power export by 10% or more of overall load dedicated to electric vehicle charging, credits~~ This measure is not permitted to be used in combination with measure G08. Credits shall ~~can~~ be prorated as follows:

$$EC_{G09_adj} = \frac{EVSE_{cap}}{1.0} AF \times EC_{G09_base}$$

$$AF = \left[\frac{EVCC_{Prop}}{(GCFA \times EVCD_{Base})} \right]$$

where

EC_{G09_adj} = energy credits achieved for electric vehicle ~~charging load management~~ power export

~~$EVSE_{cap}$ = installed EVSE capacity capable of electric vehicle power export, kW~~

EC_{G09_base} = G09 base energy credit value specified by Section 11.5.3

AF = ratio of proposed charging capacity to base credit charging capacity. When calculating EC_{G09_adj} , AF shall be no less than 1.0 and shall have a maximum value of 3.

$EVCC_{Prop}$ = proposed electric vehicle charging capacity in watts, W

$GCFA$ = gross conditioned floor area, ft² (m²)

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$EVCD_{Base}$ = Base (default) EV charging capacity density 0.1 watts per square foot ([watts per square meter](#)) of *gross conditioned floor area* for warehouses, 2 watts per square foot ([watts per square meter](#)) of *gross conditioned floor area*, for all other building types, W/ft² ([W/m²](#))

Table 11.5.3-2 Energy Credits for Health Care Buildings

G09	Electric Vehicle Power Export	11.5.2.8.8	9x	10x	10x	10x	10x	11x	10x	11x	11x	10x	11x	12x	10x	11x	11x	10x	10x	9x	9x
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Table 11.5.3-3 Energy Credits for Hotel/Motel

G09	Electric Vehicle Power Export	11.5.2.8.8	5x	5x	6x	6x	6x	6x	7x	7x	6x	6x	7x	7x	6x	7x	8x	6x	7x	6x	6x
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Table 11.5.3-4 Energy Credits for Office Buildings

G09	Electric Vehicle Power Export	11.5.2.8.8	9x	8x	10x	10x	11x	11x	11x	12x	12x	10x	12x	12x	11x	11x	12x	11x	11x	9x	8x
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Table 11.5.3-5 Energy Credits for Restaurant Buildings

G09	Electric Vehicle Power Export	11.5.2.8.8	5x	5x	6x	6x	6x	6x	7x	7x	6x	6x	7x	7x	6x	7x	8x	6x	7x	6x	6x
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Table 11.5.3-6 Energy Credits for Retail Buildings

G09	Electric Vehicle Power Export	11.5.2.8.8	9x	8x	10x	10x	11x	11x	11x	12x	12x	10x	12x	12x	11x	11x	12x	11x	11x	9x	8x
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Table 11.5.3-7 Energy Credits for Education Buildings

G09	Electric Vehicle Power Export	11.5.2.8.8	2x	3x	3x	3x	3x	4x	3x	4x	3x	3x	4x	4x	2x	4x	5x	4x	3x	3x	3x
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Table 11.5.3-9 Energy Credits for Other Buildings

G09	Electric Vehicle Power Export	11.5.2.8.8	6x	6x	7x	7x	7x	8x	7x	8x	8x	6x	8x	8x	6x	7x	9x	7x	7x	6x	6x
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