

APPLICABILITY GUIDE For New Construction Projects

This tool is intended to be a quick reference for design and engineering professionals and includes new or challenging requirements in the new Minnesota Commercial Energy Code (2015). It is designed for small to mid-size buildings projects (usually 50,000 SF or less) to meet the code. Meeting the following pilot program requirements will earn clients and design teams a financial incentive.

The Commercial Energy Codes Support Program aims to support design and construction professionals on targeted requirements of the State Energy Code. However, this list of program requirements does not include all Code items.

Key:	
Gray	Indicates which code requirements are NOT common, by building use type.
Applicability Summaries:	Helps identify whether an item may apply before detailed designs are available

TECHNOLOGY	TECHNOLOGY DESCRIPTION / ENERGY IMPACT & CODE REFERENCE	MEASURE REQUIREMENT	WHEN IT APPLIES	Targeted Building Use Types	APPLICABILITY SUMMARY
BUILDING ENVELOPE REQUIREMENTS	Roof Insulation R-Value	Provide adequate roof insulation between and/or above roof structure to reduce heat gain and loss. All Above Deck: Metal building: Attic & Other: IECC References: C303 & C402.2 ASHRAE References: Table 5.5-6, Sections 5.5.3.1 & 5.8.1	IECC: Required for ALL new roofs. Required for replacement roofs when all existing insulation is above the deck and the slope is < 2 inches per foot ASHRAE: Required for ALL new and replacement roofs.	Multifamily Offices Restaurants Retail Spaces	Applies to all buildings.
	Above Grade Wall Insulation	Provide adequate wall insulation between and/or outside of wall structural elements to reduce heat gain and loss. Mass wall: Metal building: Steel-framed: Wood-framed/other: or R-20 + R-3.8ci *Group R bldgs: mass wall R-15.2 c/U-0.71; steel-framed IECC U-0.057. IECC References: C303 & C402.2.2.1 ASHRAE References: Table 5.5-6, Sections 3.2, 5.5.3.1 & 5.8.1	IECC: Exterior walls that are more than 15% above grade. ASHRAE: Exterior walls that are at least partially above grade. For partially below-grade walls: 1) If insulation is within the structural wall or outside of it, then these R-values only apply to the above-grade part of the wall. OR 2) If the insulation is inside of the supporting structure, then these R-values apply to the whole wall.	Multifamily Offices Restaurants Retail Spaces	Applies to all buildings.
	Slab Edge Insulation	Provide adequate insulation around the perimeter of floors on grade or below. This eliminates a potentially overlooked heat loss path. Commercial (typical): " w/in-floor heat: Residential (typical): " w/in-floor heat: IECC References: Section 402.2.6 & Tables C402.1.2 and C402.2 ASHRAE References: Table 5.5-6 and Sections 5.5.3.5 & 3.2 (def. Slab-on-grade floor)	IECC & ASHRAE: For floor slabs in contact with the ground that aren't more than 2 feet below grade. ASHRAE: grade.	Multifamily Offices Restaurants Retail Spaces	Applies to buildings with slab on grade floors.
	Window U-Factor	Limits the U-value of windows, which saves energy by limiting the rate of heat gain or loss through windows. IECC: Fixed Windows: 0.36; Operable: 0.43; Skylights: 0.50 (0.75 if automatic daylighting controls) ASHRAE: Non-metal windows: 0.35; Curtainwall/storefront windows: 0.45; Other metal-framed windows: 0.55; Skylights-glass 1.17; plastic with curb 0.87; plastic w/o curb 0.69 IECC References: Table C402.3, Sec. C303.3.1, C402.3.3 & C402.3.4 ASHRAE References: Table 5.5-6, Sections 5.5.4.2 & 5.8.2	IECC & ASHRAE: Applies to ALL exterior windows and skylights ASHRAE:	Multifamily Offices Restaurants Retail Spaces	Applies to all buildings.
	*Window Area & Orientation	Window area is limited to reduce heat gain and loss, which is much higher through windows than through opaque walls. IECC: Window area must be ≤30% of the wall area. Up to 40% is allowed if at least half of the floor area is daylight AND visible transmittance is ≥1.1 times SHGC. ASHRAE: Window area must be ≤40% of the wall area AND the window area on the south must be ≥ the window areas on each the east and west sides. IECC References: 402.3.1 ASHRAE References: 5.5.4.2.1, 5.5.4.4.1 (exception c) & 5.5.4.5	IECC: Applies to all buildings. ASHRAE: Street-side street-level wall/windows can be ignored (for area & orientation requirements) if it has permanent exterior shading (PF>0.5) and its window area is <75% of its wall area. The orientation requirement can also be ignored if there is significant shading on the south side (building within 20 ft that is half the height of the building) or on the east or west side (75% of window area shaded by fixed object at 9am [east] or 3pm [west] on summer solstice).	Multifamily Offices Restaurants Retail Spaces	Applies to all buildings.
	Automatic Off Lighting Controls_{LA}	Install controls to automatically turn lights off when spaces are unoccupied. IECC & ASHRAE: Occupancy sensors (ASHRAE only—or timer switch) must be used in certain spaces prone to intermittent occupancy to turn off lights within 30 minutes of when everyone leaves the space. A choice of occupancy sensor or automatic time-off control can be used in other spaces. Automatic time-off controls shall have a temporary manual override that will run lights for no more than 2 hours at a time. Automatic on controls (IECC—occupancy sensors only) must bring the lights on at ≤50% power in most spaces. IECC References: C405.2.2.2 & C405.2.2.1 ASHRAE References: 9.4.1.1 & 9.4.1.2	IECC & ASHRAE: All spaces except egress stairways/corridors, sleeping/dwelling units, patient care areas, security areas, emergency areas or other areas that need 24/7 lighting. Occupancy sensors (ASHRAE—or timer that shuts off lighting within 30 minutes of everyone leaving) required in any classrooms, private offices, break rooms, meeting rooms, restrooms, storage rooms, and janitor closets plus (IECC—any other room ≤500 sf; ASHRAE—copy, dressing locker and fitting rooms).	Multifamily Offices Restaurants Retail Spaces	Doesn't apply to dwelling units—only common spaces that don't need 24/7 operation. Applies to nearly all building spaces that don't require 24/7 operation
LIGHTING REQUIREMENTS	*Daylight Zone Control_{LA}	Controls that reduce the power needed to light areas close to daylight sources. IECC & ASHRAE: Daylit areas within larger spaces shall have separate lighting controls. If automatic control, it must have at least one step with ≥35% power and at least one step from 50% to 70% power with the setpoint and calibration readily accessible. (IECC—Each daylighting control cannot serve more than 2,500 sf or daylight zones lit by windows facing more than two adjacent directions.) IECC References: C405.2.2.3.1, C405.2.2.3.2 & C202 (def. Daylight Zone Definition) ASHRAE References: 9.4.1.4, 9.4.1.5 & 3.2 (def. Daylight Area & Primary Sidelighted Area)	IECC: Required in daylight zones with >2 light fixtures. Daylit zones are the rectangle extending 2 feet beyond each end of a window and 15 feet into the building. For skylights, it is the rectangle extending beyond each side of the skylight by 1/2 of the floor to ceiling height. Required in spaces with >250 sf lit by window(s) [or >900 sf lit by skylight(s)] ASHRAE: except in retail spaces or where a structure blocks the daylight. Daylit area is defined as the rectangle extending 2 feet beyond each end of a window and as far into the building as the top of the window is above the floor. For skylights, it is the rectangular area extending beyond each side of the skylight by 70% of the floor to ceiling height.	Multifamily Offices Restaurants Retail Spaces	Doesn't apply to dwelling units. See below for other spaces. IECC: Spaces with windows (or skylights) that have 2 or more light fixtures. ASHRAE: Spaces >250 sf with windows (or >900 sf with skylights) ASHRAE: Doesn't apply to retail spaces. See above for other spaces & IECC
	*Multi-Level Lighting_{LA}	Each space must have a lighting control that provides at least one step between on and off. IECC: Each area must have a manual control that reduces lighting power to 1/2 of full power (or less) while providing uniform lighting, except for areas that have automatic daylighting control. ASHRAE: Each space must have a lighting control with at least one step that has power draw between 30% and 70% of full on. IECC References: C405.2.1.2 ASHRAE References: 9.4.1.2a	IECC & ASHRAE: Each area with more than one fixture (or one fixture ≥100W) that is not a stairway, corridor, equipment room, storeroom, restroom, public lobby, parking area, audience seating, electrical or mechanical room. IECC Only: Not required for spaces with occupancy sensors, lighting power density < 0.6 wsf, or sleeping rooms.	Multifamily Offices Restaurants Retail Spaces	Doesn't apply to dwelling units—common spaces only. Applies to most spaces within buildings.
	Interior Lighting Power Density	The total connected lighting power is limited based on the building (or space) size and type of use (e.g. office vs retail). IECC & ASHRAE: Specify and install lighting fixtures whose total power draw is less than allowed for the building. Total allowance may be calculated using building area type (building area method), or by using the sum of multiple space types and their respective areas (space by space method). The space by space method gives extra allowances for merchandise lighting (ASHRAE and for specific lighting controls in certain situations). IECC References: C405.5 ASHRAE References: 9.5 or 9.6	IECC & ASHRAE: Applies to all spaces except dwelling units.	Multifamily Offices Restaurants Retail Spaces	Doesn't apply to dwelling units—common spaces only. Applies to all spaces within buildings.
	*Conductor Sizing_{LA}	Provide large enough feeder and branch wiring to keep current (wiring heating) losses to a minimum. IECC & ASHRAE: Size feeder conductors for ≤2% voltage drop & branch conductors for ≤3% voltage drop IECC References: C405.8 ASHRAE References: 8.4.1	IECC & ASHRAE: Required on all feeder conductors and branch circuits that are not dedicated to emergency lighting or services.	Multifamily Offices Restaurants Retail Spaces	Applies to all buildings.
	*Automatic Outlet Shutoff_{LA}	Turn off power supply to at least half of outlets when spaces are unoccupied. ASHRAE Only: At least half of receptacles must be automatically turned off by one of the following: 1) a time of day control serving no more than one floor no more than 25,000 sf, 2) an occupancy sensor control with an off delay of no more than 30 minutes, or 2) another control or alarm signal that indicates that a space is unoccupied. IECC References: None ASHRAE References: 9.4.2	IECC: No Requirement ASHRAE: Office and computer classroom spaces. Applies to 125 volt 15 and 20 amp receptacles, except those specifically designed for equipment requiring 24 hour operation or where safety or security would be endangered.	Multifamily Offices Restaurants Retail Spaces	ASHRAE Only: Applies to office & computer classroom spaces only. ASHRAE Only: Applies to office & computer classroom spaces only.
	*Lighting System Functional Testing_{LA}	Testing ensures that lighting system controls are installed and calibrated properly and according to construction documents and manufacturer's standards. IECC & ASHRAE: Testing shall confirm proper control and sensor placement AND programmed controls are programmed for lights off AND that daylighting controls reduce electric light (lighting power). *ASHRAE requires that this testing be performed by a third party (and IECC allows a code official to require third party testing). IECC References: C408.3 ASHRAE References: 9.4.4	IECC & ASHRAE: Where automatic lighting controls are used. ASHRAE:	Multifamily Offices Restaurants Retail Spaces	Doesn't apply to dwelling units—common spaces only. Applies wherever automatic lighting controls are used.

TECHNOLOGY	TECHNOLOGY DESCRIPTION / ENERGY IMPACT & CODE REFERENCE	MEASURE REQUIREMENT	WHEN IT APPLIES	Targeted Building Use Types	APPLICABILITY SUMMARY	
BUILDING MECHANICAL SYSTEMS REQUIREMENTS	*Air Economizer	Equipment that uses cool outside air to meet air conditioning needs (when possible) instead of running the AC compressor(s). This reduces compressor energy use and wear.	IECC & ASHRAE: Specify and install air economizer system capable of providing up to 100% of design supply air as outdoor air (for cooling). <i>IECC References: C403.3.1 & C403.4.1</i> <i>ASHRAE References: 6.5.1</i>	IECC: When a fan cooling unit has a cooling capacity of >33,000 Btu/hour (>2.75 tons); Residential spaces: >165,000 Btu/hr (13.75 tons) ASHRAE: When a fan cooling unit has a capacity >54,000 Btu/hr (>4.5 tons) [Residential spaces: >270,000 Btu/hr (>22.5 tons); Computer Rooms: >135,000 Btu/hr (>11.25 tons)]	Multifamily Offices Restaurants Retail Spaces	Common spaces; seldom applies to dwelling units. Applies to most systems serving floor areas larger than listed (or smaller areas with high cooling loads): IECC >=1,100 sf ASHRAE >=1,800 sf
	Demand Control Ventilation (DCV)_A	A control that automatically reduces the amount of fresh outside air being brought in through the ventilation system when few or no people are in a space. This reduces the energy use for heating and cooling outside air.	IECC & ASHRAE: Specify and install a demand control ventilation system (or exhaust air energy recovery ventilation) for high occupancy spaces (Occupant Density is based on the MN 2015 Mechanical Code, Table 403.3 Minimum Ventilation Rates.) <i>IECC References: C403.2.5.1</i> <i>ASHRAE References: 6.4.3.9</i>	IECC & ASHRAE: When design occupancy is: IECC >25 people/1,000 sf ASHRAE >40 people/1,000 sf for a space >500 sf with >1,200 cfm of supply air flow AND there is an economizer, automatic modulating outdoor air damper control, OR outdoor airflow is >3,000 cfm AND the hvac system has >1,200 cfm of outdoor air AND the hvac system does NOT have exhaust air ventilation recovery with an effectiveness of at least 50%	Multifamily Offices Restaurants Retail Spaces	May apply to common spaces Often if large meeting room, reception area or phone/data entry. Almost always applies unless very small Seldom applies (except mall commons or other gathering space)
	Energy Recovery Ventilation (ERV)	Equipment that uses the air being exhausted to preheat (and precool) fresh outdoor air that is brought into the building for ventilation. This reduces the amount of heating and cooling that must be done by the primary heating and cooling equipment.	IECC & ASHRAE: Specify and install ERV that reduces the outdoor air heating or cooling load by at least 50% without unduly impacting fan energy or economizer operation. <i>IECC References: C403.2.6</i> <i>ASHRAE References: 6.5.6.1</i>	IECC & ASHRAE: Any hvac system that runs at least 20 hours a week at a combination of high ASHRAE: % outdoor air (OA) and supply flow starting at 5,500+ cfm for 30-40% OA and going down to any flow rate for >80% OA (see code between) Unless: 1) More than 1/4 of the system's exhaust is somewhere other than the primary exhaust location, OR 2) Required humidity control is via reclaimed heat, OR 3) >50% of heating is from renewables or recovered heat	Multifamily Offices Restaurants Retail Spaces	Sometimes for central ventilation or common spaces-- especially dining rooms. This requirement is generally required only for mid to large size hvac systems that primarily serve high-occupancy spaces (e.g. conferences room or dining room)
	Boiler & Chiller System Control	Adjust water system flow rate and/or temperature at reduced loads. This saves energy by reducing the pump load, reducing heating and cooling loads, and/or increasing boiler or chiller efficiency.	IECC & ASHRAE: Specify and install part load controls that reset the supply-water temperature (IECC--by >25% of design temperature drop) OR reduce system pump flow to % of design flow rate. ASHRAE: ...and reduce power to <= 30% . If DDC at each zone and reducing system pump flow, reduce flow until one valve is nearly wide open. If total pump power > 10 hp, must reduce system pump flow. <i>IECC References: C403.4.3.4</i> <i>ASHRAE References: 6.5.4.1 & 6.5.4.3</i>	IECC & ASHRAE: When hydronic system design output (heating or chilling) >300,000 Btu/hr (25 cooling tons). ASHRAE: When system pump power > 10 hp, variable flow must be used (and water temperature reset is optional).	Multifamily Offices Restaurants Retail Spaces	This will generally apply to buildings >>6,000 sf with a boiler, which is more common in office buildings and older multifamily buildings. Seldom applies--only if there is a boiler system (and the building is >>6,000 sf)
	*Duct Sealing & Testing_A	All ductwork connections shall be sealed, and high pressure ductwork shall be tested. Savings is realized through reduced fan power and heating/cooling loads.	IECC & ASHRAE: All ducts need to be sealed to Seal Class A using mastics, tapes, gaskets, and welds. [ASHRAE only allows tape if per UL-181A or UL-181B certification and IECC does not require sealing of longitudinal joints that are continuously welded and locking at pressures below 2 inches water column.] Sealing of high pressure ducts (>3 inches water column) shall be verified by testing. <i>IECC References: C403.2.7</i> <i>ASHRAE References: 6.4.4.2.1</i>	IECC & ASHRAE: Sealing to class A applies to all ducts and plenums with a pressure class ASHRAE rating. Leakage testing is required in systems with static pressures above 3 inches water column (750 Pa).	Multifamily Offices Restaurants Retail Spaces	Sealing applies to all buildings Testing seldom applies--only if high pressure ductwork.
	Supply-Air Temperature Reset for Multizone Systems	Control that raises the cooling supply air temperature when the weather is not real hot. This saves energy by reducing overcooling and reheating that occurs when different zones have unbalanced cooling loads.	IECC & ASHRAE: HVAC systems controls should be specified and installed to automatically reset the supply air temperature by at least 25% of the difference between design supply and design room temperatures. Zones with relatively constant heat loads (e.g. server room) must be sized based on the maximum reset temperature (i.e. 25%+ higher cfm). <i>IECC References: C403.4.5.4</i> <i>ASHRAE References: 6.5.3.4</i>	IECC: This applies to multizone HVAC systems EXCEPT zones with <300 cfm air flow. Is not required if reheat is via site recovered heat or site solar. ASHRAE: This applies to multizone HVAC systems EXCEPT when total system fan nameplate hp <= 5 hp (including exhaust fans). Is not required if reheat is via site recovered heat or site solar.	Multifamily Offices Restaurants Retail Spaces	Seldom applies--only if multizone hvac system with reheat. Applies to multizone systems with reheat. Seldom applies--only if multizone hvac system with reheat.
	*Fan Motor Sizing	Fan motor oversizing is limited by reducing part-load inefficiencies (and first cost) by reducing part-load inefficiencies.	IECC & ASHRAE: Each fan motor shall be no larger than the smallest available motor size that provides enough power for the fan at design conditions EXCEPT that the next largest size may be used if the smallest available size is within 30% of the calculated requirement (within 50% for fans with calculated fan requirements less than 6 hp). <i>IECC References: C403.2.10.2 (& C403.2.10)</i> <i>ASHRAE References: 6.5.3.1.2 (& 6.5.3)</i>	IECC & ASHRAE: When the total fan motor nameplate horsepower for an hvac system (including exhaust fans) is >5 hp.	Multifamily Offices Restaurants Retail Spaces	Typically applies to systems serving >>4,500 sf
	*Pool Cover_A	Provide a pool cover for the surface of any pool.	IECC: Specify and install a vapor retardant pool cover. For pools heated above 90°F, the cover shall have a minimum R-12 insulating value. <i>IECC References: C404.7.3</i> <i>ASHRAE References: 7.4.5.2</i>	IECC & ASHRAE: Required for all heated pools.	Multifamily Offices Restaurants Retail Spaces	When there is a heated pool. Doesn't apply
	Low Leakage Intake & Exhaust Dampers_A	Provide dampers meeting specific low leakage testing requirements, with motorized dampers required in many situations.	IECC & ASHRAE: Leakage Rates Based on AMCA 5000 @ 1 inch wg 1) Motorized Dampers >= 45 cfm/sf (50 cfm/sf @ 4 in wg is better); 2) Gravity Dampers >= 2 ft in both directions; >20 cfm/sf; 3) Gravity Dampers < 2 ft in one direction; >40 cfm/sf. <i>IECC References: C402.4.5.2 & C403.2.4.4</i> <i>ASHRAE References: 6.4.3.4.2 & 6.4.3.4.3</i>	IECC & ASHRAE: Low Leakage Motorized Dampers --System outdoor air intakes >300 cfm; system exhausts >300 cfm in buildings over 2 stories. Low Leakage Gravity Dampers --Other outdoor air intakes & exhausts. Only IECC Gravity Exhaust Dampers < 8 inch diameter --Must be spring-loaded with a Allows: weather hood (no testing requirement).	Multifamily Offices Restaurants Retail Spaces	Virtually all outdoor air intakes and exhausts.
	HVAC Commissioning & Documentation_A	Verification that equipment and controls are installed, balanced, adjusted and functioning properly, and mechanical system documentation.	IECC & ASHRAE: 1) Provide O&M manuals and record all setpoints; 2) HVAC systems are to be balanced to first reduce throttling losses, and then reduce fan/pump speed; 3) Controls shall be tested to ensure they are calibrated, adjusted and working properly; 4) Detailed instructions for commissioning must be in the construction documents. <i>IECC References: C408.2</i> <i>ASHRAE References: 6.7.2.2, 6.7.2.3 & 6.7.2.4</i>	IECC: Buildings with cooling capacity >480,000 Btu/hr (40 tons) OR heating capacity >600,000 Btu/hr, except for systems serving dwelling or sleeping units. ASHRAE: All hvac systems need balancing and controls testing; Written balancing report is only needed for systems serving >5,000 sf; Commissioning instructions only needed in design documents for buildings >50,000 sf.	Multifamily Offices Restaurants Retail Spaces	IECC: -NOT required for dwelling/sleeping unit systems -NOT required for projects <12,000 sf (unless high heating or cooling loads) ASHRAE: -Balancing and controls testing for all -Balancing reports: systems >5,000 sf -Commissioning: buildings >50,000 sf

TECHNOLOGY	TECHNOLOGY DESCRIPTION / ENERGY IMPACT & CODE REFERENCE	MEASURE REQUIREMENT	WHEN IT APPLIES	Targeted Building Use Types	APPLICABILITY SUMMARY	
* All new construction building projects shall comply with at least one of the following requirements. Tenant spaces should comply with C406.2 or C406.3, unless the entire building meets C406.4.						
ADDITIONAL EFFICIENCY PACKAGE REQUIREMENTS (IECC only)	*Efficient HVAC Performance	Increase heating and cooling efficiencies above the base energy code requirements. This save significantly on heating energy, and moderately on cooling energy.	Gas-fired heating equipment (except steam boilers) must be condensing with efficiencies at least: Furnaces: < 225 MBH 92% / >225 MBH 90% Hot water boilers: 97% Unit heaters & duct furnaces: 90% Air conditioners efficiency must be at least: <= 5 tons 14 SEER 5.5 to 19.5 tons 11.3 EER & 11.8 IEER >=20 tons 10.3 EER & IEER <i>IECC References: C406.1 & C406.2</i>	IECC: All building types have the option of choosing this Efficient HVAC Performance or either Efficient Lighting Power or On-Site Renewables for it's additional efficiency package.	Multifamily Offices Restaurants Retail Spaces	IECC Only: 1 of 3 Options. This has medium to large impact if base hvac system design doesn't lend itself to high efficiency condensing heating equipment. Small impact for many buildings.
	*Efficient Lighting Power	Reduce the total connected lighting power to levels below the base energy code requirements.	Connected interior lighting must be at or below a lower whole-building method value (space by space method is not an option). The percentage power reductions are much larger for retail and multifamily than for office buildings. Area Method Only with the required values being: Multifamily 0.6 wsf Office 0.85 wsf Restaurant 0.89 wsf - 0.99 wsf Retail 1.3 wsf <i>IECC References: C406.3</i>	IECC: All building types have the option of choosing this Efficient Lighting Power or either Efficient HVAC Performance or On-Site Renewables for it's additional efficiency package.	Multifamily Offices Restaurants Retail Spaces	IECC Only: 1 of 3 options. NOT in dwelling units. Medium energy impact. IECC Only: 1 of 3 options. Small energy impact IECC Only: 1 of 3 options. Large energy impact IECC Only: 1 of 3 options. Small energy impact
	*On-Site Renewables	Reduce energy impacts through on-site renewables.	On-site renewable production must be at least one of the following: 1) 1.75 Btu/sf peak rate 2) 0.50 Watts/sf peak rate 3) 3% of the sum of energy for hvac, service hot water and lighting <i>IECC References: C406.4</i>	IECC: 1 of 3 options. Small energy impact	Multifamily Offices Restaurants Retail Spaces	IECC Only: 1 of 3 options. Small energy impact
	IMPORTANT: All measures require that design compliance is documented in construction documents and/or in submitted specifications so that compliance can be reviewed and documented at Plan Review stage.					

*These measures are completely new commercial energy code requirements within the State of Minnesota (as of the effective date: June 2, 2015) or dramatically tighter than previously.
_A and/or _A indicates measures that are required under both prescriptive and performance options for the IECC 2012 path_(a) and/or ASHRAE 90.1-2010 path_(A).
cl = Continuous Insulation, meaning that any breaks in insulation are properly sealed