

Comparison of the 2026 Commercial Florida Building Code, Energy Conservation, 9th Edition with 2024 IECC & ASHRAE 90.1-2022

Interim Report

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Executive Summary

The State of Florida requested a qualitative and quantitative analysis comparing the commercial provisions of the 9th Edition (2026) Florida Building Code, Energy Conservation (FBCEC) against the 2024 IECC and ASHRAE Standard 90.1-2022. This interim report presents both the complete qualitative findings and the quantitative results for the ASHRAE 90.1-based compliance path.

The primary objectives completed in this phase include:

- **Identifying High-Impact Code Changes:** Evaluated provisions in both the IECC-based and ASHRAE 90.1-based 2026 FBCEC relative to the 2023 FBCEC, 2024 IECC, and ASHRAE Standard 90.1-2022.
- **Documenting Excluded National Provisions:** Identified specific national model code sections omitted from the 2026 FBCEC.
- **Quantitative Analysis of ASHRAE 90.1:** Conducted a comparative analysis of the ASHRAE 90.1-based 2026 FBCEC against the 2022 ASHRAE Standard 90.1.

Key Qualitative Findings

- **Appendix A (IECC-Based Provisions):** Summarizes 26 high-impact code changes identified in the IECC-based 2026 FBCEC. At least 11 key provisions have been designated for quantitative evaluation. Notably, the expanded additional efficiency options alone may require up to eight measures per building occupancy type to achieve the target energy credits.
- **Appendix B (ASHRAE 90.1-Based Provisions):** Describes 29 modifications to ASHRAE Standard 90.1-2022 that affect energy performance, 15 of which were identified as suitable for analysis using whole-building energy simulation.

Quantitative Results: ASHRAE 90.1-Based Path

A comparative energy simulation was performed evaluating the ASHRAE 90.1-based 2026 FBCEC against the 2022 ASHRAE Standard 90.1 U.S. national standard reference. The analysis used modified U.S. Department of Energy (DOE) commercial prototype building energy models, simulated in EnergyPlus (a whole-building energy performance simulation program), covering 16 building types in Florida's two climate zones (1A and 2A), for a total of 32 models.

The statewide site Energy Use Intensity (EUI) results, weighted by commercial building stock floor area, are as follows:

- **2022 ASHRAE Standard 90.1 Reference:** 41.94 kBtu/ft²-yr
- **ASHRAE 90.1-Based 2026 FBCEC:** 42.24 kBtu/ft²-yr

As anticipated, the ASHRAE 90.1-based 2026 FBCEC exhibits slightly higher average energy consumption—**0.73% higher**—due solely to the exclusion of Section 8.4.2 (Automatic Receptacle Control).

Next Steps

In the coming months, the quantitative comparative analysis evaluating the IECC-based 2026 FBCEC against the 2024 IECC U.S. national building energy code will be completed.

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Acronyms and Abbreviations

ANSI	American National Standards Institute
ASHRAE	American Society of Heating, Refrigerating, and Air-Conditioning Engineers
DOE	U.S. Department of Energy
EIA	U.S. Energy Information Administration
FBCEC	Florida Building Code, Energy Conservation
HVAC	Heating, ventilation, and air-conditioning
IES	Illuminating Engineering Society of North America
IECC	International Energy Conservation Code
PNNL	Pacific Northwest National Laboratory

Simulation Prototype Terminology

IECC-Based 2023 FBCEC	is a building energy model that simulates the 8 th Edition (2023) FBCEC, which is IECC-based.
ASHRAE 90.1-Based 2023 FBCEC	is a building energy model that simulates the 8 th Edition (2023) FBCEC under its ASHRAE Standard 90.1- 2019 compliance option.
IECC-Based 2026 FBCEC	is a building energy model that simulates the 9 th Edition (2026) FBCEC, which is IECC-based.
ASHRAE 90.1-Based 2026 FBCEC	is a building energy model that simulates the 9 th Edition (2026) FBCEC under its ASHRAE Standard 90.1- 2022 compliance option.
ASHRAE 90.1-2019	is a building energy model that simulates ASHRAE Standard 90.1-2019 .
ASHRAE 90.1-2022	is a building energy model that simulates ASHRAE Standard 90.1-2022 .

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1. Introduction

The State of Florida requested a qualitative and quantitative comparative analysis of the commercial provisions of the 9th Edition (2026) Florida Building Code, Energy Conservation (FBCEC) relative to the 2024 IECC and ASHRAE Standard 90.1-2022. This phase of the project includes a qualitative review of the code changes and selected components of the quantitative analysis.

This interim report identifies and summarizes the energy-impactful revisions between the IECC-based 2026 FBCEC and the 2023 FBCEC, as well as between the ASHRAE 90.1-based 2026 FBCEC and ASHRAE Standard 90.1-2022. The ASHRAE 90.1-based 2026 FBCEC is a modified version of ASHRAE Standard 90.1-2022. Appendix A and Appendix B provide complete listings of all energy-impactful changes in the IECC-based and ASHRAE 90.1-based versions of the 2026 FBCEC, respectively.

Qualitative Analysis of Code Changes

- Identifies and summarizes the energy-impactful changes in the IECC-based and ASHRAE 90.1-based 9th Edition (2026) FBCEC. Each appendix table includes the code section and title, a brief description of the change, and the anticipated energy impact. The analysis also identifies high-impact provisions from the 2024 IECC and ASHRAE Standard 90.1-2022 that were not adopted in the 2026 FBCEC.
- Identifies the code changes recommended for inclusion in the quantitative comparative analysis.

Quantitative Analysis of Code Changes

- Develop building energy models for the 2026 FBCEC and the 2024 IECC for 16 prototype buildings across Florida's two climate zones (1A and 2A), simulate them, and perform a comparative energy analysis.
- Conduct a similar comparative analysis for the ASHRAE 90.1-based 2026 FBCEC against ASHRAE Standard 90.1-2022 using modified U.S. Department of Energy (DOE) prototype building models.
- The comparative energy performance analysis between the ASHRAE 90.1-based 2026 FBCEC and ASHRAE Standard 90.1-2022 has been completed and is included in this interim report. The analysis methodology is introduced, and results are presented using Energy Use Intensity (EUI) and Energy Cost Index (ECI) metrics.
- Complete the remaining quantitative analysis comparing the IECC-based 2026 FBCEC with the 2024 IECC U.S. national model energy code; this work is currently in progress.

2. The IECC-Based 2026 Florida Building Energy Code

This analysis compares the IECC-based 2026 (9th Edition) Florida Building Code, Energy Conservation (FBCEC) with the 2024 IECC and identifies the code modifications and additions with the greatest energy impact, such as the expanded set of new additional energy efficiency measures. To quantify these impacts, 32 prototype building energy models (16 building types in each of Florida's two climate zones) will be simulated in EnergyPlus, the U.S. Department of Energy's whole-building energy performance simulation program (U.S. Department of Energy, 2026), to evaluate the energy performance of the 2026 FBCEC relative to the 2024 IECC. This interim report presents the initial qualitative analysis of these high-impact changes; the comparative quantitative analysis will be completed in the coming months.

2.1 Most Impactful Code Changes of the 2026 FBCEC

Appendix A provides a comprehensive list of the energy-impactful code changes in the 2026 FBCEC, giving each modification's section number, title, brief description, and potential qualitative energy impact. Table 1 summarizes these high-impact changes, which will be considered for the quantitative evaluation. The review of the IECC-based 2026 FBCEC identified twenty-six code modifications and new additions with an energy impact. At least eleven of them will be included in the quantitative analysis. The expanded additional efficiency measures alone may require a combination of three to eight measures for each building occupancy group to meet the energy efficiency credit target. For the comparative analysis, energy models will be developed for 16 prototype building types across two climate zones and evaluated under both the 2026 FBCEC and the 2024 IECC.

Table 1 Energy-impactful code changes added to the 9th Edition (2026) FBCEC

2026 FBCEC	Energy-Impactful Code Changes Added to the 2026 FBCEC	Discussion
C401.2	Modified the compliance requirements for the simulated building performance method by introducing a new equation to estimate the percentage of annual energy cost (PAEC) for the standard reference design. The annual energy cost must be less than or equal to the PAEC, calculated as follows: $PAEC = 100 \times (0.80 + 0.025 - EC_r / 1000)$ where: PAEC = The percentage of the annual energy cost of the standard reference design. EC_r = Energy efficiency credits required for the building in accordance with Section C406.1, excluding load management and renewable credits. The change also requires that: (1) energy prices be obtained from approved sources, and code officials be permitted to require time-of-use pricing in energy cost calculations; (2) the reduction in the proposed design's energy cost associated with on-site renewable energy not exceed 5% of the total energy cost; and (3) the amount of renewable energy purchased from off-site sources be the same for the standard reference design and proposed design.	The project compliance calculation must ensure that the reduction in the proposed design's energy cost associated with on-site renewable energy does not exceed 5% of the total energy cost. The amount of renewable energy purchased from off-site sources must be the same in the standard reference design and the proposed design. This change impacts all sixteen prototype buildings.
C402.1.4	Modified Table C402.1.4, Opaque Thermal Envelope Assembly Maximum Requirements, <i>U</i>-Factor Method. Added <i>U</i>-factor values for opaque non-swinging doors in all climate zones that are equivalent to the R-values in Table C402.1.3.	Reduced the opaque door <i>U</i>-factor from 0.61 to 0.37 Btu/h-ft²-°F to match the 2024 IECC values. This change affects the swinging-door <i>U</i>-factor in all fourteen prototype buildings (excluding the apartment buildings) in climate zones 1A and 2A.
C402.4	Modifies Table C402.4, Building Envelope Fenestration Maximum <i>U</i>-Factor and SHGC Requirements, by increasing the stringency of fenestration <i>U</i>-factor and SHGC requirements to align with the 2024 IECC.	The change reduces fenestration <i>U</i>-factors and SHGC values in Climate Zones 1A and 2A. It also lowers skylight <i>U</i>-factor and SHGC requirements in Climate Zone 1A. This change affects all sixteen prototype building models.

2026 FBCEC	Energy-Impactful Code Changes Added to the 2026 FBCEC	Discussion
C402.5.1.2	Section C402.5.1.2 (Section C402.6.2 in the 2024 IECC) requires whole-building air leakage testing and measurement for buildings other than Group R and I occupancies. Buildings under 25,000 ft² of floor area in climate zones 1 and 2 must also be tested and must meet the threshold of 0.35 cfm/ft². Advances in air leakage control technology have reduced the measured air leakage threshold to 0.35 cfm/ft² from 0.40 cfm/ft². Whole-building testing is required for buildings smaller than 10,000 ft², and partial testing is allowed for buildings larger than 50,000 ft².	Adds whole-building air leakage testing and measurement requirements and increases stringency for buildings with less than 25,000 ft² of floor area. The leakage threshold of 0.35 cfm/ft² was applied to small offices, stand-alone retail, strip mall, outpatient health care, hospital, hotels, warehouses, restaurants, and apartment prototype buildings.
C403.2.15	C403.2.15 Buildings with high-capacity space-heating gas boiler systems. New construction requires condensing boilers that achieve a condensing-level efficiency of 90% for large space-heating gas boiler systems with capacities between 1 and 10 MBtuh. To ensure that condensing occurs, the boiler entering-water temperature must not exceed 120°F.	Increases the efficiency requirements for large boilers in new construction. This change may affect the large office, hotel, secondary school, and high-rise apartment prototype buildings.
C405.3.2 & Table C405.3.2(1)	Based on improved lighting technologies, this change reduced the Building Area Method lighting power density (LPD) allowances in Section C405.3.2 and Table C405.3.2(1); most LPD values were reduced. The measure has little to no impact on construction cost.	Increased lighting efficacy due to improved LED technologies. Impacts office prototype buildings.
C405.3.2 & Table C405.3.2(2)	Based on improved lighting technologies, this update provides space-by-space lighting power density (LPD) values in Section C405.3.2 and Table C405.3.2(2). Most interior lighting power allowances were reduced, with little to no impact on construction cost.	Increased lighting efficacy due to improved LED technologies. Impacts most prototype buildings.

2026 FBCEC	Energy-Impactful Code Changes Added to the 2026 FBCEC	Discussion
C405.5.2	This change modifies Section C405.5.2 and Table C405.5.2(2) to update the exterior lighting power allowance values. It reduces the allowances based on advances in lighting technology and aligns them with ASHRAE 90.1-2022 requirements.	Reduces the exterior lighting power allowances. Impacts all sixteen prototype buildings.
C403.7.1	Revised the demand control ventilation (DCV) requirements by modifying the minimum floor-area threshold for DCV by climate zone. Heat recovery exemptions are based on climate zone and floor area; the exception now applies only to small floor areas and is therefore more restrictive. This change increases DCV stringency in climate zones 1A and 2A.	Added DCV to the large office, outpatient health care, hotel, retail, and school prototype buildings based on occupancy, floor area, and climate zone. In the school prototype building, DCV was added to all classrooms and other single-zone systems.
C403.7.8	Adds occupied-standby controls in new Section C403.7.8. This change affects the following space types: postsecondary classrooms, lecture rooms, training rooms, conference/meeting/multipurpose rooms, lounges/breakrooms, enclosed offices, open-plan office areas, and corridors. The change reduces lighting and fan electricity use with minimal or no increase in construction cost. It is cost-effective and is already included in ASHRAE 90.1-2022.	Added occupied-standby control to selected spaces in nine prototype buildings. This change affects the office, school, outpatient health care, hotel, and apartment prototype buildings.

2026 FBCEC	Energy-Impactful Code Changes Added to the 2026 FBCEC	Discussion
C406	Expanded the additional energy efficiency credit options, increasing the number of measures from 6 to 39, including renewable energy and load management measures. Designers select from these 39 measures to achieve the minimum required targets. The target credits for each measure vary by building type and climate zone. The 39 measures are: • C406.2.1 More efficient building thermal envelopes have six measures: E01 through E06. • C406.2.2 More efficient HVAC equipment performance has five measures: H01 through H05. • C406.2.3 Reduced energy use in service water heating has ten measures: W01 through W10. • C406.2.4 P01 Energy monitoring • C406.2.5 Energy savings in lighting systems has five measures: L02 through L06. • C406.2.6 Efficient equipment credits has four measures: Q01 through Q04. • C406.3.1 R01 Renewable energy • C406.3.2 G01 Lighting load management • C406.3.3 G02 HVAC load management • Table C406.3.3 Energy Credit Adjustment Based on Use of Ventilation Shift or Demand Response • C406.3.4 G03 Automated shading load management • C406.3.5 G04 Electric energy storage • C406.3.6 G05 Cooling energy storage • C406.3.7 G06 Service hot water energy storage • C406.3.8 G07 Building thermal mass	This change impacts all sixteen prototype buildings. However, the measures applied to a prototype building type depend on the energy credit target, the building occupancy group, and the climate zone. A combination of achievable measures that meets the required energy efficiency credit targets will be selected for each prototype building.

2026 FBCEC	Energy-Impactful Code Changes Added to the 2026 FBCEC	Discussion
C406.3.1.1	Adds new Section C406.3.1.1, Renewable energy systems, which is equivalent to Section C405.15.1 of the 2024 IECC. It is intended to match the 2024 IECC, but as an optional code provision. This section requires buildings to be provided with on-site renewable electricity generation systems with a power rating of not less than 0.75 W/ft² multiplied by the sum of the gross conditioned floor area of all floors, but not to exceed the combined gross conditioned floor area of the three largest floors. The section has four exceptions. This change has no impact on code stringency because it is optional. In the 2024 IECC, on-site renewable energy systems are a mandatory requirement.	Adds on-site PV generators to all prototype buildings except the fast-food restaurant prototype, which is exempt because its floor area is smaller than the 5,000-square-foot threshold.

2.2 Impactful 2024 IECC Changes Excluded from the 2026 FBCEC

Compared with the 2024 IECC, the IECC-based 2026 FBCEC excludes several provisions, including automatic receptacle controls, mandatory on-site renewable energy systems, energy monitoring, and energy recovery ventilator (ERV) requirements for nontransient dwelling units. On-site renewable energy will still be evaluated under the 2026 FBCEC's additional efficiency options. Under the 2024 IECC, automatic receptacle controls and mandatory on-site renewable energy requirements apply to all 16 prototype buildings. Table 2 identifies the 2024 IECC provisions that were excluded from or not incorporated into the 9th Edition (2026) FBCEC.

Table 2 Energy-impactful code provisions excluded from the 2026 FBCEC

2024 IECC Section and Title	Description
C403.2.3 Fault detection and diagnostics	Buildings with a gross conditioned floor area of 100,000 ft ² (9290 m ²) or larger that are served by HVAC systems controlled by a direct digital control (DDC) system are required to include a Fault Detection and Diagnostics (FDD) system to monitor HVAC performance and automatically identify faults. This provision is not included in the 2026 FBCEC; however, the code does contain an economizer-specific fault detection requirement in Section C403.2.4.7. In addition, FDD appears as an optional additional efficiency measure in Section C406.2.6.4 (Q04 Fault Detection and Diagnostics System). Because FDD functionality is not adequately represented in whole-building energy simulation programs, this provision will not be included in the quantitative analysis.
C403.7.4.1 Nontransient dwelling units	Neither the 2023 FBCEC nor the 2026 FBCEC includes a section dedicated to ERV requirements for nontransient dwelling units. This omission affects the high-rise and mid-rise apartment prototype buildings.
C403.16 Service water pressure-booster systems	This new provision requires variable-speed pressure-booster systems, which can achieve energy savings of 20%–50% by using onboard pressure sensors and control software instead of pressure-reducing devices and field-mounted remote pressure sensors. It also requires the booster pump to shut off when there is no water flow. The 2026 FBCEC does not include an equivalent section.
C405.2.10 Sleeping unit and dwelling unit lighting and switched receptacle controls	This new provision requires sleeping and dwelling units to have lighting controls and switched-receptacle controls rather than occupancy-sensor-based lighting and receptacle controls. This change simplifies compliance requirements for dwelling and sleeping units and reduces stringency. The 2026 FBCEC does not include an equivalent section. This code change may impact the mid-rise and high-rise apartment prototype buildings.
C405.2.10.1 Sleeping units and dwelling units in hotels, motels and vacation timeshare properties	This new provision requires switched-receptacle controls and occupant-sensor lighting controls. Automatic shutoff is not required when a captive-key override controls all lighting and switched receptacles in a unit with five or few permanently installed lights and switched receptacles. This change provides a cost-effective alternative to occupancy-sensor-based lighting and receptacle controls. The 2026 FBCEC does not include an equivalent section.

2024 IECC Section and Title	Description
C405.3.2.2 Space-by-Space Method	This code modification reduces the maximum total connected lighting-power allowance for unfinished spaces from 0.20 W/ft ² to 0.10 W/ft ² . The 2026 FBCEC does not include this change. The modification will not be included in the quantitative analysis because it does not apply to the prototype buildings.
C405.11 Automatic Receptacle Control, C405.11.1 Automatic receptacle control function	Automatic receptacle controls are excluded from both the 2023 FBCEC and the 2026 FBCEC. The analysis applies reduction factors to plug-load schedules to account for automatic receptacle controls, affecting all 16 prototype buildings.
C405.13 Energy monitoring	New buildings with a gross conditioned floor area of at least 10,000 ft ² must be equipped to measure, monitor, record, and report energy-consumption data in accordance with this section. The 2026 FBCEC includes a related optional provision under additional efficiency measure P01 in Section C406.3.1.1.1. The measure is supported by self-contained energy-monitoring provisions in new Sections C406.2.4.1 through C406.2.4.5 of the 2026 FBCEC. This measure will not be included in the quantitative analysis because it cannot be readily implemented in whole-building energy simulations.
C405.15.1 On-site renewable energy systems	Buildings must be provided with on-site renewable electricity generation systems with a direct current (DC) nameplate power rating of at least 0.75 W/ft ² (8.1 W/m ²), multiplied by the total gross conditioned floor area of all floors and capped at the combined gross conditioned floor area of the three largest floors. The 2026 FBCEC includes a similar optional provision for use with the additional efficiency measures in Section C406.3.1.1.1.
C405.15.2 Off-site renewable energy	Buildings that qualify for one or more exceptions to Section C405.15.1, or that do not satisfy their requirements through an on-site renewable energy system, must procure off-site renewable electrical energy in accordance with Sections C405.15.2.1 and C405.15.2.2. The amount must be at least the total off-site renewable electrical energy calculated under Equation 4-11. The 2026 FBCEC includes a similar optional provision for use with additional efficiency measures in Section C406.3.1.1.2. This provision may not be included in the quantitative analysis.

3. ASHRAE 90.1-Based 2026 Florida Building Energy Code

A qualitative analysis of code changes is conducted during each code development cycle using the addenda listed in Informative Appendix M of ASHRAE Standard 90.1-2022 (ASHRAE, 2022), together with supplementary addenda published on the ASHRAE website. The analysis identifies changes that affect building energy use. [Appendix B](#) summarizes each modification and its anticipated energy impact.

ASHRAE Standard 90.1-2022 includes 88 code-change addenda, 29 of which affect energy use. Fifteen of those 29 addenda are suitable for quantitative analysis. These 15 addenda were evaluated to determine their energy impact on Florida's building energy code, and the results were compared with the ASHRAE 90.1-based 9th Edition (2026) FBCEC. Notably, the 9th Edition (2026) FBCEC excludes Sections 8.4.2, 8.4.3, and 9.4.1.1(g) of ASHRAE Standard 90.1-2022. Table 3 summarizes the most energy-impactful changes in ASHRAE Standard 90.1-2022. The excluded sections identified above are the only differences between the ASHRAE 90.1-based 9th Edition (2026) FBCEC and ASHRAE Standard 90.1-2022.

Key energy-impact improvements include mandatory building-envelope air-leakage testing and measurement; condensing boilers in new construction; minimum fan-efficiency requirements for low-power ventilation fans; enhanced demand-control ventilation requirements; start/stop and setback controls for residential HVAC systems; and revised exterior lighting power and control requirements. Additional improvements include a lower minimum connected-load threshold for daylight-responsive controls in sidelit and toplit areas; higher efficacy thresholds for lamps and luminaires in dwelling units; updated space-by-space lighting power density (LPD) values and interior control requirements; revised decorative and retail lighting power allowances; and increased thermal-efficiency requirements for high-capacity, gas-fired service water-heating equipment.

Further improvements establish a minimum prescriptive requirement for on-site renewable energy and introduce provisions to improve the efficiency of elevator fans, lighting, and operation. The updates also lower the air-economizer threshold for packaged fan-cooling units installed outside the building from 54 kBtu/h to 33 kBtu/h. In addition, a new section of ASHRAE Standard 90.1 introduces supplemental energy-efficiency credits intended to reduce energy costs by approximately 4% to 5%.

Table 3 Energy-impactful code changes added to ASHRAE Standard 90.1-2022

Addendum	Code Change Summary Between ASHRAE 90.1-2019 and ASHRAE 90.1-2022	Discussion
t	This amendment requires whole-building air leakage testing and measurement for buildings smaller than 10,000 ft ² , specifies performance requirements for compliance, references the applicable ASTM standard, and modifies the relevant definition.	Adds whole-building air leakage testing and measurement requirements. Increases stringency for buildings with less than 10,000 ft ² of floor area. This change impacts on the small office and restaurant prototype buildings.
bc	Requires condensing boilers for new construction to achieve condensing-level efficiency (i.e., 90% Et) for large boiler systems (i.e., between 1 and 10 MBtuh) and, to ensure that condensing occurs, requires the boiler entering water to be within the prescribed temperature or flow-rate limits.	Increases efficiency requirements for large boilers in new construction. It may affect the large hotel prototype building.
a	Establishes minimum fan efficacy requirements for low-power ventilation fans and references Standard 62.2 to determine the minimum ventilation rates for nontransient dwelling units.	This amendment adds minimum fan efficiency requirements for smaller ventilation fans not covered by Section 6.5.3.6.
b	Revises demand control ventilation parameters to be determined based on climate zone and Standard 62.1 airflow requirements.	For cost-effectiveness, the DCV requirement is based on occupancy, floor-area size, and climate zone.
c	Requires residential HVAC systems greater than 2.1 kW to be equipped with start/stop and setback controls.	Adds advanced HVAC controls in dwelling units. These control features impact apartment prototype buildings.
am	Updates exterior lighting power and control requirements based on technological improvements and revised lighting practices; restructures portions of Section 9 to better communicate exceptions to those requirements.	Reduces the exterior lighting power allowances and adds control requirements based on specific applications.
o	This change reduces the minimum connected load that triggers daylighting responsive control requirements for sidelighting and toplighting.	Because of improved LED technology, the minimum connected load for daylight-responsive controls is reduced from 150 W to 75 W for sidelighting and from 300 W to 150 W for toplighting.
br	Increases the efficacy threshold for lamps and luminaires in dwelling units and specifies interior and exterior lighting control requirements.	Increased lighting efficacy and added control requirements for interior and exterior lighting. This change also removed the exception due to permanent control requirements.

Addendum	Code Change Summary Between ASHRAE 90.1-2019 and ASHRAE 90.1- 2022	Discussion
ba	Updates space-by-space lighting power density (LPD) values and interior control requirements in Section 9.4.1.1 and Table 9.5.2.1.	Increased lighting efficacy and added control requirements for interior lighting.
bf	This change updates the decorative and retail lighting power allowances, adds an allowance for videoconferencing, and moves the additional power allowances and required controls to a table for easy reference.	Reduces decorative and retail lighting power allowances. Impacts retail prototype buildings.
ah	Increases the thermal efficiency required for high-capacity gas-fired service water-heating equipment and provides the U.S. DOE criteria for defining high-capacity water heaters.	Where a single high-capacity water heater supplies a system, or where multiple high-capacity water heaters serve a single system, the minimum efficiency increases to 92%. This change may affect the large hotel prototype building.
by	Adds a minimum prescriptive requirement for on-site renewable energy.	The building site must have on-site renewable energy equipment with a rated capacity of at least 0.5 W/ft ² multiplied by the sum of the gross conditioned floor area of all floors, up to the three largest floors.
cf	Introduces provisions that improve elevator fan, lighting, and movement efficiency.	This change increases elevator fan efficiency, reduces the lighting allowance, and improves standby mode energy use.
ci	Lowers the air-economizer threshold for packaged fan cooling units installed outside the building from 54 kBtuh to 33 kBtuh. Does not apply to indoor installations.	Reduces the cooling energy required for smaller packaged systems where applicable.
ap	Adds a new section to ASHRAE Standard 90.1 that uses energy credits to save approximately 4% to 5% of energy costs. Users can earn the required number of credits for their building type and climate zone from 32 individual measures.	A new Section 11 includes thirty-two cost-effective prescriptive energy credit requirements and supports nine building occupancy types.

4. Florida Climate Zones

Based on the U.S. Department of Energy (DOE) climate zone classification, Florida comprises two climate zones: Very Hot-Humid (1A) and Hot-Humid (2A). Miami (Zone 1A) and Tampa (Zone 2A) were selected as representative site locations for the quantitative analysis, matching the standard climate cities used by DOE for U.S. national building energy code studies. The distribution of Florida’s commercial building stock floor area across these climate zones and building types—along with the underlying methodology—is detailed in Appendix D.

5. Comparative Analysis of the 2026 Florida Energy Code

The quantitative analysis determined and compared annual total Energy Use Intensity (EUI) and Energy Cost Index (ECI) by prototype building type, as well as a floor-area-weighted Florida average. Sixteen commercial prototype building types were used to represent Florida's commercial new construction building stock. [Appendix D summarizes](#) the floor area weighting factors by building type and how they were determined for the State of Florida.

Annual energy use and annual operating energy costs were compared between prototype building energy models designed to the ASHRAE 90.1-based 2026 FBCEC and those designed to the 2022 ASHRAE Standard 90.1. The comparative energy performance analysis between the IECC-based 2026 FBCEC and the 2024 IECC is not included in this interim report.

The 2022 ASHRAE Standard 90.1 prototype models were based on the U.S. Department of Energy (DOE) reference commercial prototype building energy models developed by PNNL (DOE, 2023). The ASHRAE 90.1-based 2026 FBCEC prototype models were developed by modifying these DOE reference models. The 16 prototype building types represent the commercial building stock. The 15 energy-impactful changes to ASHRAE Standard 90.1-2022 summarized in Table 3 were incorporated into the prototype models. In total, 32 commercial prototype building models—representing 16 building types in each of Florida's two climate zones—were simulated under both energy codes using EnergyPlus, DOE's whole-building energy performance simulation program (U.S. Department of Energy, 2026).

Finally, the EUI and ECI of the prototype models designed under the ASHRAE 90.1-based 2026 FBCEC and ASHRAE Standard 90.1-2022 were determined by post-processing the simulation outputs of the 64 prototype building models. Weighted Florida average site EUIs and ECIs were calculated using weighting factors that reflect each prototype building's floor area distribution by climate zone and building type.

- **Site EUI** was determined by dividing a building's total annual electric and natural gas energy consumption by its total floor area.
- **Site ECI** was determined by dividing a building's total annual operating energy cost (including electricity and natural gas) by its total floor area.

The percent differences in EUI and ECI between the ASHRAE 90.1-based 2026 FBCEC and ASHRAE Standard 90.1-2022 were calculated as follows:

$$\text{Percent Difference (\%)} = \left(\frac{X_{\text{FBCEC}} - X_{\text{BaseCode}}}{X_{\text{BaseCode}}} \right) \times 100$$

Where:

- X represents the EUI or ECI value of an individual prototype building or an aggregate across all 16 prototype buildings.
- X_{BaseCode} represents the EUI or ECI value (or weighted average) for the 2022 ASHRAE Standard 90.1 reference models.

- X_{FBCEC} represents the EUI or ECI value (or weighted average) for the ASHRAE 90.1-based 2026 FBCEC models.

The latest standard utility rates for electricity and natural gas in Florida used for this analysis were obtained from the U.S. Energy Information Administration (EIA) and are detailed in [Appendix C](#).

5.1 Prototype Buildings and Floor Area Distribution

The performance of the Florida commercial building energy code was analyzed quantitatively using the sixteen prototype building energy models representing climate zones 1A and 2A. Figure 1 shows the total floor area weighting factors used for Florida commercial buildings, by prototype building. These sixteen prototype energy models represent the commercial building stock floor area and its distribution by prototype building in the State of Florida.

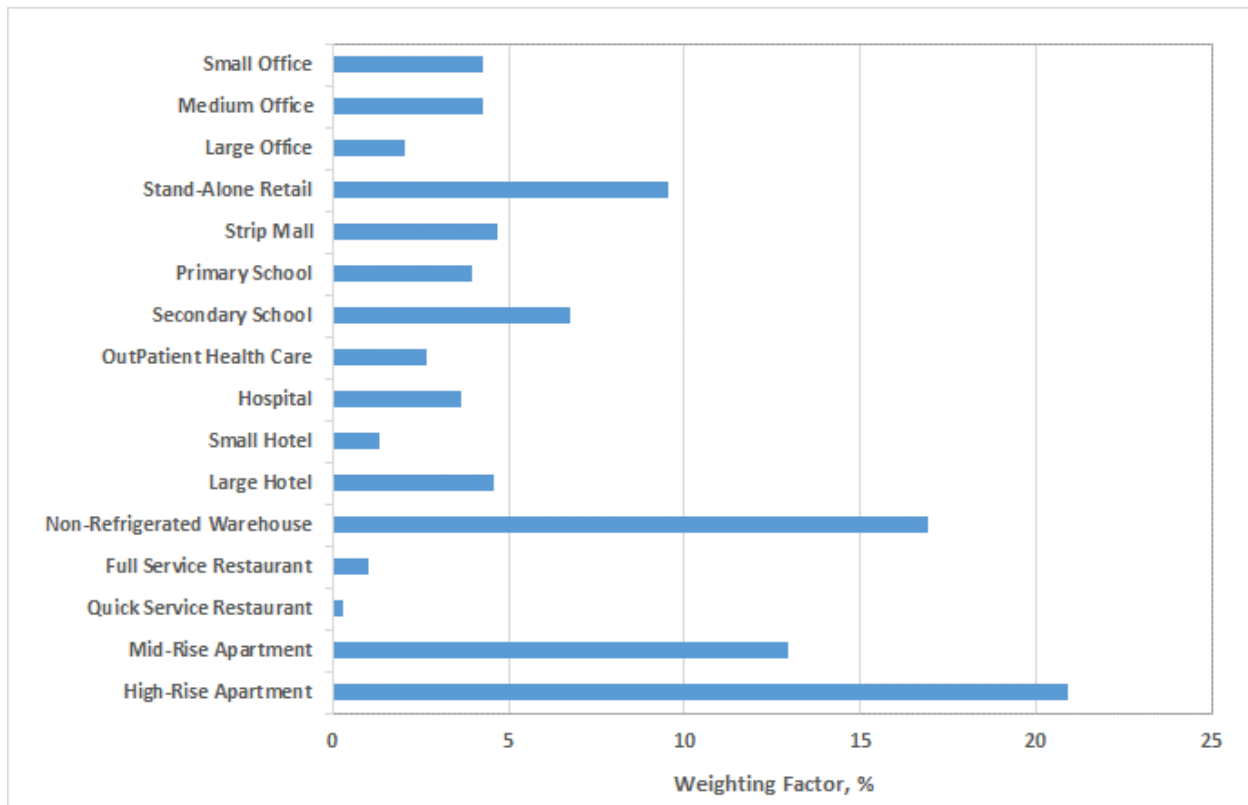


Figure 1 Commercial Prototype Building Types and Floor Area Distribution in Florida

DOE uses the same commercial prototype buildings floor area distribution dataset to represent the U.S. national commercial building stock in quantitative building energy analyses. According to DOE, these building types represent 75% of the U.S. national commercial building floor area stock (Lei et al., 2020). The prototype building floor area weighting factors presented here are specific to the State of Florida and were determined as detailed in Appendix D.

6. Comparative Analysis of the 2026 FBCEC and ASHRAE 90.1-2022

Modeling Methodology and Code Modifications

The 9th Edition (2026) Florida Building Code, Energy Conservation (FBCEC) allows ASHRAE Standard 90.1-2022 as a compliance path. However, the ASHRAE 90.1-based 2026 FBCEC excludes three provisions from the national standard:

- **Section 8.4.2:** Automatic Receptacle Control
- **Section 8.4.3:** Energy Monitoring
- **Section 9.4.1.1(g):** Automatic Reduction (Partial-OFF) Lighting Control

This section presents the quantitative comparison of the energy performance of the ASHRAE 90.1-based 2026 FBCEC and the ASHRAE 90.1-2022 U.S. national building energy code. To quantify the impact of these exclusions, a comparative energy analysis was conducted using 32 whole-building energy models, comprising 16 commercial prototype building types modeled across Florida's two climate zones (1A and 2A) under both the 2022 ASHRAE Standard 90.1 reference and the 2026 FBCEC.

Prototype models for the 2026 FBCEC were developed by modifying the U.S. Department of Energy (DOE) reference commercial prototype models for ASHRAE Standard 90.1-2022. Section 8.4.3 (Energy Monitoring) is not amenable to energy simulation and was omitted from the quantitative evaluation for both the ASHRAE 90.1-2022 and the ASHRAE 90.1-based 2026 FBCEC prototype building models. The 2022 ASHRAE Standard 90.1 prototype models incorporate energy-impactful changes, summarized in Table 3; the ASHRAE 90.1-based 2026 FBCEC models incorporate all these changes except for the excluded sections mentioned above. For each prototype building, only three to eight additional efficiency measures are incorporated into the models to meet the required additional energy efficiency credit targets.

Section 8.4.2: Automatic Receptacle Controls

The 2026 FBCEC waives the mandatory automatic receptacle control requirements specified in Section 8.4.2. In the DOE prototype models, receptacle controls are represented by applying reduced hourly load fractions. Eliminating this control affects all 16 prototype building types, although the magnitude of the impact varies considerably by occupancy. For example, in the multi-family (apartment) prototype, the effect is confined entirely to common office spaces.

Section 8.4.3: Energy Monitoring

Energy monitoring can significantly reduce operational energy consumption; however, it cannot be effectively represented within building energy simulation programs and is therefore excluded from the quantitative analysis for both the ASHRAE 90.1-based 2026 FBCEC and the ASHRAE Standard 90.1-2022 model energy codes.

Section 9.4.1.1(g): Automatic Reduction Control

ASHRAE Standard 90.1-2022 includes interior lighting control requirements under Section 9.4.1.1(g) (automatic reduction/partial-OFF) and Section 9.4.1.1(h) (automatic full-OFF), with Table 9.6.1 specifying the required control type by space. The 2026 FBCEC removes Section 9.4.1.1(g). As a result, any space that would otherwise require partial-OFF controls must instead comply with the automatic full-OFF requirements in Section 9.4.1.1(h), which mandate that all non-exempt lighting automatically turn off within 20 minutes of vacancy.

A review of the DOE prototype building models indicates that automatic full-OFF control (Section 9.4.1.1(h)) is already implemented in the ASHRAE 90.1-2022 U.S. reference models wherever Section 9.4.1.1(g) applies. Because the DOE prototypes already assume full-OFF control in these spaces, removing Section 9.4.1.1(g) in the 2026 FBCEC does not produce any impact in modeled energy use between the ASHRAE 90.1-based 2026 FBCEC and ASHRAE Standard 90.1-2022. Furthermore, ASHRAE Standard 90.1-2022 clarifies that compliance with Section 9.4.1.1(h) also satisfies the requirements of Section 9.4.1.1(g).

Quantitative Results & Energy Performance Comparison

Energy Use Intensity (EUI) values for each prototype building and climate zone were aggregated using Florida-specific commercial floor-area weighting factors developed from Pacific Northwest National Laboratory (PNNL) data (Lei et al., 2020).

As expected, the omission of automatic receptacle controls results in slightly higher energy use in the ASHRAE 90.1-based 2026 FBCEC compared with the US. national model energy code:

- **ASHRAE Standard 90.1-2022 Reference:** 41.94 kBtu/ft²-yr (weighted average)
- **ASHRAE 90.1-based 2026 FBCEC:** 42.24 kBtu/ft²-yr (weighted average)

Overall, the weighted average site EUI for the ASHRAE 90.1-based 2026 FBCEC is approximately **0.73% higher** than ASHRAE Standard 90.1-2022 across Florida's commercial building stock. This difference is attributable solely to the exclusion of Section 8.4.2, *Automatic Receptacle Control*, from the FBCEC. Table 4 summarizes the annual site EUI comparison by prototype building type.

Differences in annual energy use among individual prototype buildings vary widely, ranging from 0.03% to 4.5%. The impact is greatest for office prototypes because receptacle loads account for a large share of their total internal loads. Small and medium office prototypes consist almost entirely of office space, whereas the large office prototype includes additional space types, such as data centers (computer rooms), whose loads are not subject to receptacle control requirements. As a result, the overall effect is slightly smaller for the large office prototype.

Table 4 Site EUI of the ASHRAE 90.1-2022 and 2026 FBCEC by Prototype Building

Building Type	Weighting Factors, %	ASHRAE 90.1-2022 EUI, kBtu/ft²-yr	ASHRAE 90.1-Based 2026 FBCEC EUI, kBtu/ft²-yr	ΔEUI, %
Small Office	4.27	25.79	26.75	3.69
Medium Office	4.27	28.24	29.51	4.50
Large Office	2.06	54.62	55.86	2.26
Stand-Alone Retail	9.57	36.36	36.41	0.14
Strip Mall	4.71	39.14	39.19	0.12
Primary School	3.98	43.95	45.81	4.22
Secondary School	6.77	41.54	42.11	1.37
Outpatient Health Care	2.65	97.60	97.87	0.27
Hospital	3.68	93.54	94.30	0.81
Small Hotel	1.33	53.79	53.88	0.17
Large Hotel	4.57	80.70	80.77	0.09
Non-Refrigerated Warehouse	16.94	7.01	7.06	0.67
Quick Service Restaurant	1.03	437.44	437.55	0.03
Full Service Restaurant	0.29	300.80	300.95	0.05
Mid-Rise Apartment	12.96	34.37	34.43	0.18
High-Rise Apartment	20.91	39.00	39.04	0.10
Weighted Florida Average	100.00	41.94	42.24	0.73

Figure 2 shows the annual site Energy Use Intensity (EUI) plots of the ASHRAE 90.1-based 2026 FBCEC and ASHRAE Standard 90.1-2022, by prototype building. Figure 3 shows the annual Energy Cost Index (ECI) plots of the ASHRAE 90.1-based 2026 FBCEC and ASHRAE Standard 90.1-2022, by prototype building.

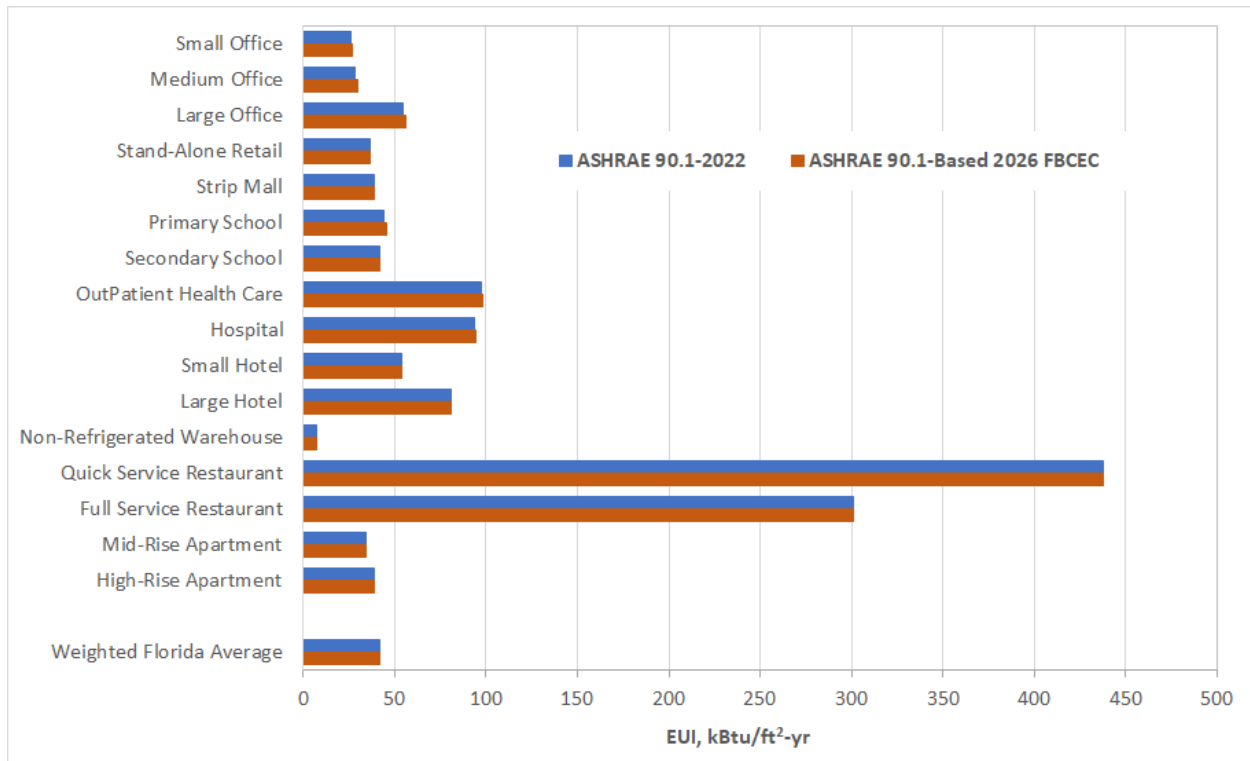


Figure 2 Site EUI of the ASHRAE 90.1-Based 2026 FBCEC and ASHRAE 90.1-2022

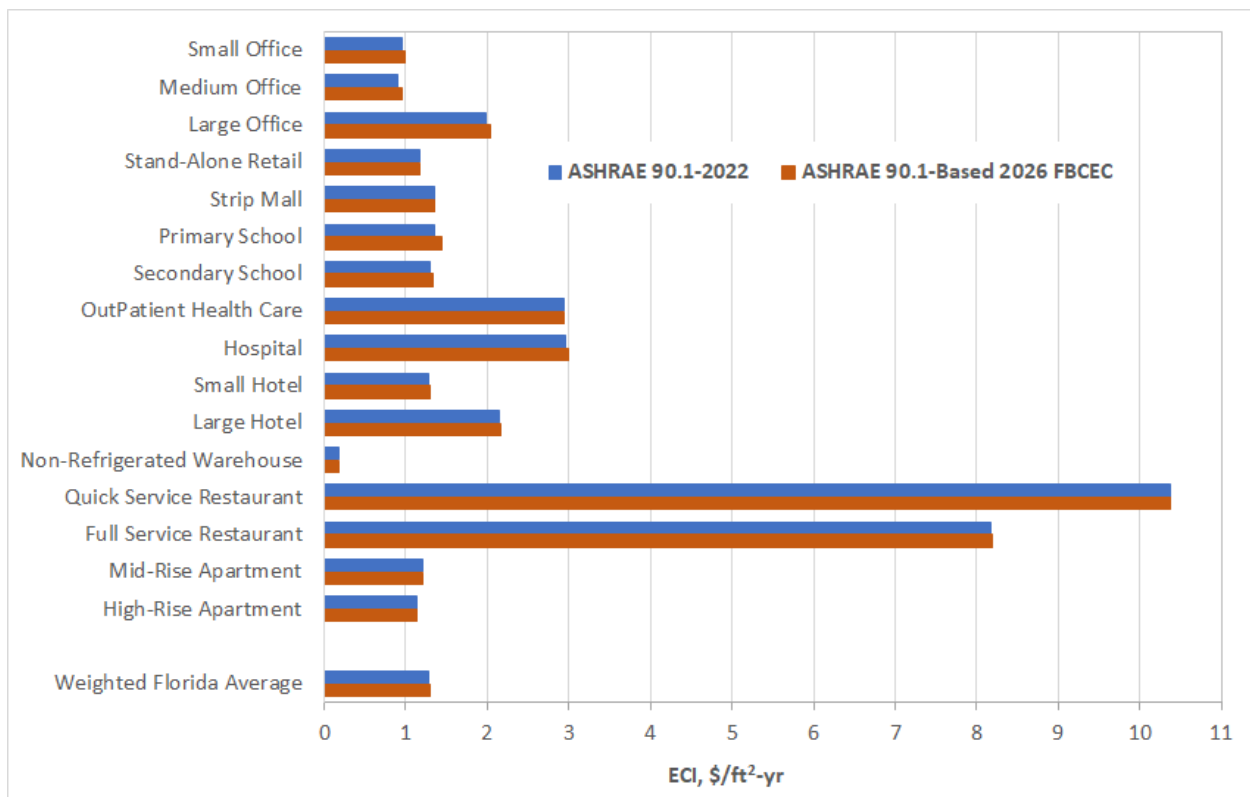


Figure 3 Site ECI of the ASHRAE 90.1-Based 2026 FBCEC and ASHRAE 90.1-2022

As projected, omitting automatic receptacle controls causes the ASHRAE 90.1-based 2026 FBCEC to incur slightly higher annual operating energy costs than the national model code:

- **2022 ASHRAE Standard 90.1 Reference:** 1.279 \$/ft²-yr (weighted average)
- **ASHRAE 90.1-based 2026 FBCEC:** 1.292 \$/ft²-yr (weighted average)

Overall, the weighted average site Energy Cost Index (ECI) for the ASHRAE 90.1-based 2026 FBCEC is approximately **1.02% higher** than ASHRAE Standard 90.1-2022 across Florida's commercial building stock.

7. Summary and Conclusion

This interim report presents the qualitative analysis and preliminary quantitative findings for the commercial provisions of the 9th Edition (2026) Florida Building Code, Energy Conservation (FBCEC), compared with the 2023 FBCEC, the 2024 IECC, and ASHRAE Standard 90.1-2022. The primary objectives completed in this phase included identifying high-impact code changes and documenting national model code provisions excluded from the 2026 FBCEC. The reviews and comparisons of both code bases are complete, including identification of the most energy-impactful provisions and a comparative energy performance analysis of the ASHRAE 90.1-based 2026 FBCEC and ASHRAE Standard 90.1-2022, the U.S. national building energy code.

Key Deliverables & Findings

- **IECC-Based Code Analysis (Appendix A):** Summarizes 26 high-impact code changes identified in the IECC-based 2026 FBCEC. At least 11 key provisions are designated for quantitative simulation. Notably, the expanded additional efficiency provisions alone may require up to eight measures per building occupancy type to achieve required energy credits.
- **ASHRAE 90.1-Based Code Analysis (Appendix B):** Identifies 29 code modifications in ASHRAE Standard 90.1-2022 affecting energy use, 15 of which were selected for quantitative evaluation.
- **Quantitative Simulation Results:** Whole-building energy simulations evaluated the ASHRAE 90.1-based 2026 FBCEC against the ASHRAE Standard 90.1-2022 reference. The analysis captured both the efficiency gains of newly adopted provisions and the impact of excluding Sections 8.4.2 (Automatic Receptacle Control) and 9.4.1.1(g) (Automatic Reduction Control).

Across the Florida commercial building sector, the ASHRAE 90.1-based 2026 FBCEC slightly lags the 2022 ASHRAE Standard 90.1 U.S. national building energy code reference:

- **2022 ASHRAE Standard 90.1 Reference:** 41.94 kBtu/ft²-yr (weighted average site EUI)
- **ASHRAE 90.1-Based 2026 FBCEC:** 42.24 kBtu/ft²-yr (weighted average site EUI)

The overall annual site energy consumption of the ASHRAE 90.1-based 2026 FBCEC was determined to be **0.73% higher** than the national model code, driven solely by the exclusion of automatic receptacle controls. Despite this small difference, the 9th Edition (2026) FBCEC can be considered nearly equivalent to the latest U.S. national building energy code.

Future Work

In the coming months, a comparative quantitative analysis will be completed to evaluate the IECC-based 2026 FBCEC relative to the 2024 IECC U.S. national building energy code.

8. References

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Appendix A: Commercial Code Changes for the 9th Edition (2026) FBCEC

Table A summarizes the changes to the commercial provisions of the 9th Edition (2026) Florida Building Code, Energy Conservation (FBCEC) relative to the 2023 FBCEC. The table has four columns, defined as follows:

2026 FBCEC Section and Title: The code section and title of the 2026 FBCEC code change.

Change Summary Between 2026 FBCEC and 2023 FBCEC: A brief description of the code change between the 2023 FBCEC and the 2026 FBCEC.

Anticipated Energy Impact on FBCEC: The anticipated effect of the change on FBCEC energy use, usually categorized as a decrease, an increase, or none. “None” means that the code change has no or negligible impact on energy use.

Anticipated Inclusion in the Analysis: Whether the code change is expected to be included in the quantitative analysis, categorized as Yes, No, or Maybe. “Yes” means that the change will likely be included, “No” means that it will not be included, and “Maybe” means that a determination has not yet been made.

Table A: Commercial Code Change Summary for the 9th Edition (2026) FBCEC vs. 2023 FBCEC

2026 FBCEC Section and Title	Change Summary Between 2026 FBCEC and 2023 FBCEC	Anticipated Energy Impact on FBCEC	Anticipated Inclusion in the Analysis
Chapter C4: Commercial Energy Efficiency			
C401.2 Applications	Modified the compliance requirements for the simulated building performance method by introducing a new equation to estimate the percentage of annual energy cost (PAEC) for the standard reference design. The change also requires that: (1) energy prices be obtained from approved sources, and code officials be permitted to require time-of-use pricing in energy cost calculations; (2) the reduction in the proposed design's energy cost associated with on-site renewable energy not exceed 5% of the total energy cost; and (3) the amount of renewable energy purchased from off-site sources be the same for the standard reference design and the proposed design. Compliance with the total simulated performance method requires annual energy cost to be less than or equal to the percentage of the annual energy cost (PAEC) of the standard reference design calculated in Equation 4-1. Energy prices must be taken from a source approved by the code official. Code officials are permitted to require time-of-use pricing in energy cost calculations. Equation 4-1 $PAEC = 100 \times (0.80 + 0.025 - EC_r / 1000)$ where: PAEC = Percentage of the annual energy cost of the standard reference design. EC_r = Energy efficiency credits required for the building in accordance with Section C406.1 (do not include load management and renewable credits)	Decrease	Yes
Table C402.1.4 Opaque Thermal Envelope Insulation Component Minimum Requirements, U-Factor Method	Added opaque door U-factor requirements for non-swinging doors, updated the U-factor requirements for swinging doors and the F-factor requirements for slab-on-grade heated floors, and edited the footnotes for clarity.	Decrease	Yes

2026 FBCEC Section and Title	Change Summary Between 2026 FBCEC and 2023 FBCEC	Anticipated Energy Impact on FBCEC	Anticipated Inclusion in the Analysis
Table C402.4 Building Thermal Envelope Fenestration Maximum U-Factors and SHGC Requirements	Increased the stringency of vertical fenestration U-factors in Climate Zones 1 and 2, and of SHGC in Climate Zone 1 only. Also increased the stringency of skylight U-factors and SHGC in Climate Zone 1.	Decrease	Yes
C402.5.1.2 Air leakage compliance	Advances in air leakage control technology reduce the measured air leakage threshold from 0.40 cfm/ft ² to 0.35 cfm/ft ² at 0.3 inch water gauge for all buildings. The measured air leakage upper limit for the exception is also reduced from 0.60 cfm/ft ² to 0.45 cfm/ft ² . Under Section C402.6.2.2, Group I-1 and Group R-1 buildings tested by an approved third party may use an alternative test method with a measured leakage threshold of 0.27 cfm/ft ² at 0.2 inch water gauge. Buildings larger than 25,000 ft ² of floor area in climate zones 0 through 4 are exempt from the testing requirement. This cost-effective change increases code stringency and aligns it with the requirements of the 2024 IECC and ASHRAE 90.1-2022.	Decrease	Yes
C402.5.1.2.3 Whole building test method and reporting	The modified exception permits air leakage testing of the entire building's thermal envelope for buildings with less than 10,000 ft ² of floor area, and of a portion of the building's thermal envelope for buildings with more than 50,000 ft ² of floor area.	None	No
C402.5.1.2.4 Dwelling and sleeping unit enclosure method and reporting	Adds a new air leakage testing method and reporting requirements for enclosures in dwelling and sleeping units. It provides exceptions for corridors and stairwells and allows enclosed spaces with a conditioned floor area of 1,500 ft ² or less to comply with either the Materials section or the Assemblies section.	None	No
Section C403 Building Mechanical Systems			

2026 FBCEC Section and Title	Change Summary Between 2026 FBCEC and 2023 FBCEC	Anticipated Energy Impact on FBCEC	Anticipated Inclusion in the Analysis
C403.2.3	Updated the minimum HVAC efficiency requirements for some of the equipment in Tables C403.2.3(1) through C403.2.3(17). For the quantitative analysis, the codes must be compared using the same federal minimum equipment efficiency values.	Decrease	Yes
C403.7 Boilers	Adds a new Section C403.7 (IECC 2024, C403.3.4) that requires combustion-air positive shutoff control and requires fan motors larger than 10 hp to use either a variable-speed drive or control rather than modulated fan airflow. This change reduces standby and part-load heat losses by restricting airflow through the combustion chamber while maintaining the CO₂ concentration in the flue gas. Although this change increases code stringency, it is cost-effective. Adds a new subsection, C403.7.1, Boiler Oxygen Concentration Controls, requiring control of boiler flue-gas oxygen concentration levels, along with a new Table C403.7.1, Boiler Oxygen Concentrations, that establishes limits for boiler flue-gas oxygen concentration levels.	Decrease	Yes
C403.2.4.1.2 Deadband	The revised provisions require (1) separate heating and cooling setpoints, each individually adjustable; (2) controls capable of, and initially configured to provide, a minimum temperature range or deadband of 5°F between the heating and cooling setpoints; and (3) a minimum deadband of not less than 1°F (0.56°C) when setpoints are adjusted. This requirement already exists and is met by most current products. The change may slightly increase stringency in some circumstances but is cost-effective.	Decrease	Yes

2026 FBCEC Section and Title	Change Summary Between 2026 FBCEC and 2023 FBCEC	Anticipated Energy Impact on FBCEC	Anticipated Inclusion in the Analysis
C403.8 Humidification and dehumidification controls	Adds new Section C403.8 (IECC 2024, C403.4.8) and three subsections. This change clarifies humidity control requirements and allows lower relative humidity where mechanical cooling is used for temperature control. It has no impact on construction costs, but it may avoid simultaneous dehumidification and humidification processes, thereby reducing energy use. It may decrease stringency in some circumstances. The new subsections include C403.8.1 Dehumidification, C403.8.2 Humidification, and C403.8.3 Control Interlock.	Decrease	Maybe
C403.2.6.1 Demand control ventilation	Revises demand control ventilation (DCV) requirements by modifying the minimum floor-area threshold by climate zone. Heat recovery exemptions are based on climate zone and floor area; the exception now applies only to smaller floor areas, increasing DCV stringency in Climate Zones 1A and 2A. Adds an exception where the professional engineer who designs the ventilation system demonstrates that contaminant concentrations will not exceed levels achievable with the required outdoor ventilation rate while maintaining a ventilation threshold of 15% or higher.	Decrease	Yes
C403.9 Occupied standby controls	Adds new Section C403.9, Occupied Standby Controls, requiring occupied-standby controls in the following space types: postsecondary classrooms, lecture rooms, and training rooms; conference, meeting, and multipurpose rooms; lounges and breakrooms; enclosed offices; open-plan office areas; and corridors. New subsection C403.9.1 defines the occupied-standby zone control requirements, and new subsection C403.9.1.1, Multiple-Zone System Controls, requires multiple-zone systems to automatically reset the effective minimum outdoor-air setpoint. This change reduces lighting and fan power consumption with minimal or no increase in construction costs and is already included in ASHRAE 90.1-2022.	Decrease	Yes

2026 FBCEC Section and Title	Change Summary Between 2026 FBCEC and 2023 FBCEC	Anticipated Energy Impact on FBCEC	Anticipated Inclusion in the Analysis
C403.2.12.5.4 Intermittent exhaust control for bathrooms and toilet rooms	Adds new Section C403.2.12.5.4. This change reduces operating energy costs by shortening exhaust fan runtime and limiting additional outdoor air infiltration. This change may slightly increase construction costs but is cost-effective.	Decrease	Maybe
C403.2.15 Buildings with high-capacity space-heating gas boiler systems	Adds new Section C403.2.15, requiring condensing boilers in new construction to achieve 90.0% space heating gas boiler thermal efficiency. This change increases code stringency but is cost-effective, particularly for building occupancy groups that operate 24 hours per day, such as hotels and hospitals. New subsections C403.2.15.1, Boiler Efficiency Requirements, and C403.2.15.2, Hot Water Distribution System Design Requirements, further define these requirements.	Decrease	Yes
SECTION C405 ELECTRICAL POWER AND LIGHTING SYSTEMS			
C405.2.1 Occupant sensor controls	This amendment adds computer rooms, data centers, medical supply rooms in health care facilities, laundry/washer areas, and telemedicine rooms to the existing list of space types that require occupant sensor lighting controls. This expansion may increase construction costs, but the change is cost-effective.	Decrease	Maybe
C405.2.4.2 Sidelit daylight zone	Adds a new provision requiring compliance with secondary sidelit daylight zone requirements. Where fenestration is in a wall, the secondary sidelit daylight zone is directly adjacent to the primary sidelit daylight zone. It must extend laterally to 2.0 times the height from the floor to the top of the fenestration, or to the nearest full-height wall, whichever is less. It must also extend longitudinally from the edge of the fenestration to the nearest full-height wall, or up to 0.5 times the height from the floor to the top of the fenestration, whichever is less, as shown in Figure C405.2.4.2(1).	Decrease	Yes

2026 FBCEC Section and Title	Change Summary Between 2026 FBCEC and 2023 FBCEC	Anticipated Energy Impact on FBCEC	Anticipated Inclusion in the Analysis
C405.2.5 Specific application controls	This section clarifies the provision and adds a new requirement: “ <i>Lighting integrated into range hoods and exhaust fans must be controlled independently of the fans.</i> ” This change has little or no impact on construction costs and is therefore cost-effective.	Decrease	No
C405.2.7.3 Lighting setback	Edits the code language for clarity and reduces the total wattage threshold for parking lot luminaires from 78 W to 40 W. This change may increase code stringency. Because of current LED technology, the change is expected to have little or no impact on construction costs while reducing lighting energy use.	Decrease	Maybe
C406.3.2.1 Demand responsive lighting controls function	This new section simplifies the code by limiting demand-responsive lighting control requirements to Group B, E, M, and S occupancies. It also adds an exception for storage rooms and warehouse spaces, allowing general lighting to use switch-off control of 25% or more instead of dimming control. This exception decreases code stringency; therefore, the change is expected to be cost-effective. This requirement was added for use with lighting load management additional efficiency measure G01.	Decrease	No
Table C405.3.2(1) Interior Lighting Power Allowances: Building Area Method	Updates the LPD values in Table C405.3.2(1) based on improved lighting technologies and other requirements. Most LPD values were reduced. This measure is based on improved technology and is expected to have little or no impact on construction costs.	Decrease	Yes
Table C405.3.2(2) Interior Lighting Power Allowances: Space-by-Space Method	Updates the LPD values in Table C405.3.2(2) based on improved lighting technologies and other requirements. The LPD values for most space types were reduced. This change reflects improved technology and is expected to have little or no impact on construction costs.	Decrease	Yes

2026 FBCEC Section and Title	Change Summary Between 2026 FBCEC and 2023 FBCEC	Anticipated Energy Impact on FBCEC	Anticipated Inclusion in the Analysis
Table C405.4.2(2) Lighting Power Allowances for Building Exteriors	Updates the exterior lighting power allowance values. The allowances are reduced based on advances in lighting technology and align with ASHRAE 90.1 requirements. This change increases code stringency and may slightly increase construction costs, but it is cost-effective.	Decrease	Yes
Table C405.4.2(3) Individual Lighting Power Allowances for Building Exteriors	Updates the individual exterior lighting power allowance values. The allowances are reduced based on advances in lighting technology and align with ASHRAE 90.1 requirements. This change increases code stringency but has little or no impact on construction costs.	Decrease	Yes
C405.10 Data centers and computer rooms	Adds new Section C405.10 by moving the provision from Section C405.1 and aligning the computer-room requirements with ASHRAE Standard 90.4. This change aligns the efficiency requirements for computer rooms with those for data centers, as defined in ASHRAE Standard 90.4, and increases code stringency.	Decrease	Maybe
C405.10.1 Data centers	Adds new subsection C405.10.1 for data centers by moving the data center requirements from Section C405.1 and adding ASHRAE Standard 90.4 requirements for data centers. This change may increase stringency but is cost-effective.	Decrease	No
C405.10.2 Computer rooms	Adds new Section C405.10.2 for computer rooms and aligns the requirements with ASHRAE Standard 90.4. This change increases code stringency for computer rooms and may increase construction costs.	Decrease	Maybe
SECTION C406 ADDITIONAL EFFICIENCY, RENEWABLE AND LOAD MANAGEMENT REQUIREMENTS			

2026 FBCEC Section and Title	Change Summary Between 2026 FBCEC and 2023 FBCEC	Anticipated Energy Impact on FBCEC	Anticipated Inclusion in the Analysis
C406	Deletes the existing Section C406 and replaces it with an expanded set of measures to choose from; renames the section; adds separate new measures for renewable energy and load management; and increases the number of energy efficiency measures from 6 to 39. The new measures are cost-effective and provide design flexibility. To comply, the energy efficiency credit targets must be met by selecting one or more achievable energy efficiency measures.	None	No
C406.1 Compliance	This amendment renames the section and rearranges the subsection for on-site renewable energy generation and load management requirements. It moves some of the provisions to a new subsection, C406.1.1.	None	No
C406.1.1 Additional energy efficiency credit requirements	Adds a new subsection, C406.1.1, specifying energy credit requirements by building occupancy group and climate zone. It increases the number of building occupancy groups to nine and expands the energy efficiency credit measures, providing design flexibility by better matching the measures to each building occupancy group. The new measures may increase stringency but are expected to be cost-effective. The energy savings impacts are reflected in the individual measures.	None	No
Table C406.1.1(1) Energy Credit Requirements by Building Occupancy Group	Adds new Table C406.1.1(1), specifying the energy credit requirements by building occupancy group and climate zone. It increases the number of additional efficiency credit measures from 6 to 39 and expands the building occupancy groups, providing design flexibility.	None	No
Table C406.1.1(2) Limit to Energy Efficiency Credit Carryover from Renewable and Load Management Credits	Adds new Table C406.1.1(2), which specifies limits on energy efficiency credit carryover from renewable and load management credits by building occupancy group and climate zone.	None	No

2026 FBCEC Section and Title	Change Summary Between 2026 FBCEC and 2023 FBCEC	Anticipated Energy Impact on FBCEC	Anticipated Inclusion in the Analysis
C406.1.1.2 Building core/shell and build-out construction	This amendment adds a new Section C406.1.1.2, an additional efficiency requirement for core/shell buildings. Although it may increase the stringency of core/shell building compliance types, it is a cost-effective measure.	Decrease	No
C406.1.2 Additional renewable and load management credit requirements	This amendment adds a new Section C406.1.2. While it increases stringency for some building types, it also provides design alternatives. Table C406.1.2 establishes renewable and load management credit requirements by building occupancy group and climate zone. For projects with multiple building occupancies, credits for each building occupancy must be weighted by gross floor area.	Decrease	Maybe
C406.2 Additional energy efficiency credits achieved	Renames Section C406.2 and describes the energy efficiency credits achievable for each measure by building occupancy group and climate zone. The achievable base energy credits are listed by building occupancy group in Tables C406.2(1) through C406.2(9).	None	No
C406.2.1 More efficient building thermal envelope	Adds new Section C406.2.1 for achieving energy credits through an improved building envelope, covering envelope measures E01 through E06. It may increase stringency. One measure or a combination of improved thermal envelope measures may be selected. The energy impacts are accounted for in individual measures.	None	No
C406.2.1.1 E01 Improved envelope performance ASHRAE 90.1 Appendix C	The improved envelope performance requirement increases the required thermal envelope efficiency level and requires the ASHRAE 90.1 Appendix C method. This change may increase construction costs but is cost-effective.	Decrease	No
C406.2.1.2 E02 Component performance envelope reduction	This is a new measure. The energy credit is achieved where the designed component performance of the building thermal envelope is at least 15% below the component performance required by Section C402.1.5.	Decrease	No

2026 FBCEC Section and Title	Change Summary Between 2026 FBCEC and 2023 FBCEC	Anticipated Energy Impact on FBCEC	Anticipated Inclusion in the Analysis
C406.2.1.3 E03 Reduced air leakage	Energy credits are achieved where tested building air leakage is at least 10% below the maximum leakage permitted by Section C402.5.1.2, provided the building is tested in accordance with the applicable method in Section C402.5.1.2. Energy credits achieved for measure E03 must be determined using Equation 4-13.	Decrease	Yes
C406.2.1.4 E04 Added roof insulation	Added roof insulation is a new measure. Energy credits for added roof insulation must be achieved in addition to the insulation required by Table C402.1.3. All roof areas in the project must include an additional R-10 continuous insulation layer in the roof assembly. For attics, this requirement may be met with R-10 fill or batt insulation that is continuous and not interrupted by ceiling or roof joists. Where the insulation is interrupted by joists, the added insulation must be not less than R-13. Alternatively, one-half of the base credits may be achieved where the added R-value is one-half of the additional R-value required by this section.	Decrease	Yes
C406.2.1.5 E05 Added wall insulation	Added wall insulation is a new measure. Energy credits must be achieved for insulation applied to not less than 90% of all opaque wall area in the project that is in addition to the required insulation in Table C402.1.3. Opaque walls must have additional R-5 continuous insulation included in the wall assembly. Alternatively, one-half of the base credits must be achieved where the added R-value is R-2.5.	Decrease	Yes
C406.2.1.6 E06 Improve fenestration	Adds a new fenestration thermal performance measure that requires enhanced performance in accordance with Table C406.2.1.6, Vertical Fenestration Requirements for Energy Credit E06. This change increases code stringency.	Decrease	Yes
C406.2.2 More efficient HVAC equipment performance	Adds measures for achieving energy efficiency credits through improved HVAC equipment. The energy impacts are described in the individual subsections for measures H01 through H05.	None	No

2026 FBCEC Section and Title	Change Summary Between 2026 FBCEC and 2023 FBCEC	Anticipated Energy Impact on FBCEC	Anticipated Inclusion in the Analysis
C406.2.2.1 H01 HVAC Total System Performance Ratio (TSPR)	Adds new subsection C406.2.2.1, which allows energy credits to be earned where systems are permitted to use Section C409 and where the system demonstrates savings in total system performance ratio (TSPR) compared with a target TSPR value. This change increases code stringency.	Decrease	No
C406.2.2.2 H02 More efficient HVAC equipment heating performance	This amendment adds a new subsection by revising an existing measure. In accordance with Section C406.1.1, not less than 90% of the total HVAC heating capacity serving the total conditioned floor area of the entire building or tenant space must comply with the requirements of this section. It increases stringency but is expected to be cost-effective.	Decrease	No
C406.2.2.3 H03 More efficient HVAC cooling equipment and fan performance	This amendment adds a new subsection by revising an existing measure. It increases stringency but is expected to be cost-effective. In accordance with Section C406.1.1, not less than 90% of the total HVAC cooling capacity serving the total conditioned floor area of the entire building or tenant space must comply with all of the requirements of this section.	Decrease	Yes
C406.2.2.4 H04 Residential HVAC control	This amendment adds a new subsection, C406.2.2.4, requiring centralized HVAC setback control in multifamily buildings. The measure requires HVAC systems serving dwelling units or sleeping units to automatically activate a setback of at least 5°F (3°C) for both heating and cooling. The temperature controller must be configured to provide setback during occupied sleep periods and must support an unoccupied setback control mode.	Decrease	No
C406.2.2.5 H05 Dedicated outdoor air system	Adds a new subsection, C406.2.2.5, by modifying an existing measure. The measure must meet the requirements of Table C406.2.2.5, DOAS Energy Recovery Adjustments. It increases stringency.	Decrease	No
C406.2.3 Reduced energy use in service water heating	Adds new Section C406.2.3 for achieving energy credits by reducing service water heating (SWH) energy. The energy impacts are accounted for by the individual measures in the subsections.	None	No

2026 FBCEC Section and Title	Change Summary Between 2026 FBCEC and 2023 FBCEC	Anticipated Energy Impact on FBCEC	Anticipated Inclusion in the Analysis
C406.2.3.1 Service water heating system efficiency	Adds new subsection C406.2.3.1 based on existing requirements. The energy impacts are accounted for by the individual measures in the subsections.	None	No
C406.2.3.1.1 W01 Recovered or renewable water heating	This amended measure is expected to provide at least 70% of the building's annual hot water requirements from waste heat recovery, water-to-water heat pump, or on-site renewable energy water-heating systems. There is no change in stringency.	Decrease	No
C406.2.3.1.2 W02 Heat pump water heater	Adds new subsection C406.2.3.1.2 by modifying an existing measure. This measure requires installing air-source heat pump water heaters that meet at least 30% of the design end-use service water heating requirements and have a capacity that exceeds 50% of the design end-use load, excluding recirculating system losses.	Decrease	Yes
C406.2.3.1.3 W03 Efficient fossil fuel water heater	Adds a new measure that requires installing an efficient fossil fuel water heater. The combined input-capacity-weighted-average equipment rating of all gas water heating equipment in the building must be not less than 95 percent thermal efficiency or 0.93 UEF.	Decrease	Yes
C406.2.3.1.4 Combination service water heating systems	Adds new subsection C406.2.3.1.4, which allows combination service water heating systems to achieve credits using one of the combinations of measures W01, W02, and W03.	Decrease	No
C406.2.3.2 W04 Service hot water piping insulation increase	This new measure achieves credit by increasing the hot water pipe insulation thickness of the central water heating system to at least 1.5 times the minimum required thickness. It increases stringency.	Decrease	No
	This new section allows credits to be achieved using measure W05, W06, or W07.	None	No

2026 FBCEC Section and Title	Change Summary Between 2026 FBCEC and 2023 FBCEC	Anticipated Energy Impact on FBCEC	Anticipated Inclusion in the Analysis
C406.2.3.3 Service water-heating distribution temperature maintenance	1. W05 Point-of-use water heaters. This credit is achieved through efficient design and installation of local water heating with no circulation and trace piping in Group B or E buildings larger than 5,000 square feet (465 m2).	Decrease	No
	2. W06 Thermostatic balancing valves. This credit is achieved when a centrally distributed recirculating hot water system includes an automatic thermostatic balancing valve designed and operated to maintain minimal return-water flow when the branch return temperature is greater than 120°F (49°C).	Decrease	No
	3. W07 Heat trace system. This credit is achieved when the insulated hot water supply piping of a central system is equipped with self-regulating electric heater cable, connection kits, and electronic controls underneath the insulation to replace standby losses.	Decrease	No
C406.2.3.4 W08 Water-heating system submeters	This credit is achieved when service hot water meters are connected to a reporting system that provides individual dwelling units in a Group R-2 occupancy building with data on actual domestic hot water usage supplied by a central service water heating system. It increases stringency.	Decrease	No
C406.2.3.5 W09 Service hot water flow reduction	This credit is achieved when all plumbing fixtures within dwelling units, sleeping units, and guestrooms served by the service water-heating system have flow or consumption ratings less than or equal to the maximum flow rates established for residential plumbing fixtures using heated water in Table C406.2.3.5. It increases stringency.	Decrease	No

2026 FBCEC Section and Title	Change Summary Between 2026 FBCEC and 2023 FBCEC	Anticipated Energy Impact on FBCEC	Anticipated Inclusion in the Analysis
C406.2.3.6 W10 Shower drain heat recovery	This credit is achieved when cold water serving building showers is preheated through the use of shower drain heat recovery units that comply with Section C404.8. Drain heat recovery units must demonstrate a minimum efficiency of 54%, as determined in accordance with CSA B55.1. Full credit is awarded for buildings classified as Groups I-2, I-4, R-1, and R-2, and for Group E buildings containing more than eight showers. It increases stringency but is a cost-effective measure.	Decrease	No
C406.2.4 P01 Energy monitoring	Adds a new measure in which energy credits are achieved using an energy monitoring system. The measure is supported by self-contained energy monitoring provisions in new subsections C406.2.4.1 through C406.2.4.5. The 2024 IECC instead has a mandatory energy monitoring requirement in Section C405.13.	Decrease	No
C406.2.5 Energy savings in lighting systems	This section covers lighting enhancement measures L02 through L06, which achieve lighting energy savings credits by enhancing lighting performance. The energy impact of each measure is described individually.	None	No
C406.2.5.2 L02 High-end trim lighting controls	Measure credits apply when qualifying spaces cover at least 50% of project interior floor area, excluding dwelling and sleeping units. Qualifying spaces must use high-end trim controls that are accessible only to authorized personnel, prevent users from exceeding the set maximum, limit general lighting to 85% of full output or power, and are tested per Section C406.2.5.2.1. It increases stringency.	Decrease	No
C406.2.5.3 L03 Increase occupancy sensor	Adds a new measure that expands occupancy-sensor-based lighting control to 13 space types that are not required by Section C405.2.1. The measure has subsections C406.2.5.3.1 Occupant sensor controls, C406.2.5.3.2 Occupant sensor control function, and C406.2.5.3.3 Occupant sensor time delay and setpoint requirements. It increases stringency.	Decrease	Yes

2026 FBCEC Section and Title	Change Summary Between 2026 FBCEC and 2023 FBCEC	Anticipated Energy Impact on FBCEC	Anticipated Inclusion in the Analysis
C406.2.5.4 L04 Increased daylight area	Adds new subsection C406.2.5.4, based on an existing measure. It increases the floor area controlled by daylight-responsive controls by about 5%. The credits achieved are calculated using Equation 4-22, 4-23, or 4-24, depending on the typical and maximum daylighting areas for each building occupancy group defined in Table C406.2.5.4. It may slightly increase stringency.	Decrease	No
C406.2.5.5 L05 Residential light control	This new measure requires Group R-2 buildings to use occupant sensor controls in listed common areas, including laundry and washing areas, dining areas, food preparation areas, seating areas, exercise areas, and massage spaces. The requirements also apply to switched receptacles in living and sleeping rooms, occupant sensors in bathrooms and kitchens, and a marked main-entry control switch unless occupant sensors already control the load. This measure does not affect code stringency because lighting controls are required elsewhere in the code.	Decrease	No
C406.2.5.6 L06 Reduced lighting power	This new measure requires interior lighting power to be 95% or less of the allowance specified in Section C405.3.1, with credits capped at four times the L06 base credit. Dwelling and sleeping unit lighting must meet the required efficacy level of not less than 90 lumens per watt or be provided by luminaires with an efficacy of not less than 65 lumens per watt. This measure expands and clarifies an existing measure.	Decrease	Yes
C406.2.6 Efficient equipment credits	Adds new Section C406.2.6. This category applies to various types of equipment and appliances in commercial buildings. The energy impact assessments are described in measures Q01 through Q04.	None	No
C406.2.6.1 Q01 Efficient elevator equipment	This new measure requires the installation of higher-efficiency elevator equipment. It increases stringency.	Decrease	No

2026 FBCEC Section and Title	Change Summary Between 2026 FBCEC and 2023 FBCEC	Anticipated Energy Impact on FBCEC	Anticipated Inclusion in the Analysis
C406.2.6.2 Q02 Efficient commercial kitchen equipment	This new measure requires the installation of efficient commercial kitchen equipment, such as fryers, steam cookers, dishwashers, and ovens. The enhanced equipment requirements are specified in Tables C406.2.6.2(1), C406.2.6.2(2), C406.2.6.2(3), and C406.2.6.2(4) for fryers, steam cookers, dishwashers, and ovens, respectively.	Decrease	Yes
C406.2.6.3 Q03 Efficient residential kitchen equipment	This new measure requires installation of higher-efficiency or ENERGY STAR refrigerators in apartments and hotel guestrooms. The measure may slightly increase stringency.	Decrease	No
C406.2.6.4 Q04 Fault detection and diagnostics system	This new measure requires fault detection and diagnostic systems. A project can achieve energy credits for installing a fault detection and diagnostics system to monitor the HVAC system's performance and automatically identify faults. The installed system must comply with items 1 through 6 in Section C406.2.6.4.1.	Decrease	No
C406.3 Renewable and load management credits achieved	Adds new Section C406.3 for achieving energy credits through renewable and load management measures. Renewable and load management credits are defined for the nine building occupancy groups in Tables C406.3(1) through C406.3(9). The building occupancy groups include Group R-2, R-4 and I-1; Group I-2; Group R-1; Group B; Group A-2; Group N; Group E; Group S-1 and S-2; and Other. This change may increase stringency.	None	No

2026 FBCEC Section and Title	Change Summary Between 2026 FBCEC and 2023 FBCEC	Anticipated Energy Impact on FBCEC	Anticipated Inclusion in the Analysis
C406.3.1 R01 Renewable energy	This amendment adds new Section C406.3.1 by expanding the existing additional energy efficiency measure. It also increases the renewable energy generation capacity by at least 0.1 watts per gross square foot (1.08 W/m²) of building area or secures off-site renewable energy. This change may increase the code stringency but provides a simpler compliance verification alternative. The FBCEC has removed the mandatory requirements for on-site and off-site renewable energy systems and moved them to Section C406.3.1.1 to make them optional. This addition is intended to allow the installation of on-site renewable energy systems, or the purchase of off-site renewable energy, for energy efficiency credit. However, the required energy efficiency credits of Table C406.1.1.1(1) is reduced according to Equation 4-12, the limit to the renewable energy efficiency credits carryover defined in Table C406.1.1(2), and the achieved renewable energy efficiency credits from Section C406.3.	Decrease	Yes
C406.3.1.1 Renewable energy systems	Adds a new subsection, C406.3.1.1, with on-site renewable energy generation provisions, for use with the additional efficiency measures, to reduce consumer energy costs and provide societal benefits. This section is adopted from Section C405.15 of the 2024 IECC.	Decrease	No
C406.3.1.1.1 On-site renewable energy systems	Adds a new Section C406.3.1.1.1 (Section C405.15.1 in IECC 2024) requiring buildings to be provided with on-site renewable electricity generation systems with a direct current (DC) nameplate power rating of not less than 0.75 W/ft ² (8.1 W/m ²) multiplied by the sum of the gross conditioned floor area of all floors but not exceeding the combined gross conditioned floor area of the three largest floors. The section includes four exceptions. This change increases code stringency. This provision is a modified version of 2023 FBCEC Section C406.5, On-Site Renewable Energy.	Decrease	Yes

2026 FBCEC Section and Title	Change Summary Between 2026 FBCEC and 2023 FBCEC	Anticipated Energy Impact on FBCEC	Anticipated Inclusion in the Analysis
C406.3.1.1.2 Off-site renewable energy	Adds a new provision in subsection C406.3.1.1.2 (Section C405.15.2 in IECC 2024) requiring off-site renewable electrical energy procurement in accordance with subsections C406.3.1.1.2.1, Off-Site Procurement, and C406.3.1.1.2.2, Off-Site Contract, when a building qualifies for one of the exceptions in Section C406.3.1.1.1. The requirements are defined in Table C406.3.1.1.2, Annual Off-Site Renewable Energy Requirements. This provision provides a design alternative for buildings without an on-site renewable energy generator and includes renewable energy certificate documentation and certificate purchase requirements in subsections C406.3.1.1.3 and C406.3.1.1.4, respectively.	Decrease	No
C406.3.2 G01 Lighting load management	This new measure requires lighting dimming controls to reduce lighting levels and power use. The controls must be integrated with automated systems that interface with utility signals or local building demand-monitoring software. This measure increases code stringency.	Decrease	No
C406.3.3 G02 HVAC load management	This new measure requires thermostats to be reset during peak price periods or to use a gradual precooling setpoint adjustment control sequence. It also requires integration with automated controls that interface with utility signals or local building demand-monitoring software. The energy credit adjustment is defined in Table C406.3.3, Energy Credit Adjustment Based on Use of Ventilation Shift or Demand Response, which is used to adjust the credits. This measure increases code stringency.	Decrease	No
C406.3.4 G03 Automated shading load management	This new measure requires automated exterior shading devices, such as exterior roller shades, movable blinds, or movable shutters, to reduce solar gain through fenestration during peak price hours. This measure increases code stringency.	Decrease	No

2026 FBCEC Section and Title	Change Summary Between 2026 FBCEC and 2023 FBCEC	Anticipated Energy Impact on FBCEC	Anticipated Inclusion in the Analysis
C406.3.5 G04 Electric energy storage	This amendment adds a new Section C406.3.5. Batteries or other electric energy storage devices are required, as is integration with automated controls that interface with utility signals or local building demand-monitoring software. This change increases code stringency.	Decrease	No
C406.3.6 G05 Cooling energy storage	This amendment adds a new measure for cooling energy storage. Ice or chilled water cooling energy storage is required, as is integration with automated controls that interface with utility signals or local building demand-monitoring software. This change increases code stringency.	Decrease	No
C406.3.7 G06 Service hot water energy storage	This new measure for service hot water energy storage requires integration with automated controls that interface with utility signals or local building demand-monitoring software. The energy credit adjustment is defined in Table C406.3.7, Energy Credit Adjustment Based on Use of Heat Pump Water Heater or Demand Response, which is used to adjust the credits. This measure increases code stringency.	Decrease	No
C406.3.8 G07 Building thermal mass	This new measure is intended primarily to modify operational strategies and improve the response of interior thermal mass. It has no impact on code stringency.	Decrease	No

Appendix B: ASHRAE Standard 90.1-2022 Changes

Table B-1 summarizes the changes in ASHRAE Standard 90.1-2022 relative to ASHRAE Standard 90.1-2019. For each change, it gives a brief description, the energy impact, and whether the change is included in the quantitative analysis. The table has six columns, defined as follows:

Addendum: The code change **addendum** for ASHRAE Standard 90.1-2022.

Code Sections Affected: The ID of the proposed code change **as** defined in the 2019 ASHRAE 90.1 addenda. This number is used to **trace** the history of the code change.

Code Change Summary Between ASHRAE 90.1-2019 and ASHRAE 90.1-2022: A brief description of the code change between ASHRAE Standard 90.1-2019 and ASHRAE Standard 90.1-2022.

Anticipated Energy Impact on FBCEC: The effect of the code change **on energy use:** usually a decrease, an increase, or none. “None” means the code change has no or negligible impact on energy use.

Included in Quantitative Analysis: Whether the energy impact can be predicted using whole-building simulation programs and the DOE reference prototype buildings: “Yes” or “No.” “Yes” means the energy impact can be analyzed using a building energy simulation program. “No” means a simulation program cannot determine the effect on energy use.

Discussion: How the change is implemented in the quantitative analysis, how it affects the prototype buildings, and why it is or is not included in the quantitative analysis.

Table B-1: Commercial Code Change Summary Between ASHRAE 90.1-2019 and ASHRAE 90.1-2022

Addendum	Code Sections Affected	Code Change Summary Between ASHRAE 90.1-2019 and ASHRAE 90.1-2022	Anticipated Energy Impact on FBCEC*	Included in Quantitative Analysis	Discussion
5. BUILDING ENVELOPE					
t	3.2, 4.2.5, 5.1.3, 5.4.3, 5.7.2, 5.7.3.1, 5.8, 5.9.1.2, 6.4.4.2.1, 6.4.5, 6.5.1, Table 12.5.1 (5), 12.5.3, 13, C1.5, C3.5.5.3, C3.6, C3.1.1.4, Table G3.1 (5), Table H-3	This amendment adds a requirement to perform whole-building air leakage testing and measurement for buildings smaller than 10,000 ft ² , specifies performance requirements for compliance, references the applicable ASTM standard, and modifies relevant Section 3 terminology.	Decrease	Yes	Adds whole-building air leakage testing and measurement requirements. Increases stringency for buildings with less than 25,000 ft ² of floor area.
av	3.2, 3.3, 5.5.3.2, 5.5.5, 5.6.1.1, 5.7.2, 5.8.2.3, Table 12.5.1 (5), 13, A1, A10, C1.2.7, C2.9, C3.5.5.4, C3.6, Appendix E, Table G3.1 (5), Appendix J	Adds requirements to address the impacts of thermal bridges in the building envelope.	Decrease	No	Adds a prescriptive requirement for thermal bridging in the exterior envelope. This change will not be included in the quantitative analysis because it affects climate zones 4 through 8.
6. Heating, Ventilating, and Air Conditioning					

Addendum	Code Sections Affected	Code Change Summary Between ASHRAE 90.1-2019 and ASHRAE 90.1-2022	Anticipated Energy Impact on FBCEC*	Included in Quantitative Analysis	Discussion
bc	6.5.4.8	Requires condensing boilers for new construction to achieve condensing-level efficiency (i.e., 90% Et) for large boiler systems (i.e., between 1 and 10 million Btuh) and, to ensure that condensing occurs, requires the boiler entering water to be within the prescribed temperature or flow-rate limits.	Decrease	Yes	Increases efficiency requirements for large boilers in new construction. It may impact large prototype buildings.
a	6.5.3.7, 6.5.3.8, 13	Establishes minimum fan efficacy requirements for low-power ventilation fans and references Standard 62.2 to determine the minimum ventilation rates for nontransient dwelling units.	Decrease	Yes	This change adds minimum fan efficiency requirements for smaller ventilation fans not covered by Section 6.5.3.6. It impacts apartment and outpatient health care prototype buildings.
b	6.4.3.8	Revises demand control ventilation parameters to be determined based on climate zone and Standard 62.1 airflow requirements.	Decrease	Yes	For cost-effectiveness, the DCV requirement is based on occupancy, floor-area size, and climate zone. The impact depends on the prototype building design.
c	6.3.2, 6.4.3.3	Requires residential HVAC systems greater than 2.1 kW to be equipped with start/stop and setback controls.	Decrease	Yes	Adds advanced HVAC controls in dwelling units. These control features impact apartment prototype buildings.
d	3.2, 6.4.3.4.5	Adds a new term defining a parking garage section so that fan requirements can be refined for different configurations. It also requires fans to be able to modulate airflow and power as specified.	Decrease	No	It improves contaminant control and requires a lower fan flow and power threshold. It also replaces the exception limit of a 3000 ft ² parking garage floor size with a ventilation fan system power of 5 hp. The prototype building models do

Addendum	Code Sections Affected	Code Change Summary Between ASHRAE 90.1-2019 and ASHRAE 90.1-2022	Anticipated Energy Impact on FBCEC*	Included in Quantitative Analysis	Discussion
					not include an interior parking garage, so the analysis will not include this change.
bm	6.5.3.8	This change modifies occupied standby controls for multiple-zone systems to explicitly require an outdoor air reset when ventilation is reduced to zero.	Decrease	No	Reduces the amount of outdoor air at the air handler, saving energy for outdoor air treatment. This change affects the control device but not the prototype building energy model, because the model already interprets it correctly.
ci	Table 6.5.1-1	Fan cooling units outside the building must have an economizer at the indicated capacity range.	Decrease	Yes	It lowers the economizer threshold for cooling units installed outside the building from 54 kBtu/h to 33 kBtu/h. This change may impact the small hotel prototype building.
aw	3.2, 3.3, 6.4.1.1, Table 6.8.1-21, Table F-6, 13	This amendment adds the minimum energy efficiency requirements (and new CFEI metric) for large-diameter ceiling fans from 10 CFR 430.	Decrease	No	Sets minimum efficiency requirements for large-diameter ceiling fans. These fans are not a typical design, so they are not included in the prototype buildings.
ay		Updates Tables 6.8.1-8 and 6.8.1-9 for variable refrigerant flow (VRF) equipment efficiency based on the new AHRI 1230-2021 test procedure, which required adjusting the EER and IEER values.	Decrease	No	These are federal minimum efficiency requirements, and none of the prototype buildings uses a VRF HVAC system.

Addendum	Code Sections Affected	Code Change Summary Between ASHRAE 90.1-2019 and ASHRAE 90.1-2022	Anticipated Energy Impact on FBCEC*	Included in Quantitative Analysis	Discussion
7. SERVICE WATER HEATING					
ah	7.5.3	Increases the thermal efficiency required for high-capacity gas-fired service water-heating equipment and provides the U.S. DOE criteria for defining high-capacity water heaters.	Decrease	Yes	Where a single high-capacity water heater supplies a system, or where multiple high-capacity water heaters serve a single system, the minimum efficiency increases to 92%. This change may affect the large hotel prototype building.
9. Lighting					
p	9.1.2, 9.1.4	Modifies the portions of Section 9 that address alterations to ensure that such projects meet all applicable lighting requirements.	Decrease	No	All alterations, regardless of size, must meet all of the requirements of Section 9.
z	9.1.4	Lowers the wattage assigned for track lighting to reflect the predominant use of higher-efficiency LED technology.	Decrease	No	LED technology reduces the track lighting requirement from 30 to 10 W per linear foot. Track lighting is not part of the prototype buildings, so the analysis does not include this change.
ac	3.2, 9.4.1.2, Table 9.2.3.1, Table 9.6.1, Appendix E	This update to interior lighting power and minimum control requirements adds a power exception for the germicidal function in luminaires and sources, removes exceptions for casinos and parking garage daylight transition zone lighting, and defines the latter item.	Decrease	No	It updates interior LPD values for casinos and parking garage space types, removes control requirements for germicidal function, and defines a “parking garage daylight transition zone.” It is not a typical design or part of a <i>prototype building; hence, it is</i>

Addendum	Code Sections Affected	Code Change Summary Between ASHRAE 90.1-2019 and ASHRAE 90.1-2022	Anticipated Energy Impact on FBCEC*	Included in Quantitative Analysis	Discussion
					<i>not included in the quantitative analysis.</i>
ar	3.2, Table 9.2.3.1, 9.4.4, Appendix E	Adds requirements for indoor horticultural lighting based on a new metric, photosynthetic photon efficacy (PPE), developed in ANSI/ASABE S640.	Decrease	No	Adds minimum luminaire efficiency requirements depending on the building function. This is not typical, and none of the prototype buildings has such a space, so it will not be included in the analysis.
am	9.2.3.2, Table 9.2.3.2, 9.4.1.4, 9.4.2, Table 9.4.2-1, Table 9.4.2-2	Updates exterior lighting power and control requirements based on technological improvements and revised lighting practices; restructures portions of Section 9 to better communicate exceptions to those requirements.	Decrease	Yes	Reduces the exterior lighting power allowances and adds control requirements based on specific applications.
bs	9.3.1, 9.3.2	Updates the lighting power allowances (LPA) in the Simplified Building Method Compliance Path to maintain alignment with the established method (0.9x the Building Area Method LPA values). Removes an exception for alterations that had incentivized the use of LEDs before they became commonplace.	Decrease	No	It provides simplified compliance options and design flexibility. Since it is not part of the prototype building models, it will not be included in the analysis.

Addendum	Code Sections Affected	Code Change Summary Between ASHRAE 90.1-2019 and ASHRAE 90.1-2022	Anticipated Energy Impact on FBCEC*	Included in Quantitative Analysis	Discussion
o	9.4.1.1	This change reduces the minimum connected load that triggers daylighting responsive control requirements for sidelighting and toplighting.	Decrease	Yes	Because of improved LED technology, reduces the minimum connected load for daylight-responsive controls from 150 W to 75 W for sidelighting and from 300 W to 150 W for toplighting. Affected prototype buildings: to be determined.
bp	9.4.1.3	Removes the exception for captive card-key controls in hotel guestrooms.	Decrease	No	Removes the exception for captive card-key controls for hotel guests because they are easily and often bypassed, negating potential energy savings.
br	9.4.3	Increases the efficacy threshold for lamps and luminaires in dwelling units and specifies interior and exterior lighting control requirements.	Decrease	Yes	Increased lighting efficacy and added control requirements for interior and exterior lighting. This change also removed the exception due to permanent control requirements.
ba	9.4.1.1 and Table 9.5.2.1	Updates space-by-space lighting power density (LPD) values and interior control requirements in Section 9.4.1.1 and Table 9.5.2.1.	Decrease	Yes	Increased lighting efficacy and added control requirements for interior lighting.
bb	9.5.1	Updates the lighting power density values for the Building Area Method compliance path based on manufacturer-reported improvements in lighting performance.	Decrease	No	Reduces lighting power density (LPD) values, but this compliance path is not used in the prototype buildings.
bf	9.5.2.2	This change updates the decorative and retail lighting power allowances, adds an allowance	Decrease	Yes	Reduces decorative and retail lighting power allowances.

Addendum	Code Sections Affected	Code Change Summary Between ASHRAE 90.1-2019 and ASHRAE 90.1-2022	Anticipated Energy Impact on FBCEC*	Included in Quantitative Analysis	Discussion
		for videoconferencing, and moves the additional power allowances and required controls to a table for easy reference.			Impacts retail prototype buildings.
10. OTHER EQUIPMENT					
by	3.2, 10.2.1, 10.5.1	Adds a minimum prescriptive requirement for on-site renewable energy.	Decrease	Yes	The building site must have on-site renewable energy equipment with a rated capacity of at least 0.5 W/ft ² multiplied by the sum of the gross conditioned floor area of all floors, up to the three largest floors. Five conditions may exempt a building from this requirement. This change may affect all prototype buildings except the small office and restaurant.
az	3.2, 10.4.6	Introduces compressed air system requirements with measures for reducing common sources of energy waste.	Decrease	No	This change enforces best design practices. However, the analysis will not include this change because the prototype building models do not include compressed air systems.
cf	10.4.3, 10.9.3	Introduces provisions that improve elevator fan, lighting, and movement efficiency.	Decrease	Yes	This change increases elevator fan efficiency, reduces the lighting allowance, and improves standby mode energy use.

Addendum	Code Sections Affected	Code Change Summary Between ASHRAE 90.1-2019 and ASHRAE 90.1-2022	Anticipated Energy Impact on FBCEC*	Included in Quantitative Analysis	Discussion
11. ADDITIONAL EFFICIENCY REQUIREMENTS					
ap	3.2, 3.3, 4.2.1, 4.2.2, 9.9.1, 12.2, 13, Section 11	Adds a new section to Standard 90.1 that uses energy credits to save approximately 4% to 5% of energy costs. Users can earn the required number of credits for their building type and climate zone from 32 individual measures.	Decrease	Yes	A new Section 11 includes 32 cost-effective prescriptive energy credit requirements. It supports nine building use types (office, restaurant, retail, education, warehouse, healthcare, hotel/motel, multifamily, dormitory, and all others) in all climate zones.
12. ENERGY COST BUDGET METHOD					
cr	12.2, G1.2.1	Adds language to limit the extent that envelope trade-offs can be used for compliance with Section 12 and Appendix G based on the amount that a proposed envelope performance factor is permitted to exceed the base value (i.e., envelope “backstop”).	Decrease	No	Increases the stringency of the envelope by limiting the envelope trade-off amount allowed with the performance compliance methods. It is not part of the prototype buildings, so it is not included in the quantitative analysis.

Appendix C: Florida Energy Rates

The analysis used a constant electric energy rate obtained from EIA¹. It is customary for DOE to use fixed energy rates for the U.S. National Building Energy Code analysis during the triennial code development cycle. The September 2024 electric energy rates in Table C-1 were used for the analysis. The analysis used the 2025–2026 Florida commercial retail electricity price² of \$0.1283/kWh and a commercial natural gas rate³ of \$12.19/Mcf (\$1.18/therm).

Table C-1 Standard Electricity and Natural Gas Rates for Florida

	Electric Energy Rates, \$/kWh	Natural Gas Rates (annual), \$/therm
July 2025	0.1130	1.18
July 2026	0.1137	-

¹ https://www.eia.gov/electricity/monthly/epm_table_grapher.php?t=table_5_06_a

² https://www.eia.gov/electricity/monthly/epm_table_grapher.php?t=epmt_5_6_a&utm_source=copilot.com

³ https://www.eia.gov/dnav/ng/ng_pri_sum_dcu_SFL_a.htm?utm_source=copilot.com

Appendix D: Florida Commercial Building Floor Area Distribution

Floor Area Weighting Factors Determination

The conditioned floor area weighting factors used in this study were generated by processing building stock information from the latest PNNL report (Lei et al., 2020). The information obtained includes total floor areas by building type for Florida and national average building weighting factors by climate zones. The Florida average weighting factors by building type and climate zones 1A and 2A were obtained directly from the PNNL report. Two sets of weighting factors were generated for this investigation: weighting factors for the two Florida climate zones for each prototype building type and the state's average weighting factors by building type and climate zone. The former weighting factors for climate zones 1A and 2A were used to estimate the EUI for each of the sixteen prototype buildings in Florida. The latter weighting factors were used to determine an aggregate EUI across the sixteen commercial prototype buildings for the state of Florida. Table D-1 summarizes the distribution of total commercial building floor area by prototype building in Florida.

Table D-1 Commercial Prototype Building Floor Area Distribution in Florida

Building Type	Prototype Building	Prototype Building Floor Area, ft ²	Sample Total Building Floor Area, 1000 ft ²	Floor Area Weighting Factors, %
Office	Small Office	5,502	60,118	4.27
	Medium Office	53,628	59,533	4.27
	Large Office	498,588	28,515	2.06
Retail	Stand-Alone Retail	24,692	132,725	9.57
	Strip Mall	22,500	64,402	4.71
Education	Primary School	73,959	55,681	3.98
	Secondary School	210,887	95,221	6.77
Health Care	Outpatient Health Care	40,946	36,318	2.65
	Hospital	241,501	51,718	3.68
Lodging	Small Hotel	43,202	16,958	1.33
	Large Hotel	122,120	64,988	4.57
Warehouse	Non-Refrigerated Warehouse	52,045	235,608	16.94
Food Service	Quick Service Restaurant	2,501	12,756	1.03
	Full Service Restaurant	5,502	4,850	0.29
Apartment	Mid-Rise Apartment	33,741	181,057	12.96
	High-Rise Apartment	84,360	292,976	20.91
Total		1,515,674	1,393,424	100.00

Floor Area Weighting Factors by Florida Climate Zones

Figure D-1 shows Florida's weighting factors by climate zones and prototype building type. The weighting factors for each prototype building type sum to 1.0. These weighting factors split the total floor area stock of each prototype building in the state into climate zone 1A and 2A fractions. For instance, for High-Rise Apartments, 68.3% of the total floor area in Florida is in climate zone 1A, and the remaining 31.7% is in climate zone 2A.

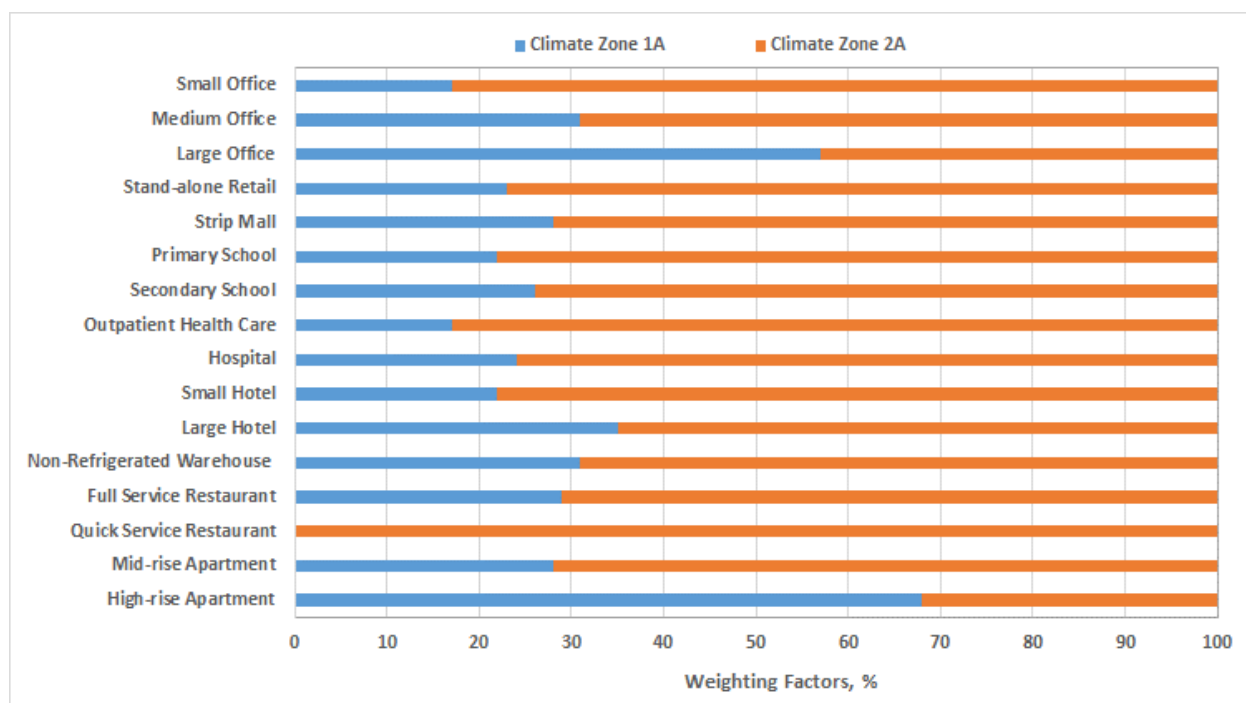


Figure D-1 Florida Floor Area Weighting Factors by Climate Zone and Building Type

Average Floor Area Weighting Factors by Building Type

The average weighting factors were used to determine an aggregate EUI across the sixteen prototype building types for the State. The weighting factors across the sixteen prototype buildings and the two climate zones sum to 1. Figure D-2 shows Florida's average weighting factors by building type (sum of climate zones 1A and 2A). The High-Rise Apartment building type represents the largest share of total floor area in Florida, at 20.91% of the state's commercial building floor area stock. Warehouse and Mid-Rise Apartment commercial prototype buildings are the State's second and third largest by floor area, respectively.

The distribution of conditioned floor area in commercial buildings across the State of Florida presented here was obtained from data published by PNNL (Lei et al., 2020). Florida's distribution of conditioned floor area in commercial buildings by climate zone and building type was determined from construction data compiled by PNNL for building energy analysis.

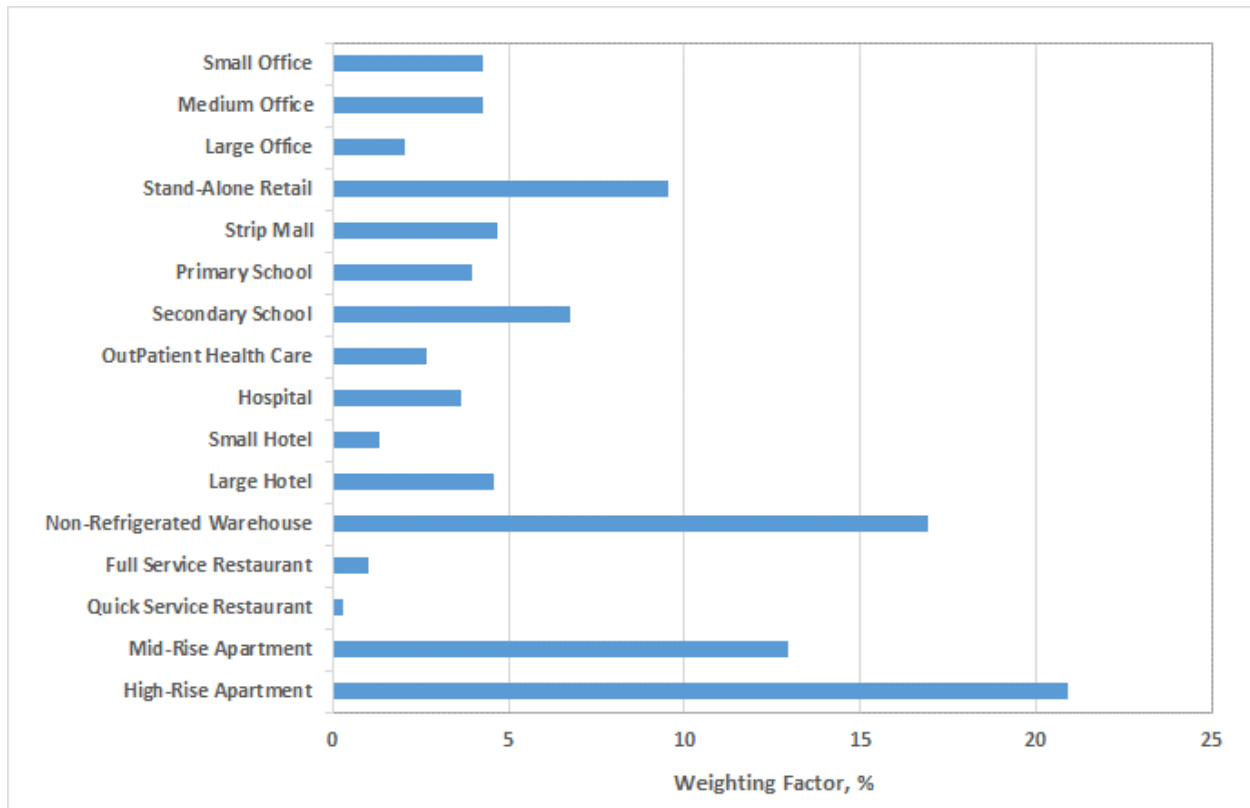


Figure D-2 Commercial Building Floor Area Weighting Factors by Prototype Building