




2023 Commercial Stretch Code Part 3: Solar and EV Ready

WE ARE MASS SAVE®:



1



What is Mass Save®?

- Mass Save® is an initiative sponsored by Massachusetts' gas and electric Program Administrators and energy efficiency service providers, including
 - The Berkshire Gas Company
 - Cape Light Compact
 - Eversource Energy
 - Liberty Utilities
 - National Grid
 - Unitil
- The Sponsors of Mass Save work closely with the Massachusetts Department of Energy Resources to provide a wide range of services, incentives, trainings, and information promoting energy efficiency that help residents and businesses manage energy use and related costs.

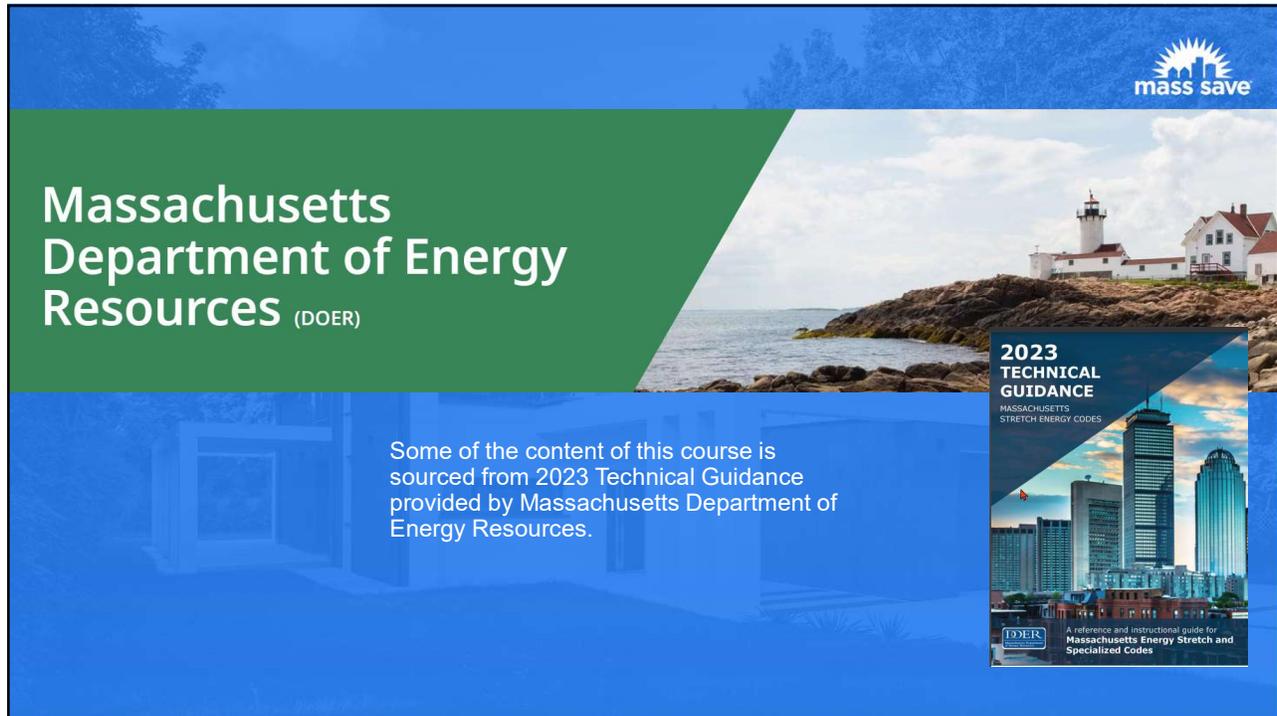


We Are Mass Save®

WE ARE MASS SAVE®:



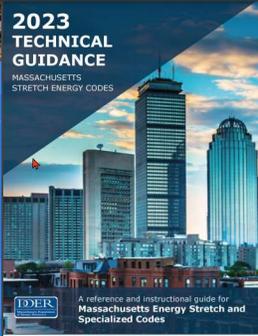
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Massachusetts Department of Energy Resources (DOER)

Some of the content of this course is sourced from 2023 Technical Guidance provided by Massachusetts Department of Energy Resources.



2023 TECHNICAL GUIDANCE
MASSACHUSETTS STRETCH ENERGY CODES

A reference and instructional guide for Massachusetts Energy Stretch and Specialized Codes

3



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Presented by:

PSD

4



Moving Energy Efficiency Forward

We combine building science with technology to help utility providers, program implementers, and building performance professionals achieve energy savings.



5

Today's Presenter



Art Pakatar
Senior Manager, Energy Codes Division

6

Today's Presenter



Bill Footer
Energy Efficiency Program Manager

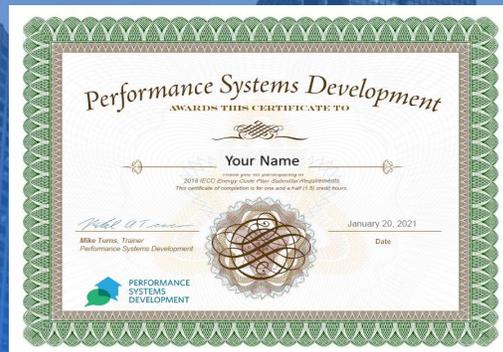
7

Continuing Education

This webinar is approved for:

- 1-hour CSL CEU
- 1 AIA LU | HSW
- 1 CO CEU
- 1 BPI CEU

Everyone will receive a certificate of attendance via email



8





Agenda

- Introduction**
- Massachusetts Energy Code**
- Appendix CB Solar Ready**
- EV Ready**
- Municipal Opt-In Specialized Stretch Code**
- Summary**

9

Learning Outcomes

After attending this session, attendees will:

- Know when a project is exempt from the requirements to provide solar ready zones 
- Learn how to calculate the solar ready zone when required on a commercial building 
- Be able to determine the requirements for compliance with the EV Ready Space requirement 
- Gain knowledge of electrical load management for EV parking demands 

10

Poll Question #1

Which of the following best describes your field of work?

- A. Builder/Contractor/Remodeler
- B. Design Professional
- C. Code Official
- D. HERS Rater/Passive House Consultant/ Energy Modeler
- E. Other

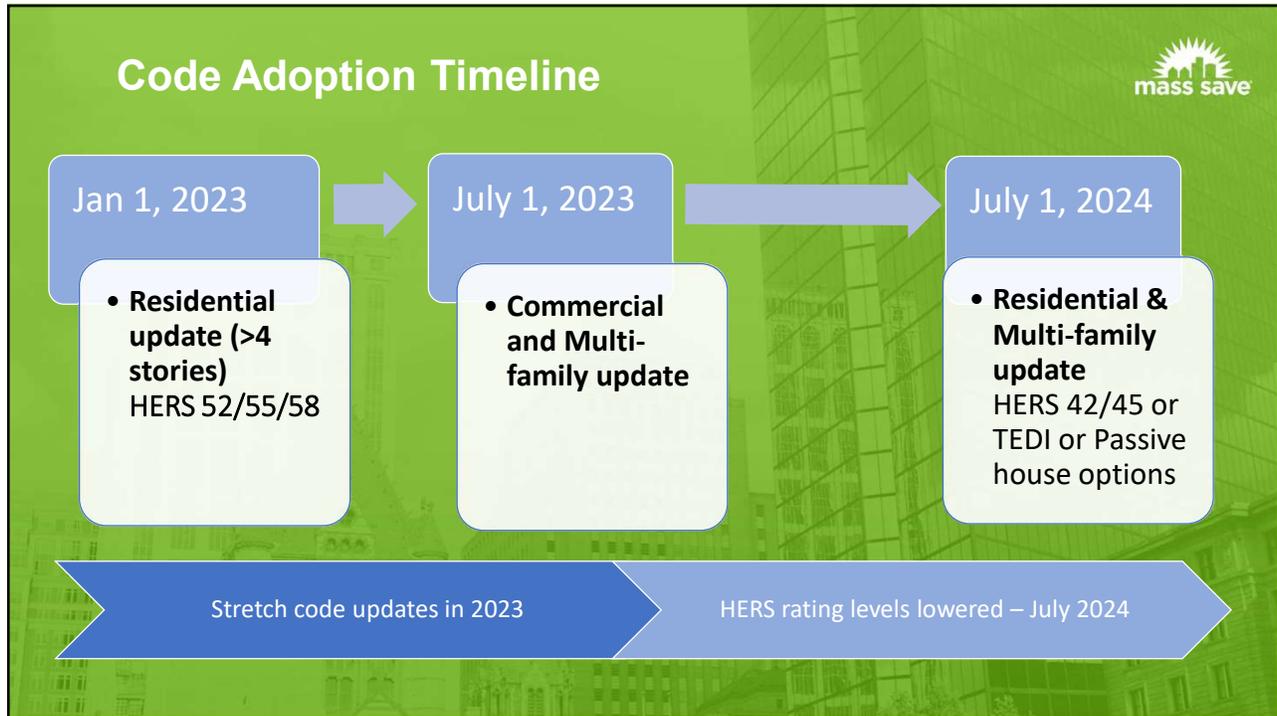


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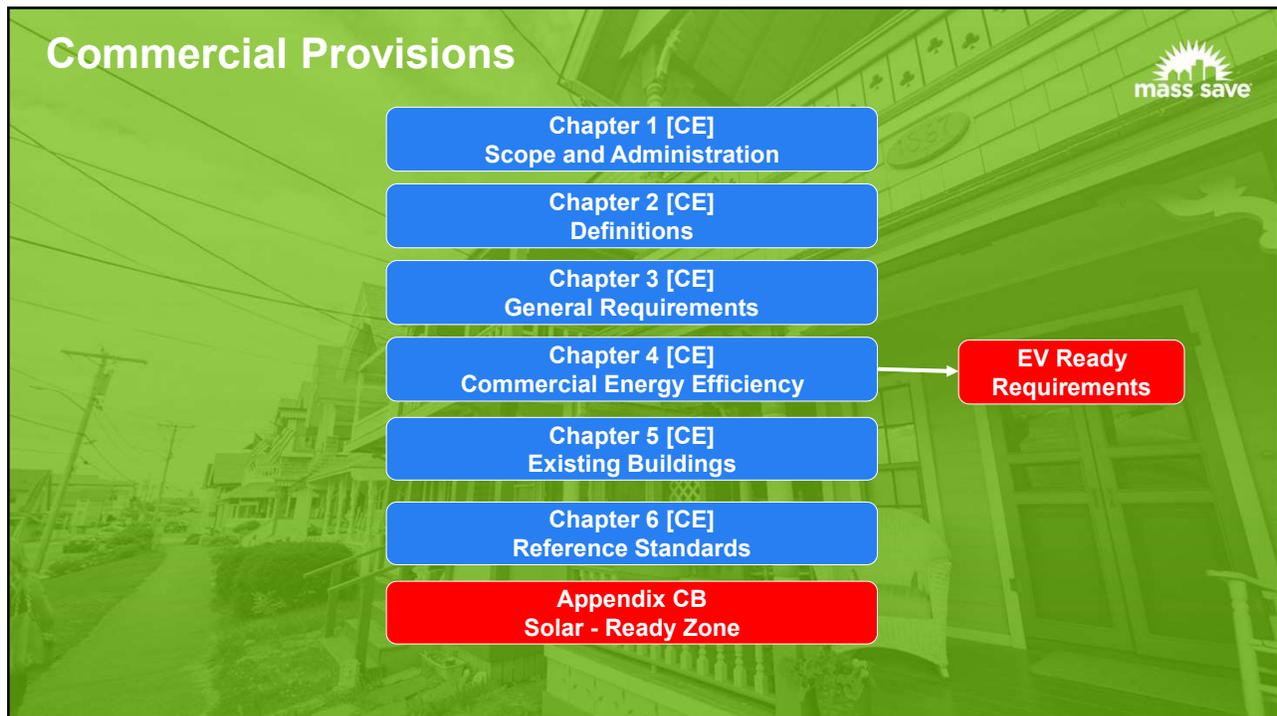
The 2023 Massachusetts Energy Code



12



13



14

MA Stretch Energy Code

The Commercial Stretch Energy Code...

- Is developed by the MA Department of Energy Resources (DOER)
- Results in greater energy savings than the Base Energy Code
- Requires compliance with 2021 IECC as amended for MA
- Includes Appendix CB: Solar-Ready Zone in its entirety
- Includes EV Ready requirements (Chapter 4)
- Is adopted at the level of the local jurisdiction



15

Poll Question # 4

Which of the following is a new requirement to be depicted on the Construction Documents submitted for permitting?

- Solar Ready Zone
- Thermal Boundary
- Air Barrier
- Ventilation documentation, schedules, and calculations



16



17

Appendix CB

Appendix CB – Solar-Ready Zone – Commercial

- Adopted unamended from 2021 IECC Appendix CB
- Ability to plan ahead
- Solar-ready zones and roof load documentation helps solar contractors with future installs
- Easy identification of unobstructed areas
- Easy identification of pathway to run conduits and wiring

18

CB101 Scope

These provisions shall be applicable to new construction, not additions.

CB102 Definition

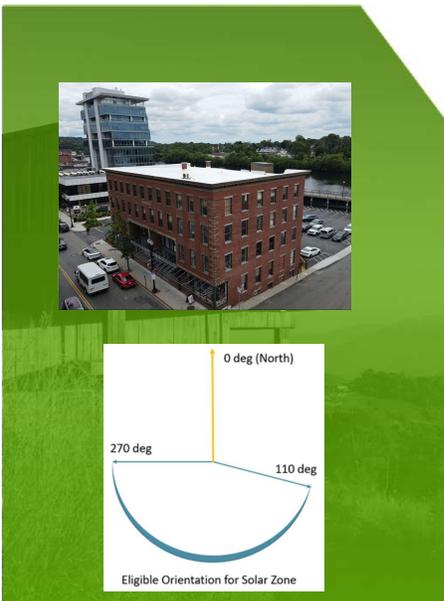
Solar-Ready Zone:

A section of sections of the roof or building overhang designated and **reserved** for the future installation of a solar photovoltaic or solar thermal system



19

Appendix CB: Solar-Ready Provisions



Applies to all Commercial and Multifamily Buildings*

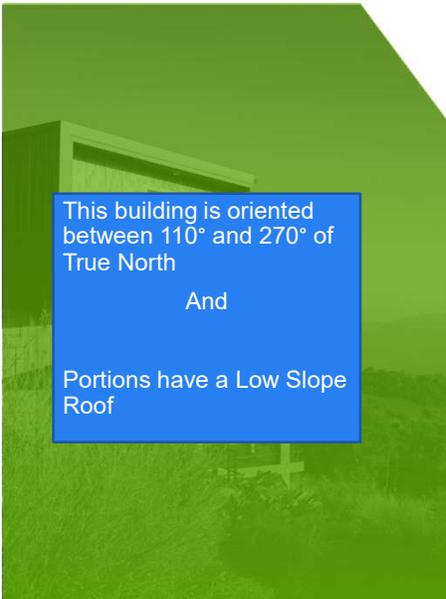
- 5 stories and less in height above the grade plane
- Oriented between 110 degrees and 270 degrees of true north or have low slope roofs**

* Multi-family buildings greater than 3 stories are classified as commercial buildings

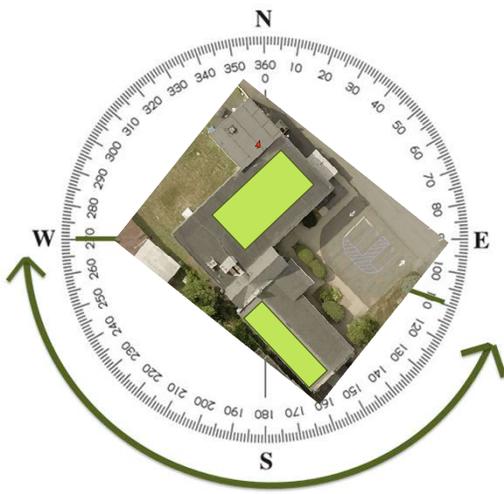
** A roof having a slope less than 2 units vertical in 12 units horizontal

20

Appendix CB: Solar-Ready Provisions

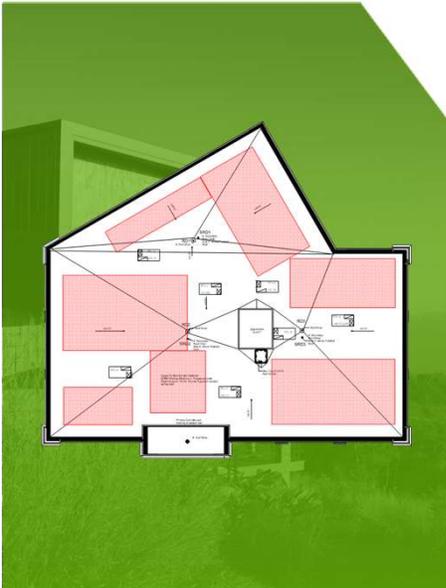


This building is oriented between 110° and 270° of True North
And
Portions have a Low Slope Roof



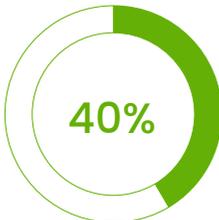
21

Appendix CB: Solar-Ready Provisions



Solar-Ready Zone Area

- Total area shall not be less that 40% of the gross roof area. Can be a single area or several smaller areas. Each area must be at least 5' in width.
- Shall be free from obstructions including pipes, vents, ducts, equipment, skylights and roof-mounted equipment. Objects may include taller portions of the building, parapets, chimneys, antennas, signage, trees and roof plantings



40%

22



Appendix CB: Solar-Ready Provisions - Exceptions

There are Four exceptions to the Solar-Ready Zone requirement:

1. Building has permanently installed, on-site renewable energy system
2. Building solar-ready zone is shaded for more than 70 percent of daylight hours annually.

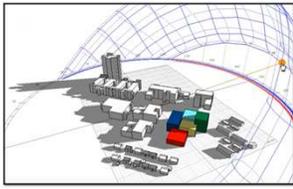



23



Appendix CB: Solar-Ready Provisions - Exceptions

3. Incident solar radiation is not suitable as certified by a licensed design professional.
4. Solar zone area cannot be met because of extensive rooftop equipment, skylights, vegetative roof areas, or other obstructions




24

Appendix CB: Solar-Ready Provisions

CB103.2 Construction Document Requirements:

- ✓ Construction documents shall indicate the solar-ready zone(s)

While not specifically required by code, CDs should show:

- ✓ Area calculations showing area of zones
- ✓ Approximate dimensions of zones
- ✓ Obstructions
- ✓ Required pathways



25

Appendix CB: Solar-Ready Provisions

CB103.4 Obstructions:

Solar-Ready Zones shall be free from obstructions including:

- ✓ Vent pipes
- ✓ Flue Vents
- ✓ Ducts
- ✓ HVAC Equipment
- ✓ Skylights
- ✓ Elevator penthouses
- ✓ Roof-mounted equipment



26

Definitions

- Chapter 2 definitions applicable to Solar Ready and EV Ready:

<ul style="list-style-type: none"> • Electric Vehicle • Electric Vehicle Supply Equipment (EVSE) • EV Ready Space • Automatic Load Management System (ALMS) • On-site 	<ul style="list-style-type: none"> • Renewable Energy Resources • Vegetative Roof
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27

Appendix CB: Solar-Ready Provisions

- Roof Loads and Documentation – Structural design loads shall be indicated on the CDs. A dead load of 5 PSF shall be included in the gravity load calculations.

ROOF LOADS:		
GROUND SNOW LOAD, P_g		= 20 PSF
TERRAIN CATEGORY		= C
SNOW EXPOSURE FACTOR, C_e		= 1.0
THERMAL FACTOR, C_t		= 1.1
SLOPE REDUCTION FACTOR, C_s		= 1.0
IMPORTANCE FACTOR, I		= 1.1
MINIMUM FLAT ROOF SNOW LOAD, P_f		= 22 PSF
LIVE LOAD		= 20 PSF
MISCELLANEOUS MECHANICAL AND ELECTRICAL LOADS		= 6 PSF

Future Solar = 5.0psf

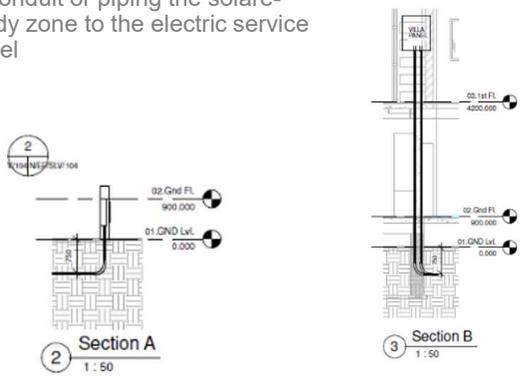


28

Appendix CB: Solar-Ready Provisions

- Interconnection Pathway – CDs shall delineate pathways for routing of conduit or piping the solare-ready zone to the electric service panel



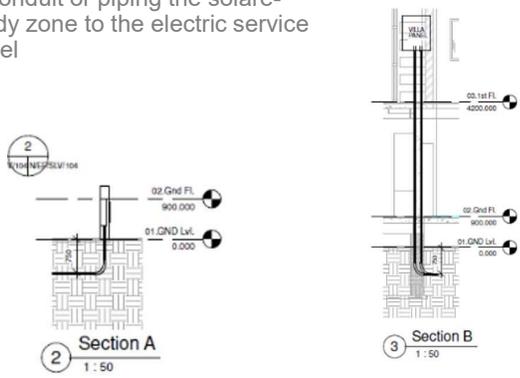


29

Appendix CB: Solar-Ready Provisions

- Electric Energy Storage System-Ready Area – the floor area share not be less than 2' x 4'. The locations and layout shall be depicted on the CDs





30



Appendix CB: Solar-Ready Provisions

- Electric Service Reserved Space – the main electric service panel shall have a reserved space to allow installation of a dual-pole breaker

31



Appendix CB: Solar-Ready Provisions

- Construction Documentation Certificate – a permanent certificate showing the solar-ready zone, the structural loading, the interconnection pathway is to be posted by the electrical distribution panel

Solar-ready Zone Certificate

This permanent certificate, indicating the solar-ready zone and other requirements of this section, shall be posted at a conspicuous location (electrical distribution panel, water heater, etc.) by the builder/registered design professional

32

Solar-Ready Zone

Example:

- Four story building
- Low slope roof
- Vegetative roof
- Obstructions preventing clear solar-ready zone area
- Orientation – Does not matter because low slope roof

Determination:

Solar-ready Zone not required



33

Solar-Ready Zone

Example:

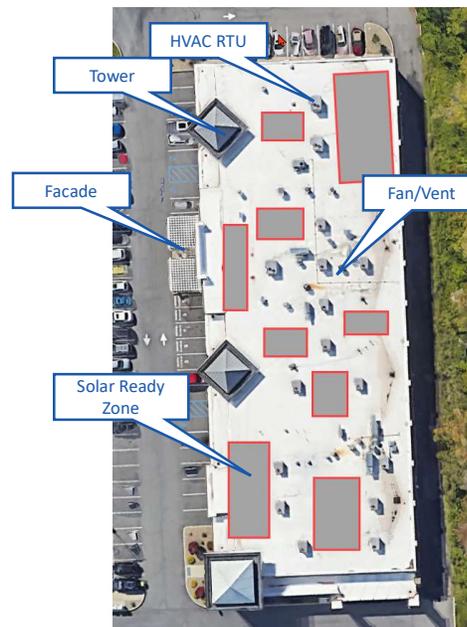
- One Story (Retail Strip Mall)
- Overall Area 35,960 SF
- Low slope roof
- Obstructions limiting clear solar-ready zone area
- Orientation – Does not matter because low slope roof

Determination:

Solar Ready Zone Required

$35,960\text{SF} \times .40 = 14,384\text{ SF}$

Solution – multiple zones totaling 14,400sf+/-, minimum dim. 5 ft.



34

Poll Question # 8

Renovations of an existing building requires identification of a solar ready zone

A. TRUE.
B. FALSE



35



EV Ready

36

EV Ready Parking Spaces

("EV Ready Spaces")

EV Ready Spaces shall be provided in accordance with Table C405.13

- AC Level II spaces
- The dedicated branch circuit shall be identified as "EV READY" in the service panel or subpanel directory, and the termination location shall be marked as "EV READY."
- The circuit shall terminate in a NEMA receptacle, outlet or a Society of Automotive Engineers (SAE) standard J1772 electrical connector.

EV Ready
Install electrical panel capacity and raceway with conduit to terminate in a 240-volt charging outlet (typical clothing dryer outlet).

EV Ready
EV space that has circuit installations and panel capacity, raceway with wiring, receptacle, and circuit overprotection devices.

37

EV Ready Parking Spaces

- Automatic Load Management System (ALMS) can be used to service multiple spaces using a higher amperage circuit
- CDs to show details and calculations
- EV Spaces are required for a compliance paths.

EV Ready
EV space that has circuit installations and panel capacity, raceway with wiring, receptacle, and circuit overprotection devices.

38

Definitions

ELECTRIC VEHICLE.

An automotive-type vehicle for on-road use

Includes automobiles, buses, trucks, vans, neighborhood electric vehicles, electric motorcycles

Primarily powered by an electric motor

Informational note: The EV definition comes from 527 CMR 12.00: Massachusetts Electrical Code (Amendments) section 625.2.



39

Definitions

ELECTRIC VEHICLE SUPPLY EQUIPMENT (EVSE) includes:

- Conductors
- Electric Vehicle
 - Connectors
 - Attachment plugs
 - All other fittings, devices, power outlets, or apparatus

...installed specifically for the purpose of transferring energy between the premises wiring and the Electric Vehicle.

Note: Comprehensive ESVE is not a requirement for EV Ready Spaces

Informational note: The EV definition comes from 527 CMR 12.00: Massachusetts Electrical Code (Amendments) section 625.2.



40

Definitions

ELECTRIC VEHICLE READY PARKING SPACE (“EV Ready Space”)

- A designated parking space which is provided with **wiring and electrical service** sufficient to provide:
 - 240-volt AC level II or equivalent EV charging, as defined by Standard SAE J1772 for EVSE servicing light duty Electric Vehicles.
- Standard SAE J1772 is the International and North American standard for EV plugs, known as a J plug.



41

EV Ready Spaces – Identification in Service Panel or Subpanel



The dedicated branch circuit shall be identified as “EV READY” in the service panel or subpanel directory



© Performance Systems Development

42

EV Ready Spaces – Marking of Termination Location

The termination location shall be marked as “EV READY”.



43

R404.4 Wiring for Electric Vehicle Charging Spaces (“EV Ready Spaces”)



The circuit shall terminate in a
NEMA receptacle

OR

Society of Automotive Engineers
(SAE) standard J1772 electrical
connector.



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44

EV Ready - Exceptions

Exception 1:

Parking and garage spaces exclusively for retail sale or vehicle service

Exception 2:

Parking facilities ≥ 4 spaces providing fast charging EVSE w/ 150 kW to each space



45

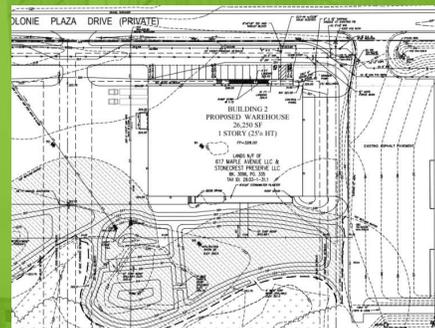
EV Ready - Exceptions

Exception 3:

One or more Level II spaces may be substituted w/ multiple AC Level I spaces. Ratio of 3 AC Level I for each AC Level II spaces

Exception 4:

Parking spaces specifically designated for medium or heavy-duty vehicles are excluded from EV-ready space percentage calculation.



46

EV Ready Spaces

Table C405.13 EV Ready Space Requirements

Occupancy Classification Group	Minimum percentage of EV-Ready Spaces	EV Charging Performance Requirements
Group R and Group B	At least 20% of spaces	40-amp dedicated branch circuit or larger branch circuit with ALMS in accordance with Table C405.13.1
All other Occupancies	At least 10% of spaces	40-amp dedicated branch circuit or larger branch circuit with ALMS in accordance with Table C405.13.1

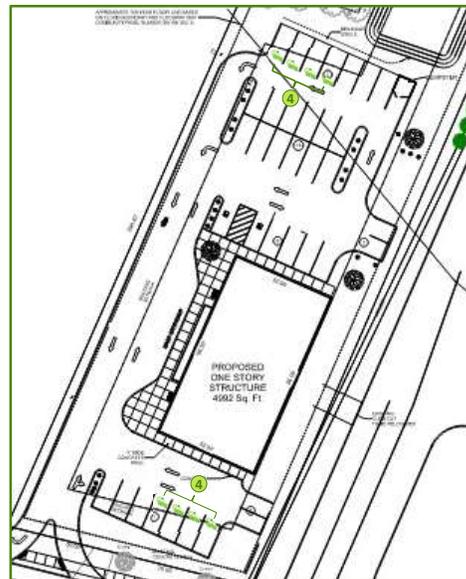
47

EV Ready Parking Spaces

Example:

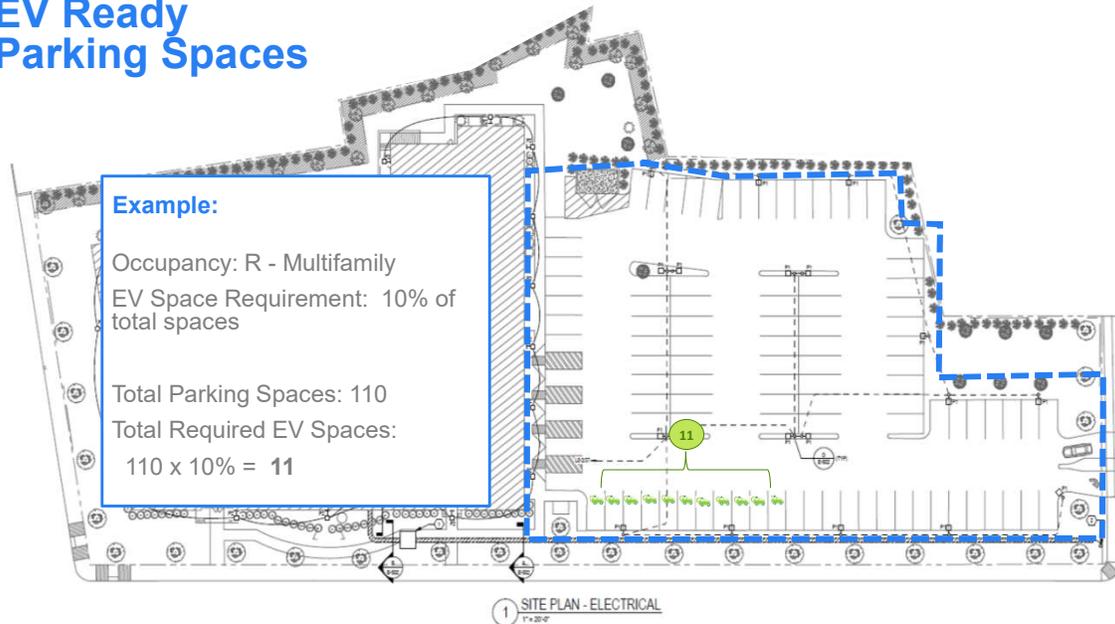
Occupancy: Business B
 EV Space Requirement: 20% of total spaces

Total Parking Spaces: 36
 Total Required EV Spaces:
 $36 \times 20\% = 7.2$ round up to 8



48

EV Ready Parking Spaces



49

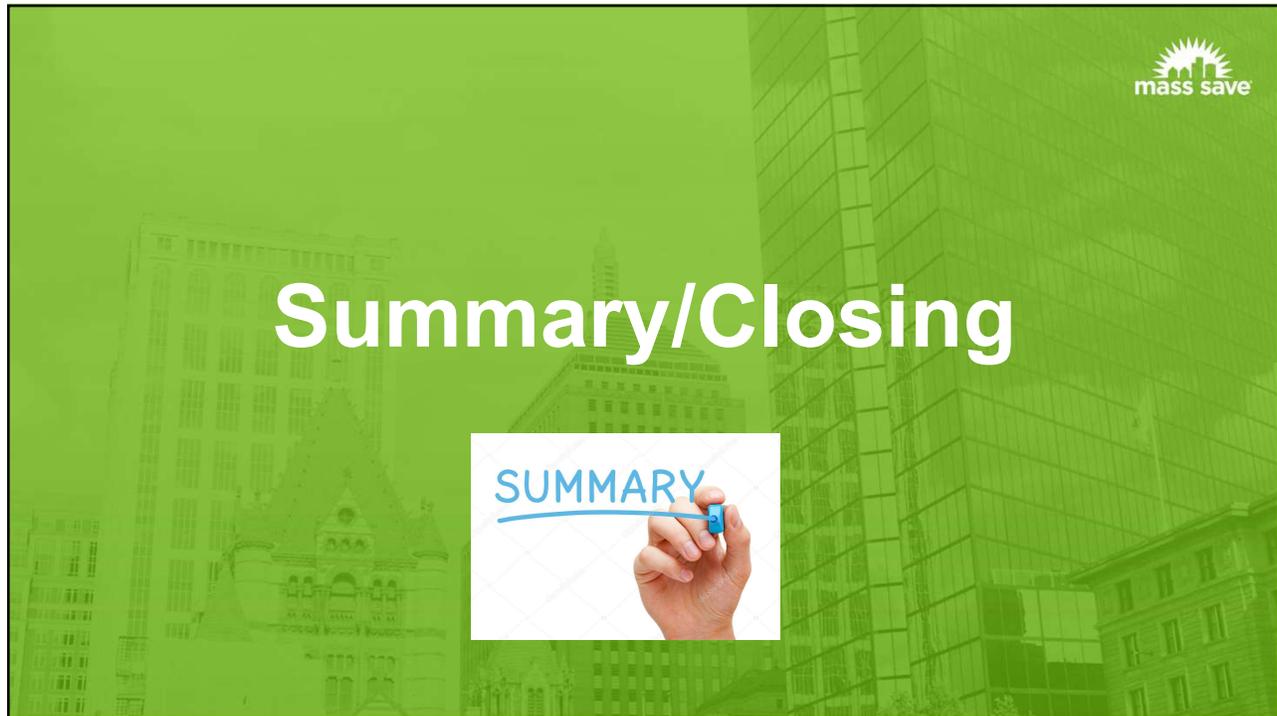
Poll Question # 9

Automatic Load Management System (ALMS) can be used to service multiple spaces using a higher amperage circuit.

- A. TRUE
- B. FALSE



50



51



Commercial Overview Summary

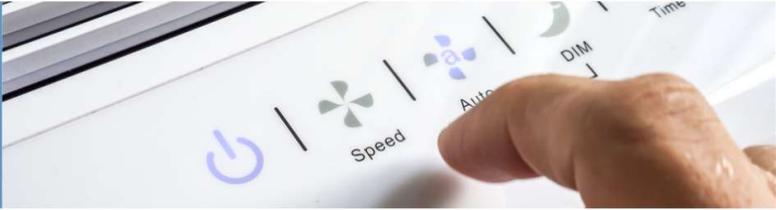
- Solar-Ready provisions have been adopted unamended from the IECC 2021
- Solar-Ready Zones equaling a minimum of 40% of unobstructed roof area is required on buildings 5 stories or less with orientation between 110° and 270° of True North
- Orientation does not apply to low slope roofs
- A dead load of 5 psf is required to be built in to solar-ready required buildings. Documentation of this load is to be provided on certificate
- EV parking spaces are required
- Automatic Load Management System (ALMS) can be used to distribute loads for spaces between circuits

52

Mass Save Incentive Programs



Residential Rebates and Incentives
Rebates for appliances, heating systems and more.



www.masssave.com/en/residential/rebates-and-incentives

53



Commercial New Construction or Major Renovation Program

Choose Your Path to Generate Energy Savings and Reduce Carbon

54

There is a Pathway for Every Project

Mass Save Sponsors offer the highest incentives for projects with the lowest EUIs and greatest levels of decarbonization

Path 1, Net Zero and Low EUI Buildings (10,000 sf or greater)	Path 2, Whole Building Energy Use Intensity (EUI) Reduction Approach (50,000 sf or greater)	Path 2, High Performance Buildings
Receive expert net zero building technical assistance and the highest new construction/major renovation project incentives available. Set an ultra-low EUI and save. We provide support through a post occupancy period to help you make sure the building performs at the level you expect	In this path for larger, complex building projects, your incentives will be greater with the lowest design EUIs. We offer technical support and energy modeling services to help you succeed	For whole building projects of any size where customers do not wish to set and pursue an EUI target, projects that are not whole buildings (e.g., tenant fit outs, open air parking garages), projects that are process-load heavy buildings (e.g., cannabis, industrial), and projects where customers are only interested in one-off measures.

55

High-Rise Path Overview

Eligibility

- 4+ stories and 5+ units with residential-metered heat
- All multi-family with commercially-metered heat
- New construction and ≥ 50% rehab projects
- Must register prior to construction start

Enrollment process

- Work with a dedicated ICF Account Manager
- Verification completed utilizing architect and/or engineer approved submittals

Residential New Construction High-Rise
Multi-family homes with four stories or more

Build upon our energy efficiency incentives

The Sponsors of Mass Save® promote the construction of energy-efficient residential multi-family buildings within Sponsor service territories. Incentives are available for new building construction that meets our eligibility requirements.*

Are you eligible?
Residential and mixed-use new construction or greater than 50% gut-rehab jobs, at four stories or more, are eligible if located within a Sponsor's service territory. Additionally, master-metered HVAC buildings under four stories are eligible within our service territories.

What determines your incentive?

- Incentives are available for both residential in-unit and common area energy efficiency measures.
- Incentives are determined by the electric and natural gas savings as modeled by account managers from the building's energy efficiency measures as confirmed in the construction documents and compared to an approved code baseline.
- Examples of improved energy efficiency measures include commercial lighting, HVAC, domestic hot water, the building enclosure, and tested infiltration reduction by third-party verifiers.
- We urge you to contact us during the schematic or design development phase to maximize financial incentives and technical support.

*Specific terms are subject to change from year to year.

56

Available Incentives

- Provides incentives for both residential in-unit and common area energy savings.
- Building Envelope
- Domestic Hot Water Production
- HVAC Systems
- Motors & Drives
- Lighting & Controls
- Plumbing Fixtures
- And more

57

Energy Code Support

Questions about the energy code?



Energy Code Support Hotline:

855-757-9717



Energy Code Support Email:

energycodesma@psdconsulting.com

58



Thanks!

Massachusetts Energy Code Technical Support Program

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GAS
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Cape Light
Connect



EVERSOURCE



Liberty



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Unitil