# Who Is Mass Save®?



- Mass Save\* is an initiative sponsored by Massachusetts' gas and electric utilities 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':





**EVERS•URCE** 



nationalgrid

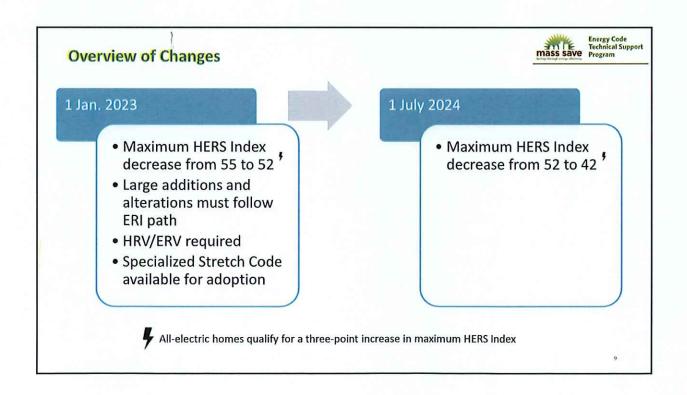


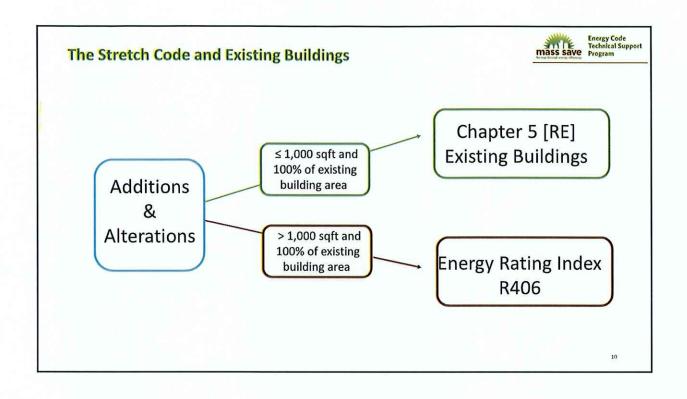
Energy Code Technical Support

# **Residential Stretch Code**

Massachusetts Energy Code Technical Support Program

# The 2023 Massachusetts Energy Code Municipal Opt-In Specialized Stretch Code Stretch Code Base Code





Clean Energy Application	New Construction Starts January 1,	New Construction Permits	Major- Alterations, Additions, or Change of Use.		
	2023, until June 30, 2024	After July 1, 2024	Starts January 1, 2023		
Mixed-Fuel Building	52	42	52		
Solar Electric Generation*	55	42	55		
All-Electric Building	55	45	55		
Solar Electric* and All-Electric Building	58	45	58		

# R 401 Scope Compliance Options for Stretch Code



### **New Construction**

### R401.2.2 Passive House

 The Passive House Building Certification Option requires compliance with Section R405 and R404.4.

### R401.2.3 Energy Rating Index

• The Energy Rating Index (ERI) Option requires compliance with Section R406, R403.6 and R404.4.

## R401.2.4 Appendix RC Opt-in Stretch Code

 Residential Buildings and dwelling units covered by this chapter may elect to comply with the requirements of IECC Appendix RC and R404 as amended.



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# Table 406.2 Requirements - Energy Rating Index



Formally
Listed As
Mandatory
Requirements

Now in One Table

Section	Title
	General
R401.3	Certificate
	Building Thermal Envelope
R402.1.1	Vapor retarder
R402.2.3	Eave Baffle
R402.2.4.1	Access hatches and doors
R402.2.10.1	Crawl space wall insulation installation
R402.4.1.1	Installation
R402.4.1.2	Testing
	Mechanical
R403.1	Controls
R403.3	Ducts (except R403.3.2, R403.3.3, and R403.3.6)
R403.4	Mechanical system piping insulation
R403.5.1	Heated water circulation and temperature maintenance systems
R403.5.3	Drain water heat recovery units
R403.6.1	Heat or energy recovery ventilation (HRV/ERV)
R403.7	Equipment sizing and efficiency rating
R403.8	System serving multiple dwelling units
R403.9	Snow and ice melt systems
R403.10	Energy consumption of pools and spas
R403.11	Portable spas
R403.12	Residential pools and permanent residential spas
	Electrical Power and Lighting Systems
R404.1	Lighting equipment

# R406.6.2 Documentation for Permit Application Energy Rating Index



# Prior to the issuance of a <u>building</u> <u>permit</u>:

- A HERS compliance report which includes a BBRS Approved HERS index score of 55 or lower, or otherwise complies via renewable trade-offs
- 2. A description of energy features
- A statement that the rating index score is "based on plans"

Property man Bullder 121 main timest Soumes, ma \$2277	Home sens sering Type sering Core tepping (I)	e Energ	y Rating Ce						
				Estimated Annual Energy Cost					
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A Description of the Control of the				Service Charges	90.5	11111	1009		
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Dutt Exchange to Dutticks	NAME OF REAL PROPERTY.			*Compliance & determine		5			
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<b>Building Shell Featur</b>	es								
Cuting Fire	F-41.0	Sint	Store	1					
Swind after	Na.	Expendition	1.90.4						
Voubud Calling	194	Villador Type	2 16w 8.00, 9400 8.00						
Alberty Grade Yorks	N 25-0	Militaries Note	my tisting tistionise						
Foundation trails	* 6 5	ratiod	Burrar des test						
Lights and Appliance	Features			Parformance System 5 124 Romition M	hov				
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Fernand Garage Lighting	100.06	Clother Gryor Fuel	Date	MP 277 6240					
Bubblewice (Kithou)	717	Chithes Jayer CDF	1.0						
Dishwahar (Kithrys)	210 54	ding Fan Edwinstern	4.00						
	his lifernation due not a	contribute any warrant	Energy Society and Energy Soll by of every come or carbon, it is belonge for this home is a validitie	IS 2017 HORDON, Bridde	, Externally,				

14

# MA Residential Amendments ERI Documentation – Final

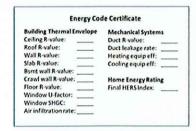


# Prior to the issuance of a <u>certificate of occupancy</u>:

- 1. A **copy of the final certificate** indicating that the HERS rating index score for each unit is verified to be 55 or less or otherwise complies via renewable trade-offs
- 2. Completed HERS rater verified ENERGY STAR Thermal Enclosure Checklist
- 3. A copy of the certificate, as required by Section R401.3 for each unit listing the final HERS index score of the dwelling unit







# R404.4 Wiring for Electric Vehicle Charging Spaces ("EV Ready Spaces")



- EV Ready Spaces shall be provided in accordance with Table R404.4
  - -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 or a Society of Automotive Engineers (SAE) standard J1772 electrical connector.



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# **TABLE R404.4 EV READY SPACE REQUIREMENTS**



Type of Building	Number of spaces
1 & 2 Family Dwellings and Townhomes	At Least 1 50 Amp Circuit per Dwelling Unit
All Other R-use Buildings	At least 20% of spaces served with a 40-Amp, 208/240-volt circuit with a minimum capacity of 9.6 kVA.

# **Municipal Specialized Opt-in Code**



The Specialized Stretch Code...

- · Includes net-zero building performance standards
- Is designed to achieve MA GHG emissions limits
- · Requires compliance with the Stretch Code
- Requires pre-wiring for future electrification of space and water heating for homes with fossil fuels
- Is adopted at the local level but is NOT required for participation in Green Communities



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# Appendix RB: Solar Ready Provisions - Scope





- · RB101.1 General
  - These provisions shall be applicable for all R-use buildings new construction, except additions 1,000 sqft and under.
- Exceptions
  - -Buildings and dwelling units
    - Complying with Appendix RC: Sections RC102 (Zero Energy Pathway) or RC105 (Mixed-fuel Pathway)
    - With roof is shaded for more than 70% of daylight hours annually

### APPENDIX RB: SOLAR-READY PROVISIONS



New in 2021:

## Applies to all R-use Buildings 3 stories and below Shading

- The solar-ready zone shall be set back from any permanently affixed object, such as a chimney on the building that is located south, east, or west of the solarready zone
- · Setback must be at least 2X the object's height
- Objects may include taller portions of the building, parapets, chimneys, antennas, signage, rooftop equipment, trees and roof plantings

### Capped roof penetration sleeve

- A capped roof penetration sleeve shall be provided adjacent to a solar-ready zone located on a roof slope of not greater than 1 in 12.
- Sleeve shall be sized to accommodate the future photovoltaic system conduit, but not less than 1.25" in diameter



2018 IECC stretch ease Fact sheet

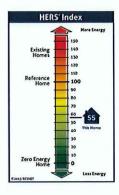
# The Massachusetts Stretch Energy Code at a Glance

This document applies to new one- and two-family dwellings, townhouses, and dwelling units in R-use buildings four stories or less. Alterations, renovations, additions or repairs to existing buildings are exempt from the stretch energy code and are only required to comply with IECC Section R501 – R505 for matters relating to energy efficiency. All compliance paths must meet all mandatory requirements found on page two of this document.

Path

# **Energy Rating Index Compliance Alternative**

- A Home Energy System (HERS) Rating must be completed by a certified HERS Rater for all new construction
- Homes without onsite renewable energy systems must achieve a HERS Index score of 55 or less
- Homes with onsite renewable energy systems are allowed a 5- to 12-point increase in maximum HERS Index depending on the type and number of systems. See Table R406.4 for more detail
- Documentation:
  - Preliminary HERS report, description of energy features and a statement that the index score is" based on plans" for permit
  - Final HERS report, completed ENERGY STAR Thermal Enclosure checklist and copy of certificate required by R401.3 for C.O



2 gth

# **ENERGY STAR® Certified New Homes**

- The home must receive a certification from the EPA's ENERGY STAR Certified New Homes Program, Version 3.1.
- The program requires verification to be performed by a Home Energy System (HERS) Rater
- Documentation:
- Preliminary HERS report, description of energy features and a statement that the index score is" based on plans" for permit
- ENERGY STAR Homes certificate, Final HERS Report, completed ENERGY STAR Thermal Enclosure checklist and copy of certificate required by R401.3 for C.O



Sath 3

## **Passive House**

- The home must receive a certification from PHIUS or PHI
- The program requires verification by a Certified Passive House Consultant using PHIUS or PHI approved software
- Documentation:
  - A WUFI of PHI report demonstrating compliance with PHIUS+2018 (or newer) or PHI requirements, a statement that the report is "based on plans" and evidence of PHIUS or PHI precertification approval
  - An updated WUFI or PHI report demonstrating compliance with PHIUS+2018 (or newer) or PHI requirements, copy of Rater's test results, a statement that report the is "based on 'as-built" conditions







# **All Paths**

# **Mandatory requirements**

- Certificate (R401.3)
- Air Leakage (R402.4)
- Maximum fenestration U-factor and SHGC (R402.5)
- Controls (R403.1)
- Heat pump supplementary heat (R403.1.2)
- Duct sealing (R403.3.2)
- Duct testing (R403.3.3)
- Building cavities (R403.3.5)
- Mechanical system pipe insulation (R403.4)
- Heated water circulation and temperature maintenance system (R403.5.1)
- Hot water pipe insulation (R403.5.3) (Required for Path 1 only)
- Mechanical ventilation (R403.6)
- Equipment sizing and efficiency rating (R403.7)
- System serving multiple dwelling units (R403.8)
- · Snow melt and ice system controls (R403.9)
- Pools and permanent spas (R403.10)
- · Portable spas (R403.11)
- · Lighting equipment (404.1)

Learn More at MassSave.com/EnergyCode



2018 vpdated - MA Regidential Code weeklist Energy

# LOW-RISE RESIDENTIAL NEW CONSTRUCTION Massachusetts Energy Code 9th Edition

mass save

Energy Code Technical Support Program

Massachusetts Energy Code 9th Edition

Permit Application Checklist\*

*This checklist guides permit applicants through the main requirements of the energy code prior to permit application										
Applicant Name: Applicant Phone:										
F	Project Address: Date:									
In	Indicate which Compliance Path is being used (R401.2)									
			(ERI and				Man	datory Pod	uirements (A	II projecte)
_	rum i (i rosemparo)									iii projects)
Path 1. Prescriptive: Sections R401 – R404 & R407: Indicate page number in plans & specifications where details are found:  Wood Slab										
Windows & Doors Skylight Ceiling frame wall Floor Wall insulation / depth									Crawlspace Wall	
	Option A: Maximum value Minimum value    Maximum value   Minimum value   Minim									R-15/
_	R-value (R402.1.2)	U-0.30	U-0.55	R-49	R-13+5	R-17	R-30	R-19	R-10 / 2 ft.	R-19
_	Option B:					Maximum	value			
E	Equivalent U-factor (R402.1.4): Must include calculations	U-0.30	U-0.55	U-0.0	26 U-0.060	U-0.082	U-0.033	U-0.050	U-0.1 / 2 ft.	U-0.055
	Option C: Total UA alternative (F	R402.1.5 plu	us MA ame	endmen	R402.1.5.1)			REScheck REScheck	TM version 4.6.	5 or later
					1 Mara Efficien	+ UV/AC n	orformer		-vveb	
	Additional Efficiency Packages			닏	1. More Efficier				D400 C 4)	
	Projects must comply with one of (R407.1)	the following	ng options		2. Heat or ener					- U (D 107.0)
				Ц	3. High efficien			3 - 33 - 33 - 34 - 34 - 34 - 34 - 34 -		
	th 2. Energy rating index (ERI) and							ETCH CODE	COMPLIANO	CE
	cumentation must be submitted p  A. RESNET HERS rating with M							ating with Inc	lex score less	than or equal
L	to Table R406.4, description of er									man or oqual
				Tab	le R406.4		A marilum a come	LIEDO Indov		
	On-site Renewable en	ergy sourc	е		New cor	nstruction	aximum	HERS Index	e renovations;	additions
	None				5	55			65	
	DHW					57			67	
	Solar Electric Generation Clean Space Heating					60 60			70 70	
	Solar Electric & DHW				6	32			72	
	Solar Electric & Clean Space Heating					65 67			75 77	Military III
	Solar Electric & Clean Space Heating  B. Certified ENERGY STAR® ho		ion 3.1 cei	rtified (		Maria	t includ	e: Preliminar		description
	of energy features, and a statement	ent that the	rating inde	x score	is "based on pla	ans".				
E	C. Passive House Institute US of which demonstrates compliance with results are "based on plans", and	with PHIUS	+2018 (or	newer)	or PHI performa	nce requir				
Ge	neral Mandatory Requirements: A	PPLIES T	O ALL PR	OJEC	rs					
Ē										
Blower door test to be completed (R402.4.1.2) Building envelope leakage must be ≤ 3 ACH50										
								ucts/air hand	lers are inside	(R403.3.3.)
Ducts to be pressure tested by a HERS Rater, HERS RFI, or BPI Certified Pro. Exception: All ducts/air handlers are inside (R403.3.3.)  Boiler temperature setback control indicated in specifications (R403.2) on page #										
1. Equation 4-1 (R406.3)										
					Method by	which	一百		STAR® Home	s v3 1
E	Mechanical ventilation rate (R4	03.6):		CF			. :	3. ASHRAE		0.10.1
					calculated	(select one	*): 🗀			
	Heating and cooling load calculations (Manual J) and Equipment Selection report (Manual S) to be submitted (R403.7)									
	Solar Ready Zone indicated in		100					-	nd RA103.8)	2
	requirement applies only to new of									
	exceptions:	of area is a	riented hat	woon 1	10° and 270° of	true porth	Hati			
	<ol> <li>less than 600 square feet of ro</li> <li>buildings with a permanently in</li> </ol>					ude north;				
	3. buildings with a solar-ready zone that is shaded for more than 70 percent of daylight hours annually.									

# Massachusetts Energy Code Residential New Construction Permit Application and Plan Review Checklist Version 1.0

*This page is to be completed by the permit applicant and submitted to the local building department with other required permit application documents.									
Applicant Name: Applicant Phone:									
Project Address:					Date:				
Select a compliance path (R40	1.2)								
☐ Path 1 (Prescriptive)	_	2 (FRI a	nd Stretch	Code)	1	Mandat	tory Requi	rements (All	projects)
- Taut (Trescriptive)		12 (21110	ina Otrotor	10000)		Maria	tory reduct	iii v) omornor	projecto
Path 1. Prescriptive: Sections R401 - R404 & R407: Indicate page number in plans & specifications where details are found:									
	Windows & Doors	Skylights	Ceilings	Wood frame walls	Mass walls	Floors	Basement walls	Slab insulation / depth	Crawlspace walls
Option A:	Maximu	m value		D 00	D 42 /	Minimum			D 45 /
R-value (R402.1.2)	U-0.30	U-0.55	R-49	R-20 or R-13+5	R-13 / R-17	R-30	R-15 / R-19	R-10 / 2 ft.	R-15 / R-19
Option B:				N	/laximum	value			
Equivalent U-factor (R402.1.4): Must include calculations	U-0.30	U-0.55	U-0.026	U-0.060	U-0.082	U-0.033	U-0.050	U-0.1 / 2 ft.	U-0.055
Option C: Total UA alternative (R402.1.5 plus MA amendment R402.1.5.1)  REScheck <sup>TM</sup> version 4.6.5 or later REScheck-Web <sup>TM</sup>									
Additional Efficiency Packages (R407.1)  All prescriptive projects must comply with one of the options to the right. Select one.  More Efficient HVAC performance (R407.2)  Heat or energy recovery ventilation system (R403.6.1)  High efficiency water heating or solar thermal hot water heating (R407.3)									
Path 2. Energy rating index (ERI) and non-stretch communities). Documentat	d Approve ion must b	d Alterna e submitte	tives (R406 ed prior to is	6): MANDA suing buildir	TORY ng permit.	FOR S	TRETCH ne method	CODE (option	onal path in
Option A. RESNET HERS rating	g with MA	amendme	nts: Submit	tal must inc	lude: Pre	iminary H	ERS rating	with Index sco	re less than
or equal to Table R406.4, descrip	otion of ene	rgy feature	es, and a sta Table R		ne rating i	ndex scor	e is "based	on plans".	
		N	laximum HI			1	_		
	New cons	struction		ole house re		s; additio	ns		
Note: Higher HERS Index scores are per	mitted for n		t include ren	ewahle ener	65 ov genera	tion See	MA 780 CM	R Chanter 11	Table R406 4
Option B. Certified ENERGY S' energy features, and a statemen	TAR® home	es, versio	1 3.1 (R406.	1.1): Submit	tal must i				
Option C. Passive House Instit						nittal mus	t include: \	NUFL or PHPP	compliance
report which demonstrates comp PHPP results are "based on plan	liance with	PHIUS+20	18 (or newe	r) or PHI per	formance	requireme	ents, a state	ment that the \	WUFI or
General Mandatory Requirements (A	LL PROJ	ECTS):							
Air sealing and insulation to be	e installed	per Table	R402.4.1.1						bine, in
Blower door test to be completed (R402.4.1.2) Building envelope leakage must be ≤ 3 ACH50									
Ducts to be pressure tested by	a HERS R	ater, HERS	S RFI, or BP	I Certified Pro	o. Excepti	on: All du	cts/air handl	ers are inside	(R403.3.3.)
Boiler temperature setback co	ntrol indica	ated in spe	cifications	(R403.2) on	page #				
☐ Mechanical ventilation rate (R4	Mechanical ventilation rate (R403.6):  CFM  Method by which ventilation rate was calculated (select one):  1. Equation 4-1 (R406.3)  2. ENERGY STAR® Homes v3.1  3. ASHRAE 62.2-2013  4. MA amendment formula							s v3.1	
Heating and cooling load calcu	ılations (M	anual J) a	nd Equipme	ent Selection	report (l	Manual S	to be subr	nitted (R403.7	)
Solar Ready Zone indicated in construction documents on page # (RA101.1 through 103.6 and RA103.8) Note: This requirement applies only to new construction of one- and two-family dwellings and townhouses, excluding additions, and has the following exceptions:  1. less than 600 square feet of roof area is oriented between 110° and 270° of true north; 2. buildings with a permanently installed on-site renewable energy system; 3. buildings with a solar-ready zone that is shaded for more than 70 percent of daylight hours annually.									

Massachusetts Energy Code

Residential New Construction Inspection and Final Documentation Checklist

\*This page may be used by the local building department to assist in performing energy code inspections and collecting required documentation. **Applicant Name** Applicant Phone **Project Address** Permit number Reviewed by: Date Path 1. Prescriptive: Sections R401 - R404 & R407 (Not applicable to Stretch Code Communities) Mass Windows & Skylights Ceilings Wood Floors Basement Slab R-value/ Crawlspace Doors frame walls walls walls depth walls Maximum value Minimum value R-20 or R-13/ R-15/ R-10/ R-15/ Option A. R-Value U-0.30 U-0.55 R-49 R-30 R-13+5 R-17 R-19 2 ft. R-19 Option B. Equivalent If Option 1B was selected on the reverse side of this form, the installed materials match provided calculations **U-factor** Option C. Total UA If Option 1C was selected on the reverse side of this form, installed values match the REScheck certificate Alternative Additional The additional efficiency package selected on the reverse side of this form has been installed **Efficiency Packages** Path 2. Energy rating index (ERI) and Approved Alternatives (R406): MANDATORY FOR STRETCH CODE (optional path in non-stretch communities). Verify the permit applicant has submitted documentation for one of the following options. • Final HERS certificate indicating HERS rating index score complying with Table R406.4 Option A. Certified RESNET HERS rating with MA HERS rater verified ENERGY STAR Thermal Enclosure Checklist amendments . Copy of certificate required by R401.3 listing the final HERS Index score Final ENERGY STAR® Homes certificate Option B. Certified ENERGY · Certified final HERS rating STAR® Homes, Version 3.1 ENERGY STAR® Thermal Enclosure System Checklist signed by Rater . Copy of certificate required by R401.3 listing the final HERS Index score • Updated WUFI or PHPP compliance report demonstrating compliance with PHIUS+2018 (or newer) or PHI performance requirements Option C. Certified Passive · Passive House Rater's test results House (or PHIUS) Statement that the WUFI or PHPP results are "based on 'as built' conditions, incorporating the performance method relevant test results and documented changes to equipment, materials, and assemblies that impact performance" General Mandatory Requirements (ALL PROJECTS). Verify the following measures have been installed and testing documentation has been received. 1. Air barrier - Mandatory (Table R402.4.1.1) - Continuous air barrier is properly installed, and connections between components are properly sealed 2. Air leakage testing - Mandatory (R402.4.1.2) - Blower door test verification form received. Leakage is not over 3 ACH50 3. Duct sealing - Mandatory (R403.3.2) - All ducts, air handlers and filter boxes are sealed 4. Duct testing and leakage (R403.3.3 and .4) - Duct leakage test verification form received. Exception: All ducts and air handlers are within the building envelope. Leakage is not over 4 cubic ft. per 100 sq. ft. of conditioned floor area. (3 cubic ft. if test was performed at rough-in and without air handler installed) NOTE: Leakage may be higher if house complies using the ERI Path. 5. Duct insulation (R403.3.1) - Space conditioning ductwork in vented attics must be R-8 (or R-6 if <3" diameter). Space conditioning ductwork in all other unconditioned spaces must be R-6. (R-4.2 if <3" diameter.) 6. Building framing cavities are not used as ducts or plenums - Mandatory (R403.3.5) 7. Hot water boiler outdoor temperature setback - Mandatory (R403.2) - Installation verified 8. Mechanical ventilation - Mandatory (R403.6.2 as amended) - Airflow testing documentation collected from HERS rater, HERS Inspector, or BPI Certified Professional. 9. Lighting - Mandatory (R404.1) - Minimum 90% of the permanently installed lighting fixtures must contain only high-efficacy lamps (e.g., fluorescent or LED) 10. Certificate - Mandatory (R401.3) - Permanent certificate listing insulation R-values, fenestration U-factors, duct R-values, blower door and duct leakage test results, and final HERS Index Score (when applicable), is posted on a wall in the space where the heating system is located, utility room, or other approved location inside the building Notes:



# Residential Energy Code Compliance Paths

2018 Residential Energy Code

Non Stretch Code Communities

2015 IRC Chapter 11 as amended by 780 CMR 51.001



# **Energy Code Questions?**

Call: 855-757-9717 (toll free) Email: energycodesma@psdconsulting.com Visit: www.masssave.com/energycode

# Is your building type listed below?

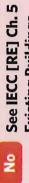
- One- and two-family dwellings and townhouses
- Groups R-2, R-3, and R-4 three stories or less



# No See 2018 IECC [CE]

# Is it new construction3?







# Mandatory requirements:

- Certificate (N1101.3)
- Air leakage (N1102.4)
- Max. fenestration U-factor & SHGC (N1102.5)
- Controls (N1103.1)
- Heat pump supplementary heat (N1103.1.2)
- **Duct sealing (N1103.3.2)**
- Duct testing (N1103.3.3)
- Building cavities (N1103.3.5)
- Mechanical system pipe insulation (N1103.4)
  - Heated water circulation and temperature maintenance systems (N1103.5.1)
- Mechanical ventilation (N1103.6)
- Equipment sizing and efficiency rating (N1103.7)
- Systems serving multiple dwelling units (N1103.8)
- Snow melt and ice system controls (N1103.9)
  - Pools and permanent spas (N1103.10)
    - Portable spas (N1103.11)
- Lighting equipment (N1104.1)



One option to the right

# Prescriptive

- Building Thermal Envelope (N1102)
  - Systems (N1103)
- Electric Power & Lighting (N1104)
- Additional Efficiency Packages (N1107)

# Same as above + Envelope tradeoffs in REScheck Prescriptive with Envelope Tradeoffs

# Energy Rating Index<sup>2</sup> HERS Index

ENERGY STAR v3.1

Passive House Certified

The provisions of IECC Chapter 4 [RE] are equivalent to IRC Chapter 11.

<sup>&</sup>lt;sup>2</sup> See page 2 for more detail on each Energy Rating Index option.
<sup>3</sup> Additions, alterations, repairs, and change of occupancy or use shall comply with IECC Chapter 5 Existing Buildings