Creating A Clean, Affordable, Equitable and Resilient Energy Future For the Commonwealth

COMMONWEALTH OF MASSACHUSETTS
DEPARTMENT OF ENERGY RESOURCES
Elizabeth Mahony, Commissioner

Building Codes and Sustainable Zoning: Latest Updates and Tips on Successful Adoption and Implementation

November 22, 2024

Agenda

11:00 – 11:05	**Introduction** Dillan Patel, DOER
11:05 – 11:20	**The Massachusetts Energy Code: What is it, what's changing & why do we have it?** Becca Edson, DOER
11:20 – 11:35	**Getting to Yes: Strategies for Successful Adoption** Julie Gagen, Weston
11:35 – 11:50	**Using Building Codes, Zoning, Incentives, and Guidelines to Foster Sustainable Development** Neil Angus, Devens Enterprise Commission
11:50 – 12:15	**Questions & Answers**

DOER Energy Codes Home Page

YES! Slides will be posted on the Green Communities website.

DOER
Massachusetts Department of Energy Resources

Green Communities Contacts

Regional Coordinators act as direct liaisons with cities and towns.

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Sign up for code updates

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Show of hands

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The Massachusetts **ENERGY CODE:**

What is it, what's changing & why do we have it?

Reach out with any questions or concerns:

becca.edson@mass.gov **or** **stretchcode@mass.gov**

the Massachusetts THERMAL CODE

Base Code

IECC 2021 w/ modest amendments

50 municipalities

New construction, Major Alterations + Additions

Stretch Code

IECC 2021 w/ **key** amendments

253 municipalities

New construction

Specialized Code

IECC 2021 w/ **key** amendments
+
Passive House (multifamily > 12,000 sf)
+
All-electric or Net-Zero or Electric-ready + Solar

48 municipalities

Where can you find the codes?

MA Building Code = CMR 780 10th Edition

Base Code = IECC 2021 w/ MA amendments
Find these amendments in:
780 CMR Chapter 11R (residential)
780 CMR Chapter 13 (commercial)

Stretch Code = IECC 2021 w/ MA amendments
Find these amendments in:
225 CMR Chapter 22 (residential)
225 CMR Chapter 23 (commercial)

Specialized Code = IECC 2021 w/ MA amendments
Find these amendments in:
225 CMR Chapter 22 + Appendix RC (residential)
225 CMR Chapter 23 + Appendix CC (commercial)

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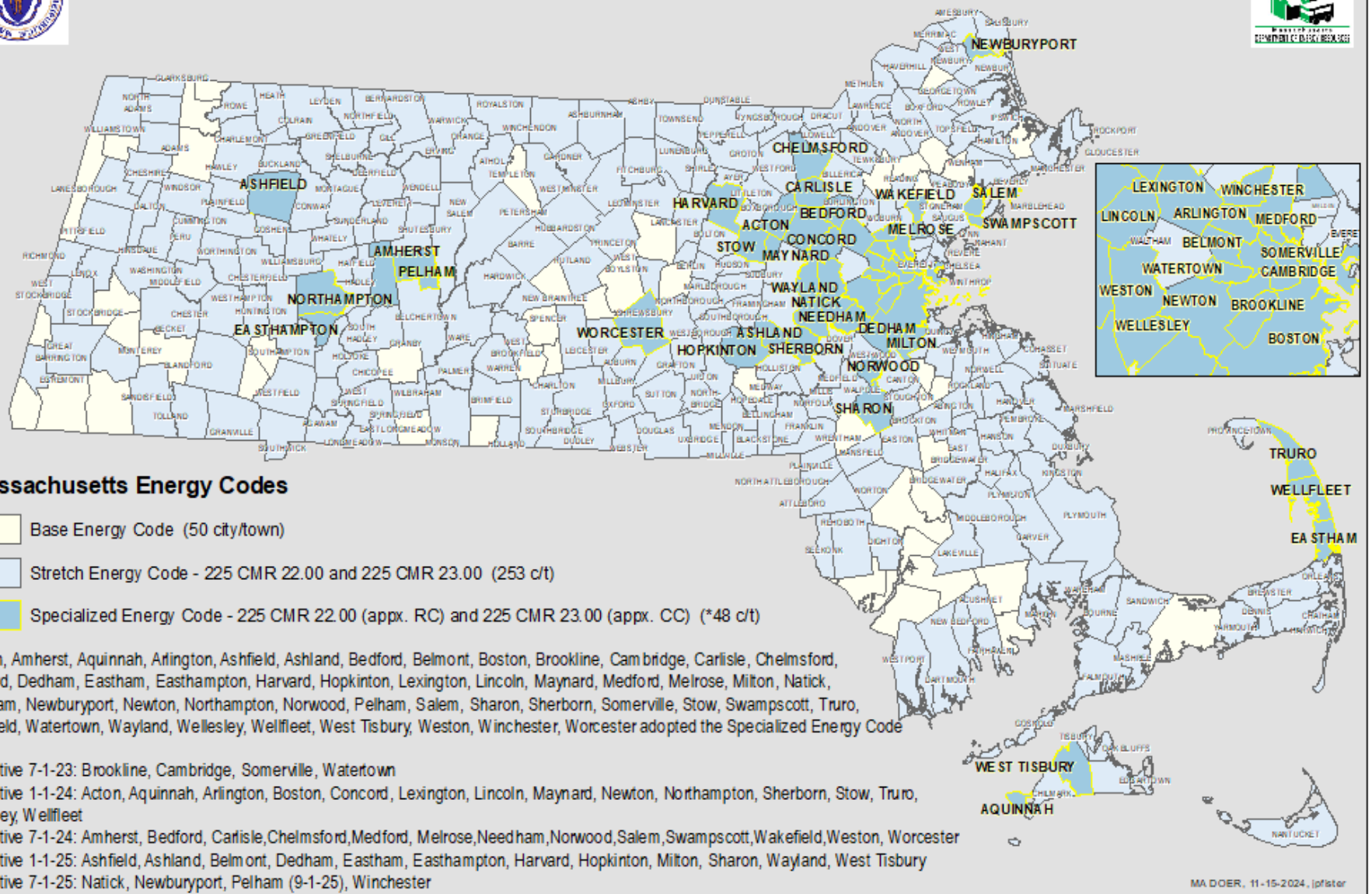
Massachusetts Building Energy Code Adoption by Municipality



Massachusetts Energy Codes

- Base Energy Code (50 city/town)
- Stretch Energy Code - 225 CMR 22.00 and 225 CMR 23.00 (253 c/t)
- Specialized Energy Code - 225 CMR 22.00 (appx. RC) and 225 CMR 23.00 (appx. CC) (*48 c/t)

* Acton, Amherst, Aquinnah, Arlington, Ashfield, Ashland, Bedford, Belmont, Boston, Brookline, Cambridge, Carlisle, Chelmsford, Concord, Dedham, Eastham, Easthampton, Harvard, Hopkinton, Lexington, Lincoln, Maynard, Medford, Melrose, Milton, Natick, Needham, Newburyport, Newton, Northampton, Norwood, Pelham, Salem, Sharon, Sherborn, Somerville, Stow, Swampscott, Truro, Wakefield, Watertown, Wayland, Wellesley, Wellfleet, West Tisbury, Weston, Winchester, Worcester adopted the Specialized Energy Code

– Effective 7-1-23: Brookline, Cambridge, Somerville, Watertown
– Effective 1-1-24: Acton, Aquinnah, Arlington, Boston, Concord, Lexington, Lincoln, Maynard, Newton, Northampton, Sherborn, Stow, Truro, Wellesley, Wellfleet
– Effective 7-1-24: Amherst, Bedford, Carlisle,Chelmsford,Medford, Melrose,Needham,Norwood,Salem,Swampscott,Wakefield,Weston, Worcester
– Effective 1-1-25: Ashfield, Ashland, Belmont, Dedham, Eastham, Easthampton, Harvard, Hopkinton, Milton, Sharon, Wayland, West Tisbury
– Effective 7-1-25: Natick, Newburyport, Pelham (9-1-25), Winchester

The Climate Act 2021 commits Massachusetts to achieving **Net Zero emissions** by **2050**

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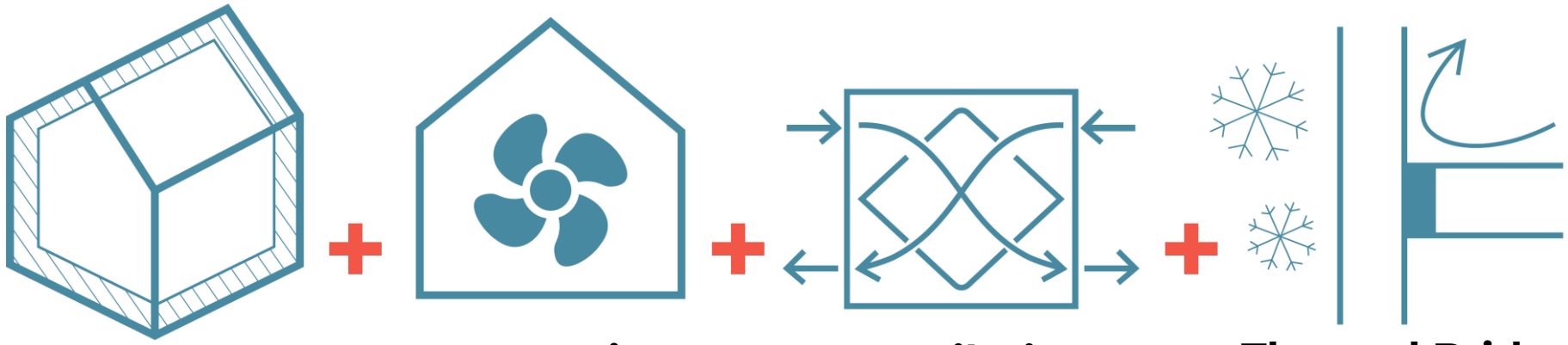
Massachusetts

THERMAL CODE

Four Pillars based on Passive House



Envelope U-Value + **Low Air Infiltration** + **Ventilation Energy Recovery** + **Thermal Bridge Mitigation**

= **energy efficiency,** comfort, **resilience** & grid-friendly electrification

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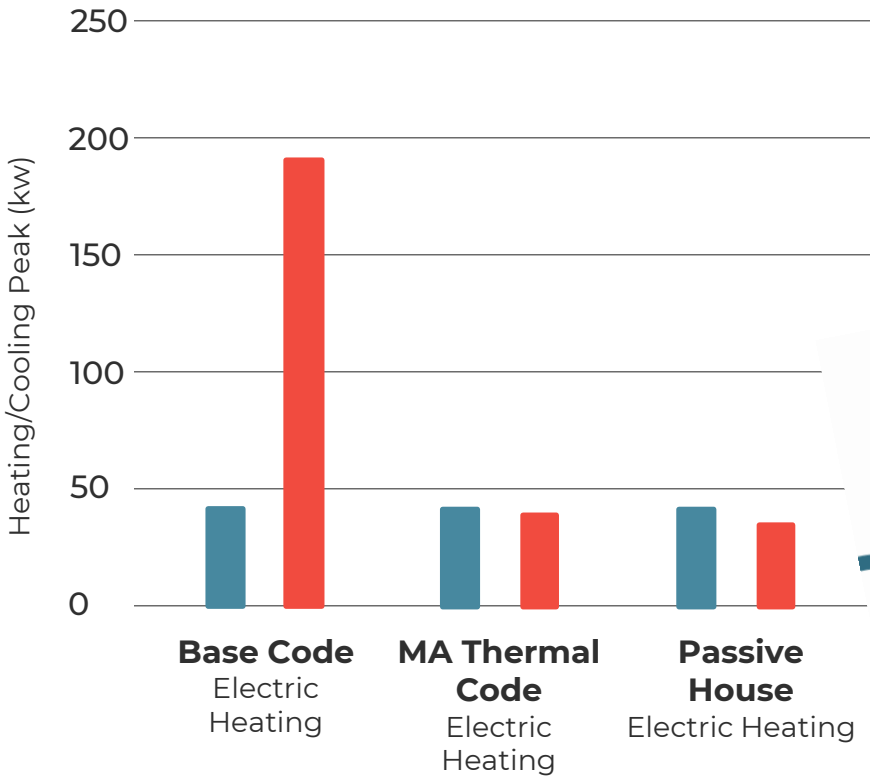
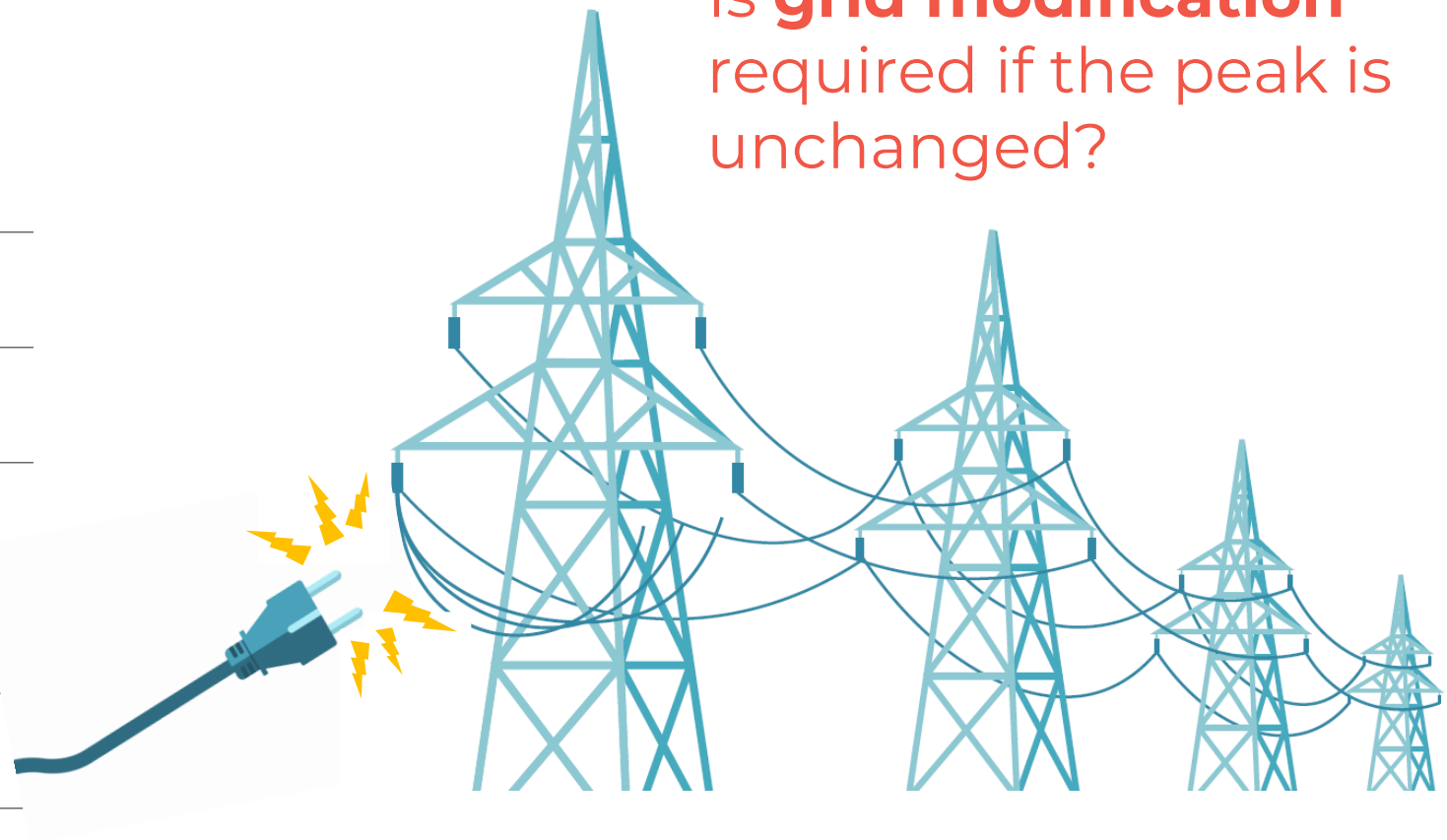
while typical above-code programs focus on reduction of total energy.....
the Massachusetts **THERMAL** CODE
CRUSHES heating loads

Is **grid modification** required if the peak is unchanged?





Example Load on Electric Grid due to Heating/Cooling in a school

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Proposed changes to the residential Stretch Code

SECTION R402 BUILDING THERMAL ENVELOPE

Table R402.1.2 *Modify Table R402.1.2 as follows:*

TABLE R402.1.2 MAXIMUM ASSEMBLY U-FACTORS[a] AND FENESTRATION REQUIREMENTS

CLIMATE ZONE	FENESTRATION U-FACTOR[f]	SKYLIGHT U-FACTOR	GLAZED FENESTRATION SHGC[d, e]	CEILING U-FACTOR	WOOD FRAME WALL U-FACTOR	MASS WALL U-FACTOR[b]	FLOOR U-FACTOR	BASEMENT WALL U-FACTOR	CRAWL SPACE WALL U-FACTOR
5 and Marine 4	0.30	0.55	~~0.40~~ NR	~~0.024~~ 0.026	0.045	0.082	0.033	0.050	0.055

Table R402.1.3 *Modify Table R402.1.3 as follows:*

TABLE R402.1.3 INSULATION MINIMUM R-VALUES AND FENESTRATION REQUIREMENTS BY COMPONENT[a]

CLIMATE ZONE	FENESTRATION U-FACTOR[f]	SKYLIGHT U-FACTOR	GLAZED FENESTRATION SHGC[d, e]	CEILING R-VALUE	WOOD FRAME WALL R-VALUE	MASS WALL R-VALUE[b]	FLOOR R-VALUE	BASEMENT[c,g] WALL R-VALUE	SLAB[d] R-VALUE & DEPTH	CRAWL SPACE[c,g] WALL R-VALUE
5 and Marine 4	0.30[i]	0.55	~~0.40~~ NR	~~60~~ 49	20&5ci or 13&10ci or 0&20	13/17	30	15ci or 19 or 13+5ci	10ci, 4 ft	15ci or 19 or 13+5ci

- SHGC value removed
- Ceiling R-Value lowered to 49 in recognition of IECC 2024 reversal

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Proposed changes to the residential Stretch Code

R403.6.1 Heat or Energy Recovery Ventilation. Heat or energy recovery balanced ventilation systems shall be provided for dwelling units as specified in either Section R403.6.1.1 or R403.6.1.2, as applicable.

R403.6.1.1 Large Systems. Systems with a rated airflow exceeding 300 cfm shall have an *enthalpy recovery ratio* of not less than 50% at cooling design condition and not less than 60 percent at heating design condition, determined in accordance with AHRI 1060 at an airflow not less than the design airflow. Compliance to the *enthalpy recovery ratio* shall be demonstrated by ratings at design conditions and airflows by software or catalogs certified by AHRI.

R403.6.1.2 Other Systems. Systems with a rated airflow of 300 cfm or less shall have a *sensible recovery efficiency* (SRE) of not less than 65% at 32°F (0°C) at an airflow not less than the design airflow. SRE shall be determined in accordance with CAN/CSA-C439 and compliance to the requirement shall be ~~listed~~ demonstrated by a listing in Home Ventilating Institute's Certified Product Directory. Linear interpolation of listed values for SRE shall be permitted.

Updated so ventilation tables reflect the requirements of AHRI Standard 1061. The Home Ventilating Institute's Certified Product Directory is now listed as a compliance reference, per feedback from the industry

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Proposed changes to the residential Stretch Code

TABLE R406.5 MAXIMUM ENERGY RATING INDEX

Clean Energy Application	Maximum HERS Index score [a,b]				
	~~New construction until June 30, 2024~~	New construction permits after July 1, 2024	New Construction with R406.5.2 embodied carbon credit	Accessory Dwelling Units	Major alterations, additions, or change of use[c]
Mixed-Fuel Building	~~52~~	42	45	52	~~52~~ 65
Solar Electric Generation	~~55~~	42	45	55	~~55~~ 70
All-Electric Building	~~55~~	45	48	55	~~55~~ 70
Solar Electric & *All-Electric Building*	~~58~~	45	48	58	~~58~~ 75

[a] Maximum HERS rating prior to onsite renewable electric generation in accordance with Section R406.5

[b] The building shall meet the mandatory requirements of Section R406.2.~~, and the building thermal envelope shall be greater than or equal to the levels of efficiency and SHGC in Table R402.1.2 or Table R402.1.4 of the 2015 International Energy Conservation Code.~~

[c] Alterations, Additions or Change of use covered by Section R502.1.1 or R503.1.5 are subject to this maximum HERS rating~~.~~, except for *Historic Buildings* which may opt to follow R503.1.1 for *alterations*.

R503.1.1 *Revise Exception 2 as follows:*

Existing ceiling, wall or floor cavities exposed during construction provided that these cavities are filled with insulation with a minimum of R-3.7 per inch for the depth of the cavity.

- Updates to HERS values for existing buildings
- Incentivizing ADUs
- Historic Buildings can insulate to R-3.7 per inch for existing cavity depth

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Proposed changes to the residential Stretch Code

***R406.5.2** Add Subsection R406.5.2 as follows:*

R406.5.2 Embodied carbon credit. New construction following Section R406 may use either of the following embodied carbon credits to increase the maximum allowable HERS rating for each unit by 3 HERS points as shown in Table R406.5:

1. **Insulation embodied carbon credit**: new single *dwelling units* or R-use buildings containing multiple *dwelling units* that demonstrate an average calculated insulation Global Warming Potential (GWP) intensity (kg $CO2_e/m^2$) less than 0 across the whole building envelope shall offset 3 HERS points for each applicable *dwelling unit* of new construction. GWP intensity shall be based on the default values in Table R406.5.3, or product specific EPDs or calculations in the approved tools: EC3 and BEAM, may be used in place of default table values.

2. **Low GWP concrete mix credit:** new single *dwelling units* or R-use buildings containing multiple *dwelling units* that demonstrate an average calculated concrete mix Global Warming Potential (GWP) for at least 90% of all concrete mix used in the building of not more than 100% of the 2022 NRMCA NorthEast Benchmark average values shown in Table R406.5.4 shall offset 3 HERS points for each applicable *dwelling unit* of new construction.

Embodied Carbon Credits are introduced into the code as *optional incentives* to gain 3 HERS points

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Proposed changes to the residential Stretch Code

R405.3 Documentation of projects that pursued Phius or PHI certification that did not achieve final certification.

R405.3.1 Compliance. Buildings shall be pre-certified per Section R405.1. If, at construction completion, final certification cannot be received from either Phius or PHI, this compliance pathway may be followed to receive a certificate of occupancy based on compliance with R405.3.2 Documentation. Compliance via R405.3.2 is not equivalent to either Phius or PHI Certification and will not designate the project as a certified passive house.

R405.3.2 Near Passive House Documentation. The following materials are required:

a. Statement from the Phius certified consultant or PHI-accredited verifier confirming project has completed all interim, final, and corrective testing and modeling requirements, including a summary of deviations from certification requirements.

b. Copy of executed contracts with Phius consultant or PHI rater/verifier covering all required inspections and testing requirements for certification.

c. Design phase pre-certification/approval, in the form of a statement issued from Phius or PHI-accredited verifier confirming design certification or pre-certification was achieved.

d. Report from rater/verifier demonstrating as-built conditions, including those that comply with Phius or PHI requirements, and those that do not.

j. If the initial whole building blower door tests do not meet the Phius or PHI airtightness requirement, a statement must be provided to reflect evidence of a re-test. Statement shall include an explanation for sources of leakage and attempted remediation efforts. Final test results shall not exceed Phius or PHI airtightness thresholds by more than 30%.

ii. If the mechanical ventilation flow rates and balance do not meet the requirements of Phius or PHI, report must show that installed ventilation system demonstrates compliance with the mechanical code in accordance with Section C403.

e. For projects with Phius design certification, provide final Energy Star and Zero Energy Ready Homes certificates.

f. A letter from a licensed professional engineer that states that the potential hygrothermal or moisture risk of the as-built assemblies, with the measured blower door test result, is acceptably low.

Option for design certified Passive House projects that fail final certification – added in response to many stakeholders concerned that a final certification hold-up could hinder financing and move-in.

ALSO - Passive House Compliance clean-up

ALSO – EnerPHit allowed

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Proposed changes to the residential Stretch Code

R502.1.1 *Add Subsection R502.1.1 as follows:*

R502.1.1 Large additions. *Additions* to a *dwelling unit* exceeding 1,000 sq ft or exceeding 100% of the existing *conditioned floor area*, shall require the combined *dwelling unit* to comply with the maximum HERS ratings for alterations, additions or change of use shown in Table R406.5.

Exception: *Additions* that add existing basement or attic spaces to the *conditioned floor area* of an existing *dwelling unit* due to changing the thermal boundary but not changing the building footprint or roofline do not require a HERS rating.

Wording clean-up to clarify ongoing confusion.

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Proposed changes to the commercial Stretch Code:

Include updates that:

- Make it easier to reuse buildings
- Allow district energy systems that are on a pathway to efficient electrification
- Ease office to residential conversions

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incentivizing **Passive House** in Massachusetts

Building Type	Fuel Type	Stretch Code	Specialized Code
New Multi-Family 4+ stories & >12,000 sf	**All Electric**	HERS 45 or TEDI or **Passive House**	**Passive House**
	Mixed Fuel	HERS 42 or TEDI or **Passive House**	**Passive House** + wiring for electrification

mass save
Savings through energy efficiency

Incentive structure for
Multi-Family (5 units or more)

$5,000 : Feasibility study
$500/unit : Energy modeling
$750/unit : Pre-Certification
$3,000/unit : Certification

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Mass Save **Passive House** Incentive Program

Leyland Community
Dorchester MA
Davis Square Architects

Glen Brook Way
Medway MA
Meander Studio Collaborative

McElwain Apartments
Bridgewater MA
Prellwitz Chilinski Associates

11 E. Lenox Street
Boston MA
Haycon Construction

Walnut Street Building 2
Foxborough MA

1005 Broadway
Chelsea MA
Utile, Inc

The Loop at Mattapan Station
Boston MA
The Architectural Team

Hillside Center for Sustainability
Newburyport MA
Hall & Moskow

JJ Carroll Redevelopment
Boston MA
MASS Design Group

to date (November 2024)

20,661 units have pursued **PH** through **Mass Save**

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Getting to Yes: Community Outreach and Education for Stretch Code Updates

JULIE GAGEN

Sustainability Coordinator, Town of Weston

Stakeholder Engagement

Definition: Stakeholder engagement is the process of identifying, developing, and maintaining relationships with people who are impacted by or have influence over an organization's goals.

Benefits of stakeholder engagement:

- Builds trust
- Increases credibility
- Develops buy-in
- Risk mitigation
- Improve decision-making
- Enhance reputation
- Foster innovation
- Prevent costly mistakes
- Uncover unknown challenges

Community Outreach Basics

With community outreach, it is helpful to utilize the marketing concept: know-like-trust. This requires honesty, transparency, valuable opportunities to participate in decision-making, and two-way conversations.

1. Show up
2. Demonstrate value
3. Listen / ask questions
4. Be flexible
5. Follow up

Three Phases of Outreach

Phase 1: **Establish Advocates** | Work with local Sustainability Committee, staff, to inform, discuss, and establish advocates that will lead outreach.

Phase 2: Build Internal Support | Collaborate with local committees to give relevant information needed to make a decision and gain support.

Phase 3: Public Outreach | Presentation for local builders with technical information, followed by public presentation for all community members.

Lessons Learned

- **Do the work**: topic needs to be well understood by community advocates to gain support. Study the updates, understand implications, and get professional support where needed.
- **Make it relevant**: when presenting to a committee, focus on how the topic/change will affect their work; if unsure, meet with chair or knowledgeable committee member to get feedback before presenting.
- **Keep it short**: every community member does not need to intimately understand every level of code update detail, evidence-based or example-based discussion is easier to understand than tables and graphics.
- **Use local expertise**: whenever possible, have a representative from the professional community at each public outreach event to answer questions and provide real-world, specific feedback that utilizes their depth of knowledge.
- **Be willing to let it go**: if you find that there is not enough local understanding and/or you need more time to for education, be willing to postpone the vote.

DEVENS REDEVELOPMENT: Beyond Codes



How Devens supports carbon reduction initiatives

Neil Angus, FAICP CEP, LEED AP, LFA
Devens Enterprise Commission
neilangus@devensec.com

Devens Overview

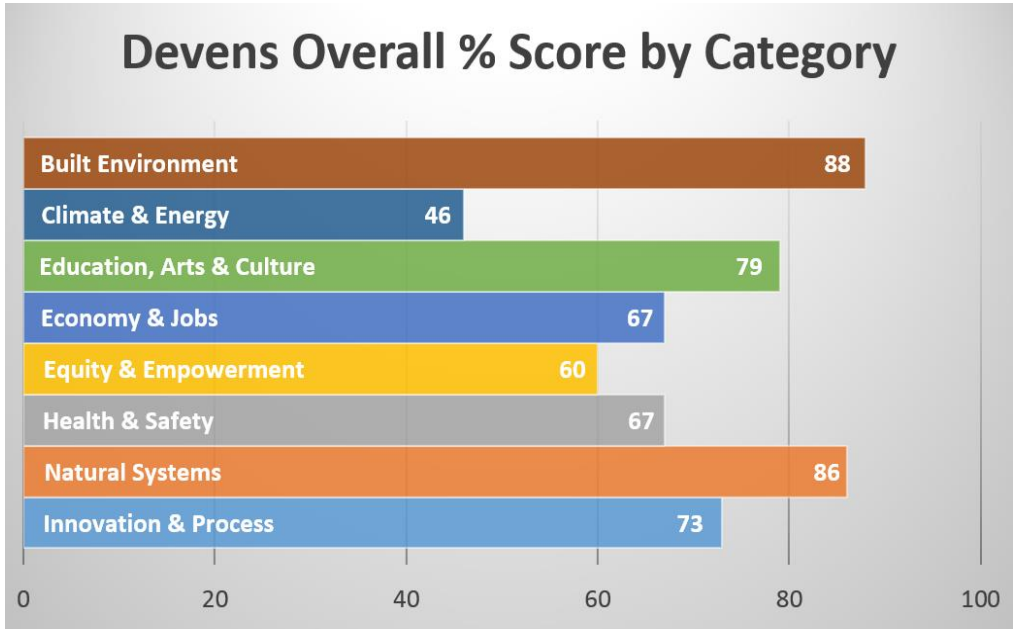
- 35 miles outside Boston
- 4400 ac. former military base
- Superfund Site
- 1993 Sustainable Redevelopment Plan
- DEC – Regulatory Authority
- One-Stop Unified Permitting

Devens Overview

- How we apply stretch code:
  - Res: Cluster in exchange for EE
  - Comm: Buildings that create 150 parking spaces or more (GHG reduction)
  - All Residential Construction Exceeds
  - Majority of Commercial/Ind. Complies (+2MSF)
- Combination of Education, Incentives, and Regs - tools to meet Sustainable Development and CAP goals

Devens: LEED for Cities & Communities Certified

- Living up to Reuse Plan Goal of Sustainable Redevelopment
- Third-Party Independent Certification
- One of 125 Local Governments in the US
- Management and Operations of communities (regulations and policies)
- Gap analysis (Climate & Energy focus)



https://www.usgbc.org/leed/rating-systems/leed-for-cities-communities

EMBODIED CARBON REDUCTION GUIDELINES

What is Embodied Carbon?

- GHG emissions associated with the manufacturing, transportation, installation, maintenance, and disposal of building and infrastructure materials.
- ~25% of global annual emissions
- Huge opportunity for climate change and overall health and wellbeing.
- Advancing CAP, Carbon neutral goals and Climate positive/regenerative buildings

https://carbonleadershipforum.org/

Tools and Resources for Building Smarter….

DEVENS
ENTERPRISE • COMMISSION

EMBODIED CARBON REDUCTION GUIDELINES

- What, Why
- Top ten products (conc., steel, insulation, etc.)
- Tools for analysis
- Implementation strategies
- Resources
- Project Checklist (CLF)
- Helping to regulate the carbon cycle to balance and reduce GHG emissions

https://bit.ly/DECEC

EMBODIED CARBON REDUCTION GUIDELINES

Start with Low Hanging Fruit:

Top ten list:

1. Concrete https://www.masscec.com/resources/concrete-environmental-product-declarations-epds
2. Structural Steel
3. Insulation
4. Refrigerants
5. Wood
6. Gypsum Board
7. Carpet
8. Flooring
9. Acoustic Wall Panels
10. Ceiling Systems

EMBODIED CARBON REDUCTION GUIDELINES

- **LCA Analysis:**
  - LCA – broader impacts than building and climate – public health.
  - EPD's and HPD's for building materials and products

- **LCA Embodied Carbon Reduction Software & Tools (simple/comparative):**
  - Building Emissions Accounting for Materials (BEAM) estimator tool: https://www.buildersforclimateaction.org/beam-estimator.html
  - Early Phase Integrated Carbon (EPIC) Still in development but good quick free tool.
  - Pathfinder – Climate Positive Design Tool for landscapes: https://climatepositivedesign.com/about/
  - Full list of Tools: https://www.clfboston.com/copy-of-policy-toolkit

- **Industry Resources:**
  - ECHO project: Coalition for uniform LCA reporting: https://www.echo-project.info/
  - Carbon Leadership Forum: https://carbonleadershipforum.org/

EMBODIED CARBON REDUCTION GUIDELINES

Project Checklist for Reducing Embodied Carbon in Devens

A Worksheet for Project Teams

Embodied Carbon Reduction Strategy	Checklist for Schematic Design			Checklist Based on As-Builts		Get Started on Learning More (More to be added in v2!)
0 Process and Tools	*Already included*	*Will pursue?*		*Achieved?*		
0 Identify Embodied Carbon as a Priority Communicate early in the design process that reducing embodied carbon is a design and procurement priority for the whole team (e.g., structural engineer, architect, contractor, sustainability consultants, mechanical engineers, etc.)	SELECT	SELECT	*Add a brief explanation here about how the project may incorporate this strategy into the project and any special considerations necessary*	SELECT	*Add a brief explanation as to whether and how the project incorporated this strategy. If the team intended to pursue this strategy but was not able to, provide insight as to why.*	WGBC Bringing Embodied Carbon Upfront
0 Set a Project Embodied Carbon Reduction Target Align the design and construction team around an embodied carbon reduction target. Consider targets from organizations around the globe (e.g., C40, Architecture 2030, understand what reductions we need now to reach 2030 and 2050 goals. U assessment tools (see Sections 0.3 and 0.4 below) to track progress toward See Section "4.1 Integrate Carbon Intensity Limits into Specifications" for setting targets for multiple building products.						C40 Cities Clean Construction Declaration LETI Embodied Carbon Primer: Best Practice Targets Architecture 2030 2030 Challenge for Embodied Carbon
0 Commit to Using Whole Building (Whole Project) Life Cycle Asse Perform a whole building life cycle assessment (WBLCA) early in design de the largest opportunities ("hot spots") for emissions reductions. Use the re done throughout design to compare design choices and identify which red have the largest impact. WBLCA can be used to analyze the whole building, tenant improvement pr building.						Carbon Leadership Forum LCA Practice Guide AIA-CLF Embodied Carbon Toolkit for Architects (particularly Part 2: Measuring Embodied Carbon)
0 Use Environmental Product Declarations (EPDs) During Procure Once a product type has been selected, ask manufacturers (via specifications and the bidding and procurement processes) to provide environmental product declarations (EPDs) of their products to help select the lowest-carbon option.	SELECT	SELECT		SELECT		Embodied Carbon in Construction Calculator (EC3) AIA-CLF Embodied Carbon Toolkit for Architects (particularly Part 2: Measuring Embodied Carbon)
0 Discuss Whether to Integrate Carbon into the Bid Process Carbon can be evaluated alongside cost, schedule, and other criteria when selecting bids for materials to be used in construction. Alternatively, performance incentives can be provided to contractors who deliver low-embodied-carbon projects or suppliers that deliver materials below a certain carbon threshold. These strategies all require discussion early in the process between the owner, design team, and contractor.	SELECT	SELECT		SELECT		Steps to Develop a Low Carbon Procurement Policy (Incentives) OwnersCAN Embodied Carbon Action Plan Microsoft Case Study
1 Build Less, Reuse More	*Already included*	*Will pursue?*		*Achieved?*		**Learn More**
1 Reuse/Retrofit Existing Buildings Re-use or retrofit existing buildings instead of constructing a completely new building. Reductions in new square footage or new structure will translate directly to reductions in embodied carbon.	SELECT	SELECT	*Add a brief explanation here about how the project may incorporate this strategy into the project and any special considerations necessary*	SELECT	*Add a brief explanation as to whether and how the project incorporated this strategy. If the team intended to pursue this strategy but was not able to, provide insight as to why.*	
1 Design for Disassembly and Reuse Maximize the reuse potential of building components by detailing connections that can be easily						Zero Net Carbon Collaboration Resources AIA's Retrofitting Existing Buildings Guide

Better Use of Resources….

Devens Deconstruction Guidelines

- Support adaptive reuse of buildings and materials within
- Can’t manage what you don’t measure!
- Redirect waste
- GHG reduction
- Maximizing embodied carbon (LCA /Circ Eco. – NS thinking)

https://bit.ly/DevensDemoPlan

Devens Deconstruction Guidelines

DEVENS SOLID WASTE RECYCLING AND MANAGEMENT PLAN FOR DEMOLITION PROJECTS

(To be Submitted with a Demolition Permit)

A Solid Waste Recycling and Management Plan should be prepared for all demolition projects within the Devens Regional Enterprise Zone. The purpose of this plan is to minimize waste and maximize recycling, reuse, and repurposing of materials. Local Reuse and recycling outlets include the Devens Eco-Efficiency Center (508.878.1728), Devens Recycling (operated by Republic Services 978.772.6500), and Habitat for Humanity ReStore in Leominster (978.227.5556). Projects are not limited to these outlets and are encouraged to seek others.

PROJECT NAME:			
Project Location:			
Owner:		**General Contractor:**	
Street Address:		Street Address:	
City, State, Zip:		City, State, Zip:	
Phone:		Phone:	
Email:		Email:	

Architect:		**Prepared by:**	
Street Address:		Street Address:	
City, State, Zip:		City, State, Zip:	
Phone:		Phone:	
Email:		Email:	

WASTE MANAGEMENT GOALS:
Please provide a description of the project's waste management goals: *(example: This project will recycle, reuse, or salvage at least XX% of the waste generated on site. [ADD OTHERS AS APPROPRIATE – LEED, REUSE, ETC.*

COMMUNICATION PLAN:
Please provide a description of your communication strategy for your Solid Watse Recycling and Management Program. *This is required to ensure all contractors and subcontractors are aware of and support the project's waste management goals:*
• Waste prevention and recycling activities will be discussed at each job site meeting with [General Contractor] employees and subcontractors. • All contractor and subcontractor employees will be notified of this plan and will be expected to comply with the plan • All contractor and subcontractor foremen will receive a copy of this plan • All subcontracts for this project clearly specify that adherence by subcontractors with this waste management plan is mandatory • Any incidence of contamination by subcontractor of materials designated by this plan for source-separated recycling will result in a $_____ fine (per subcontracts). • Additional strategies •

RECYCLING AND WASTE MANAGEMENT PROCEDURES (use abbreviations in Plan below)	
SAL	Salvage
CRUSH-ON*	On-site crushing and reuse (asphalt, block, brick, concrete)
**Note: MassDEP and the Devens Enterprise Commission, as the local board of health, must be notified at least 30 days prior to starting the crushing operation, using: Exempt Recycling and Organics Management Notification Form*	
CRUSH-OFF	Removed from site for off-site crushing
SSR	Source-separated recycling
MDR	Mixed debris recycling
DISP	Disposal (recycling alternative not feasible)
OTHER (list)	
OTHER (list)	

SOLID WASTE RECYCLING AND MANAGEMENT PLAN					
Material	**Procedure**	**Market**	**Mgm't Plan**	**Estimated Quantities (if available)**	
				Quantity	**Units**
Land clearing Debris					
Soils *Aim for balanced site*			Compliance with Devens Soil Mgm't Policy is mandatory		
Brick					
Asphalt					
Block					
Concrete w/Rebar					
Concrete w/oRebar					
Arch. Salvage					

https://bit.ly/DevensDemoPlan

Devens Deconstruction Guidelines

SOLID WASTE RECYCLING AND MANAGEMENT PLAN PRELIMINARY LANDFILL DIVERSION RATE CALCULATION	
Estimated Tons to be Salvaged, Reused and Recycled	*Example:* *10,000 tons*
Estimated Tons to be Disposed	*Example:* *2,500 tons*
Total Tons Generated	*Example:* *12,5000 tons*
Landfill Diversion Rate (Reused, Recycled Tons/Generated Tons = Diversion Rate)	*Example:* *10,000/12,500 = 80%*

- Better tracking (LEED and other rating systems)
- Prolonged value (maximizing Life Cycle and Embodied Carbon

https://bit.ly/DevensDemoPlan

EMBODIED CARBON REDUCTION GUIDELINES

- Including embodied carbon and reuse considerations in all Procurements (reuse first)
- Using buildings as a Carbon sink
- Case Study Examples:
  - Fiberglass Foundation Alternatives – Emerson Green https://compositepanelsystems.com/
  - Reduced Carbon Concrete – Recycled ground glass for cement replacement https://www.mass.gov/doc/recycled-ground-glass-pozzolan-rggp-for-use-in-cement-concrete/download
  - https://cshub.mit.edu/sites/default/files/images/glassbrief.pdf
- Education and Awareness: https://devensforward.com/blog/295-targeting-embodied-carbon-as-a-climate-solution-
- Incentives – Expedited Permitting and Long-Term cost savings

Keys to More Sustainable Development:

- Reduce barriers (reg. audit)
- Build consensus: education/awareness (case studies; fact sheets)
- Seeing is believing –show how it can and is being done
- Market transformation (increased awareness = increased demand)
- Balance of regulations, education, and incentives
- Specifications & Guidelines to help developers do the right thing

Promoting Embodied Carbon as a climate adaptation/resilience strategy:

- Reduced emissions
- Improved passive survivability
- Smarter development:
  - Reduced waste/less landfill
  - More efficient ($$avings)
  - Protecting future generations

Resources:

Sustainable Devens
https://devensec.com/sustain.html

Climate and Resiliency Action Plan
https://devensforward.com/home

Policies and Guidelines:
https://www.devensec.com/planning-docs.html

Embodied Carbon Policy Toolkit:
https://www.clfboston.com/policy-toolkit

MA Building Decarbonization Clearinghouse:
https://www.mass.gov/info-details/ma-building-decarbonization-clearinghouse

Thanks!

Devens Enterprise Commission
www.devensec.com
neilangus@devensec.com

DEVENS
ENTERPRISE • COMMISSION

LEADERSHIP IN ENERGY & ENVIRONMENTAL DESIGN
LEED
CERTIFIED
2018

DOER
Massachusetts Department of Energy Resources

THANK YOU!

Q&A

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Massachusetts Department of Energy Resources

Last note: trainings

BE+ Stretch Code Building Envelope Training Series (through Jan 9, 2025)

NEHERS getting to HERS 42/45

Mass Save Code Mailing list sign up

PSD on-demand energy code training

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Massachusetts Department of Energy Resources

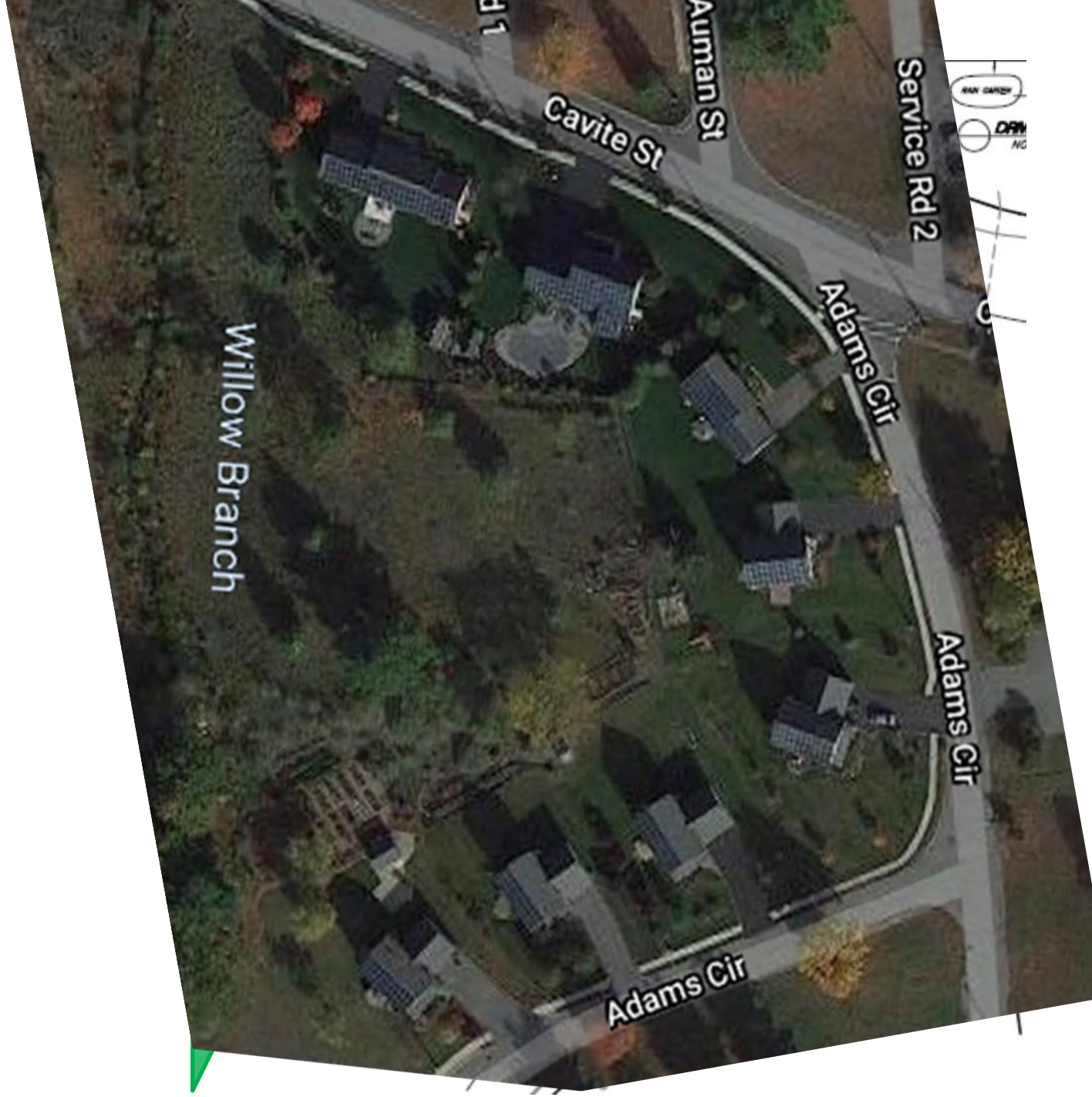
DEVENS REDEVELOPMENT BONUS SLIDES

Adaptive Reuse

- Former military housing
- Affordable Housing
- Sustainable Housing (NZEB pilot and IRD)

Seeing is Believing: Devens NZEB Pilot

- Regulation Audit
- Pilot housing project (8 &12)
- Showcase res. GB practices
- State goal - ZNEB by 2030 (assist with market transformation)
- Social equity
- Educate – Smart Growth, EE, WE & healthy
- Cluster as an incentive (carrot-stick)



ENERGY-POSITIVE HOMES

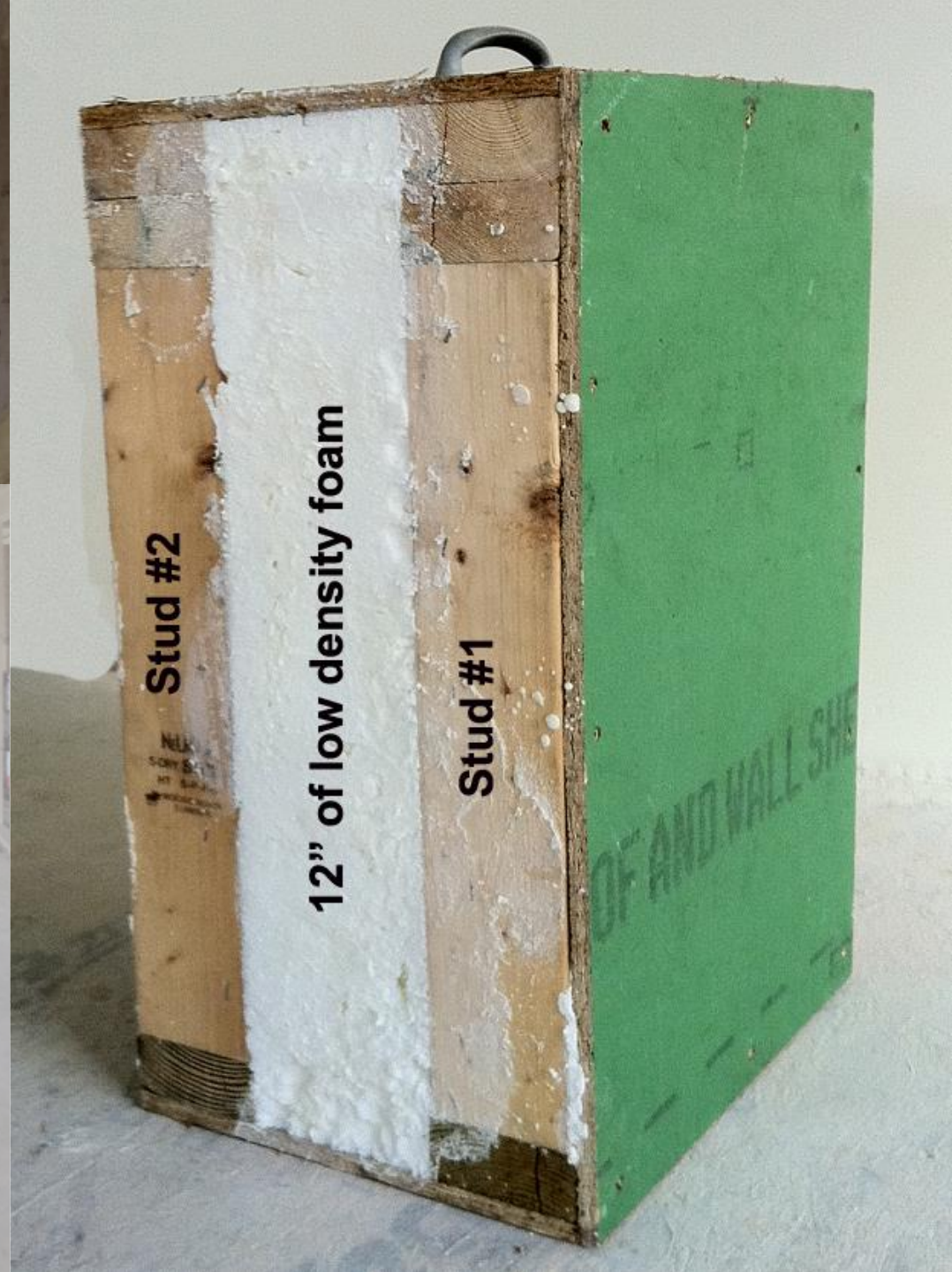
IN DEVENS, MA

A customized saltbox model with an 18.33kW PV system achieved a HERS index of -21. It was projected to prodice 10,200 kWh more than the house consumed in a 12 month period - enough additional energy to power an EV for more 30,000 miles.

AMERICAN SOLAR ENERGY SOCIETY

Showcase EE, WE and IAQ:

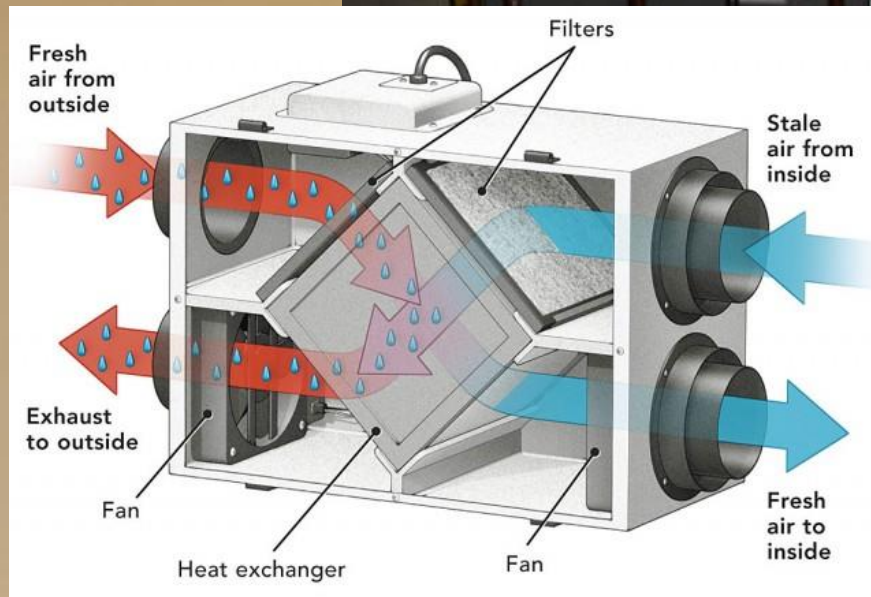
- MD Selecting the right Developer
- Double-wall construction
- Triple glazed windows
- Low/no VOC materials
- Air sealing and IAQ (build it tight!)
- EPA Water Sense Plumbing Fixtures
- Stronger, more resilient buildings (climate mit./adaptation)
- Typically higher building material costs, but….



Cost neutral:

- *Open floor plan/daylighting*
- *Passive solar*
- *No central HVAC/no duct work*
- *HRV (EE and $avings)*
- *Tankless hot water heating*

- Affordable construction ($200-$350K)



More elements of efficiency and affordability:

- East-west long axis - maximize active solar
- Passive solar – south facing windows/roof solar shading
- Passive survivability (consistent internal temp. control)
- “Right-sized” homes (1,000 sq.ft. to 2,200 sq.ft)

LEED-ND

Pilot Follow-Up:

- Seeing is believing! - Pilot helped gain public support & justify additional reg. updates in 2013
- A step further than Pilot – focus on neighborhood design for people first!(LEED ND)
- Mix of incentives and requirements:

-Reduced lot size, frontage and setbacks
-Higher density: 7-20 DU/acre (transit supportive)

→

-Min. EE, WE and IAQ requirements
-LID and Green Infrastructure (open space pres.)
-Lower infrastructure costs

New Grant Road Neighborhood Redevelopment

- Neighborhood scale - designed for people first!
  -homes framing the street
  -Trail connections, dedicated bike lanes
- Healthy/active socially engaging neighborhood
  -sidewalks on both sides
  -community gardens and active parks
- NZE-Ready