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PRO FORUM

Bridging the Gap: From model code to Passive House

Massachusetts Thermal Codes

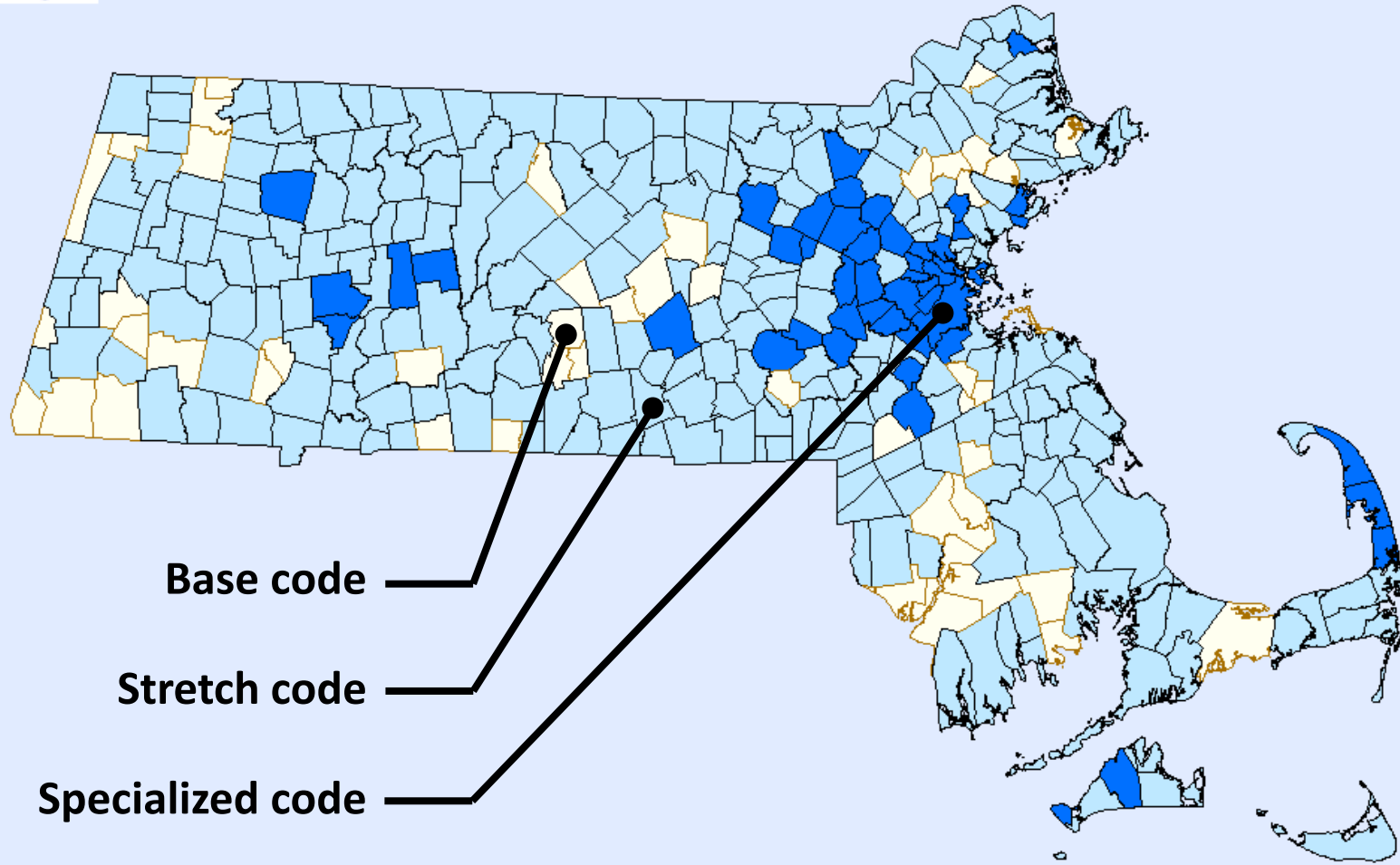
Paul Ormond, Engineer
Department of Energy Resources
Commonwealth of Massachusetts



Base

Stretch

Specialized

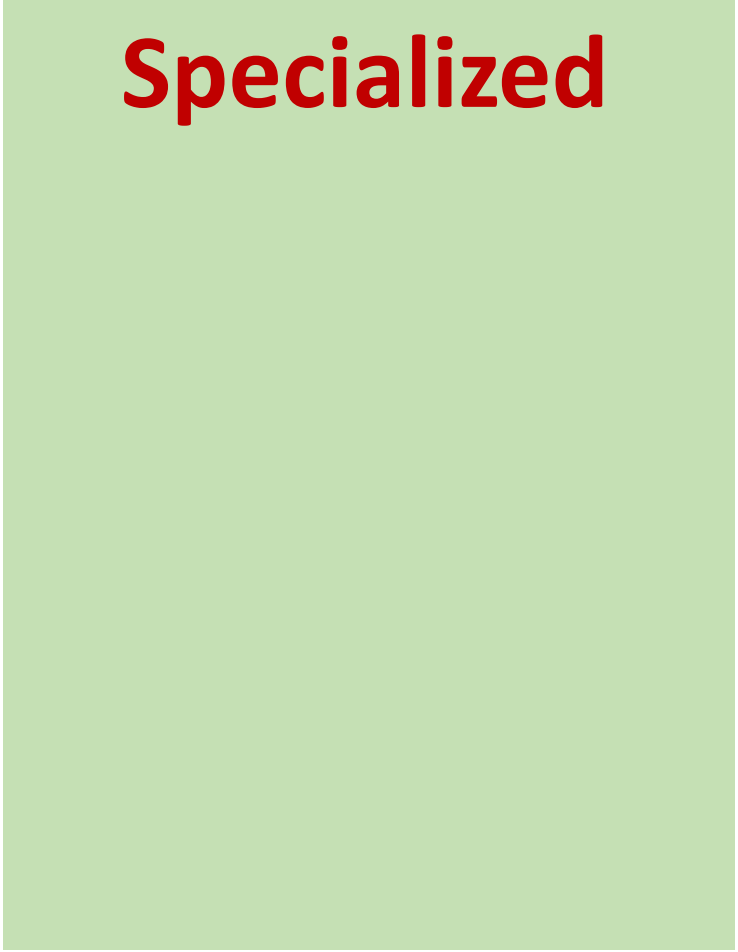


Population in Stretch or Specialized – 92%

Official Green Communities map is available here: [Massachusetts Building Energy Code Adoption by Municipality](#)



Thermal Code

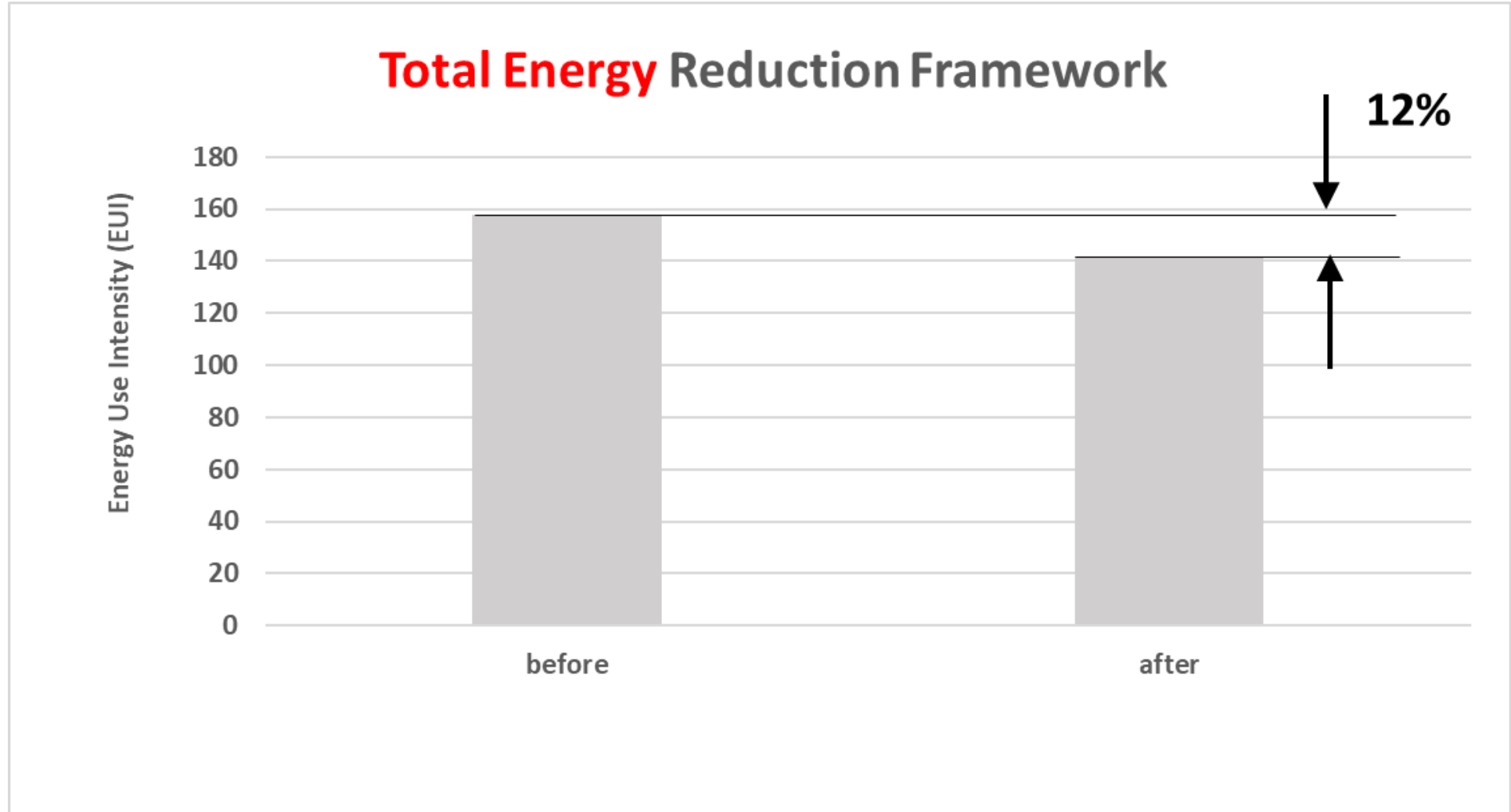




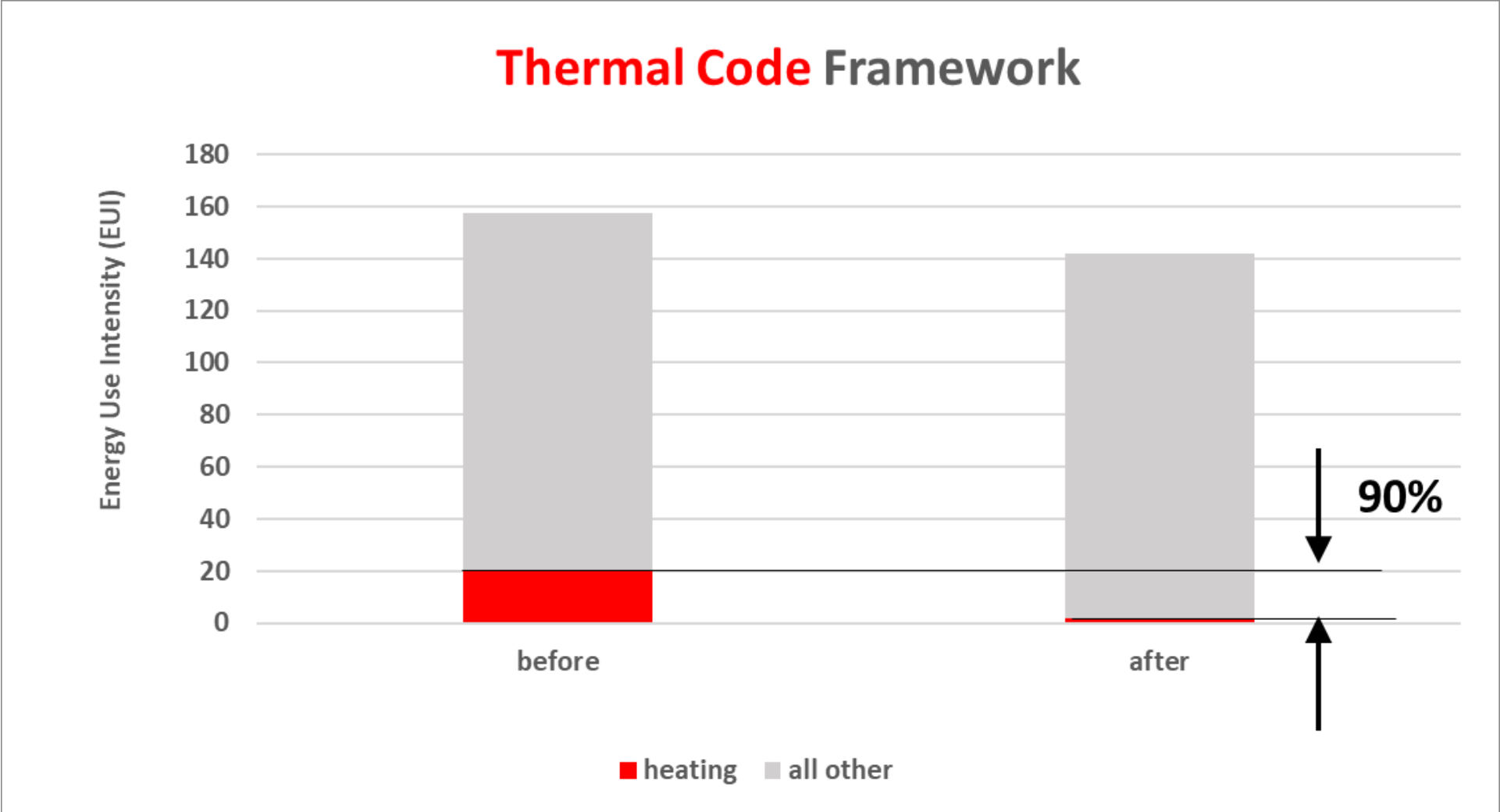
Thermal Codes

“Not your father’s stretch code!”





Typical stretch and above-code programs are focused on reduction of **total energy** – some % improvement to IECC/ASHRAE model code



Massachusetts thermal code zooms in (and then crushes) heating/cooling loads

thermal code

what

h/c demand

h/c peak

h/c total annual

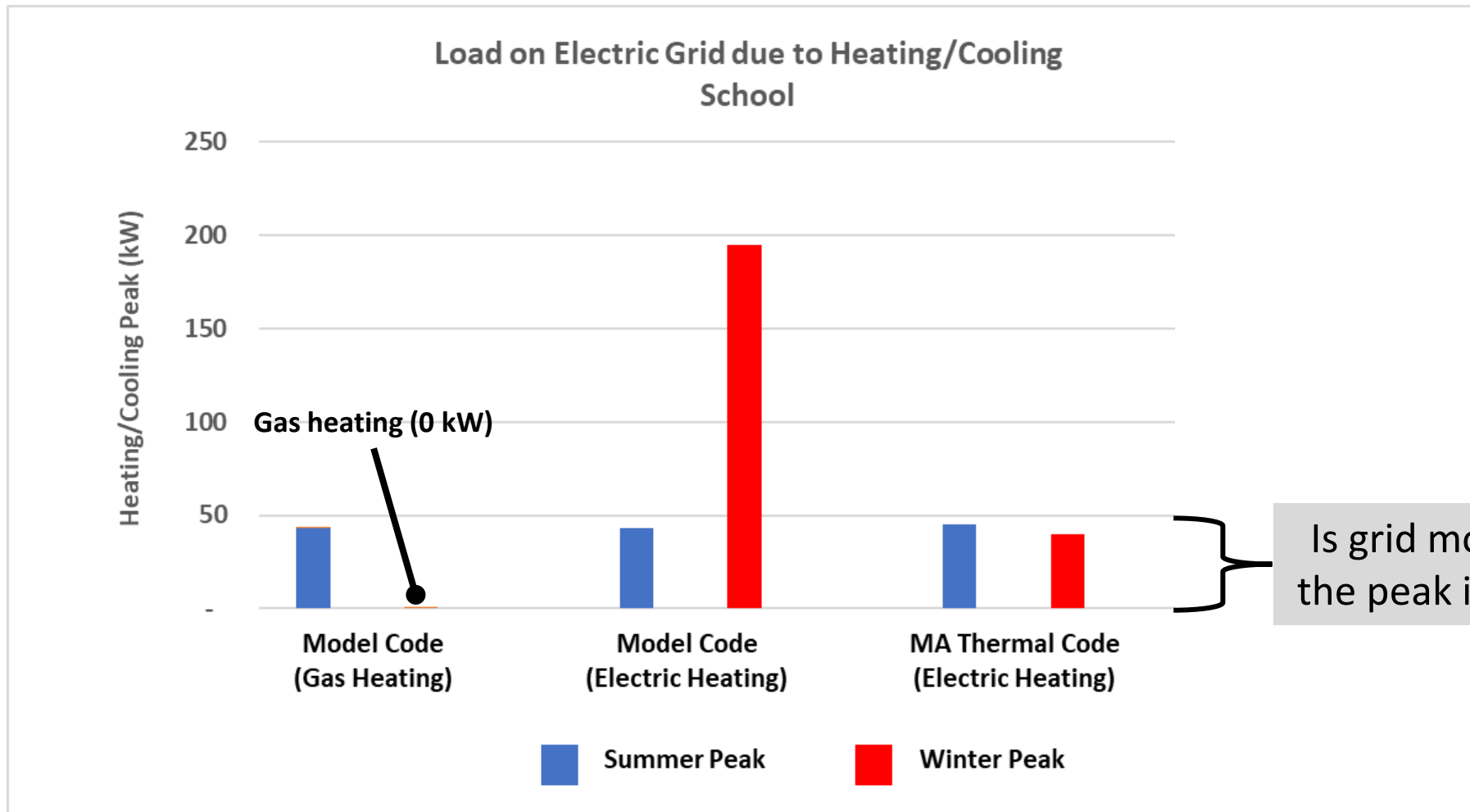
why

energy
efficiency

comfort


resilience

grid-friendly
electrification



Is grid mod required if the peak is unchanged?

Crushing heating with thermal codes is **essential** to accomplish electrification of space heating – there is **no new winter peak**

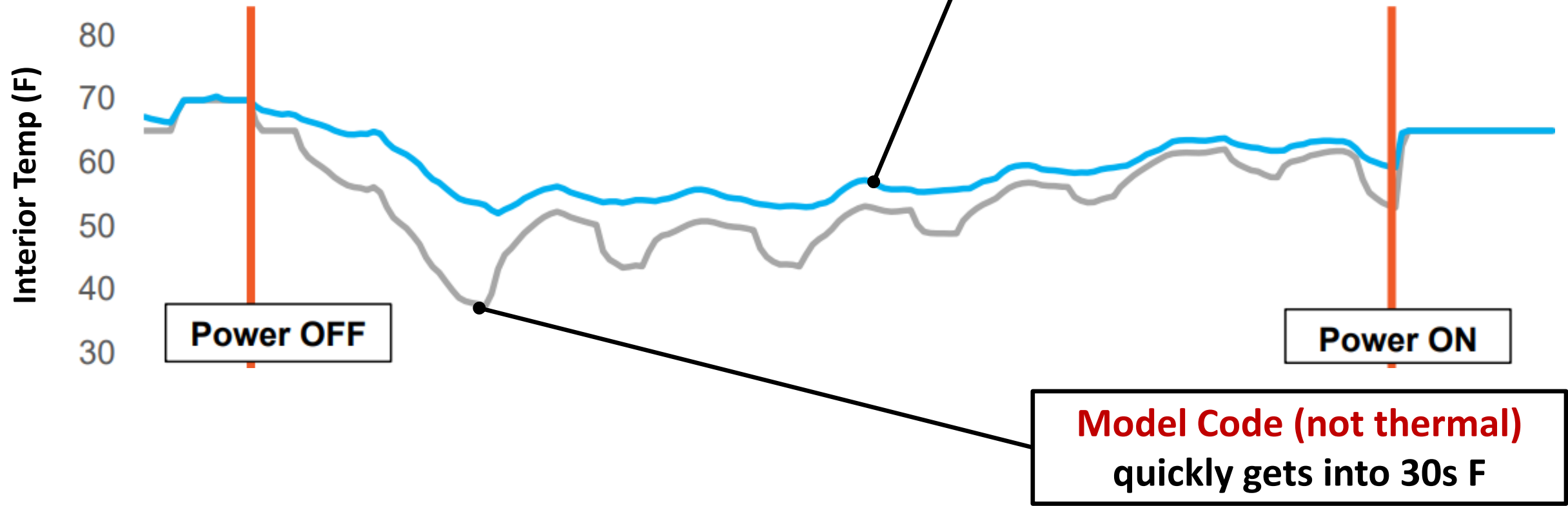


↑ 5%

New Buildings Institute: swapping from gas to electric increases peak winter electric use by only 5% when using the thermal code approach.

What happens during power outage during “worst week” in last 25 years with sustained outdoor temps at -7 F?

Thermal Code
above 53F for 7 days



Thermal codes deliver unprecedented resilience.

How to get a thermal code: **the four pillars**



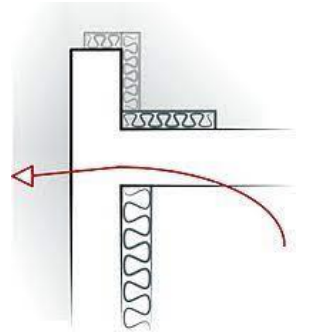
Envelope
U-value



Low Air
infiltration



Ventilation
energy recovery



Thermal bridge
mitigation

These are the **four pillars** of a thermal code and enable grid-friendly gas to electric swap – **these will look familiar to Passive House experts!**



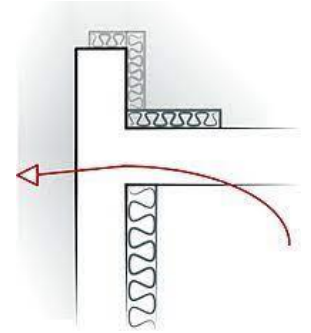
Envelope
U-value



Low Air
infiltration



Ventilation
energy recovery



Thermal bridge
mitigation

Unlimited
tradeoffs

Testing recently
added

Many
exceptions, low
expectations

Completely
missing

Model codes (IECC/ASHRAE) have no (or low) standards w/r/t the four pillars. States must add these as adopting amendments

Thermal Code

Base

IECC 2021

Stretch

Adds the thermal pillars
(**E+LAI+VER+TBM**)

Specialized

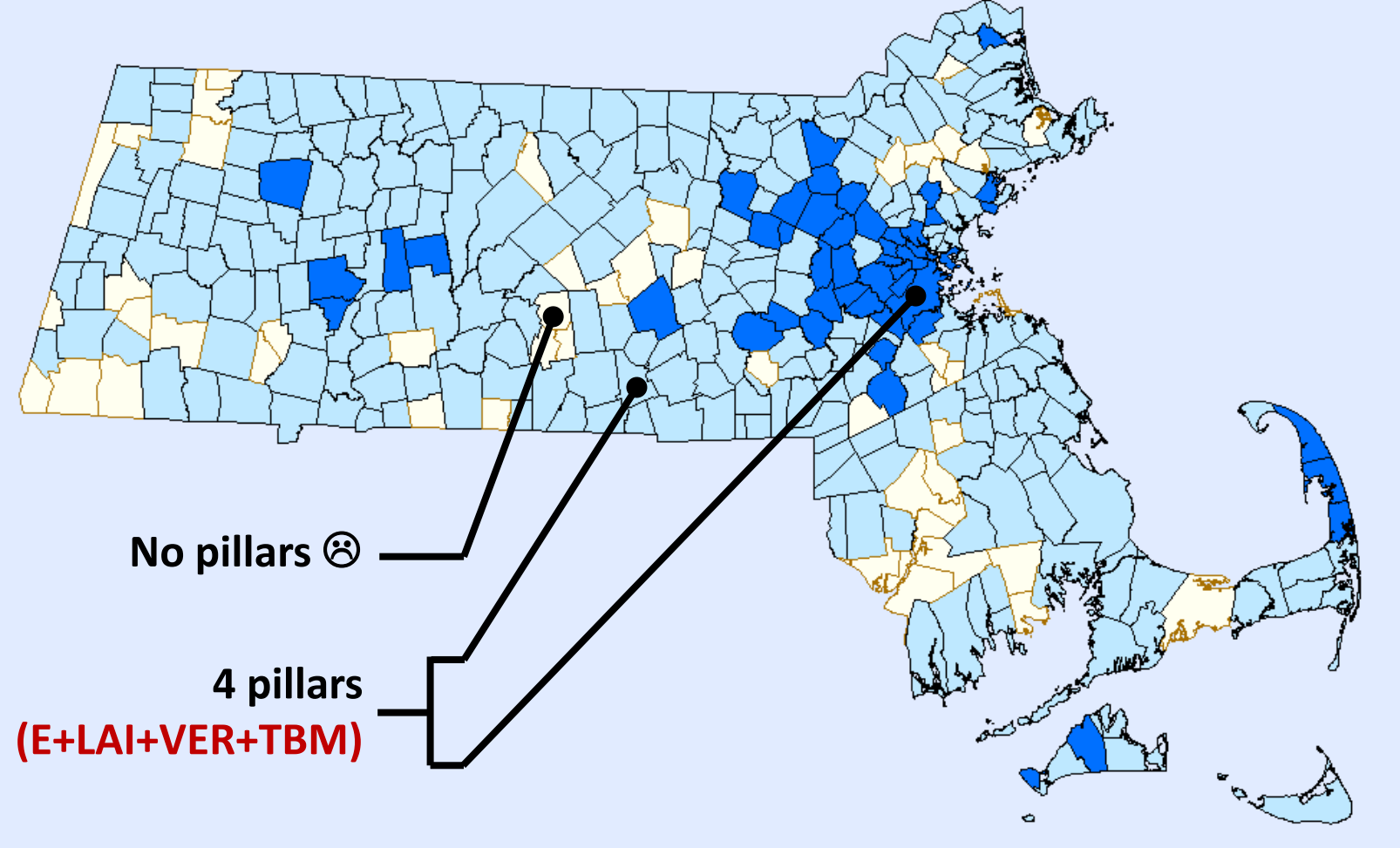
Adds the thermal pillars
(**E+LAI+VER+TBM**)



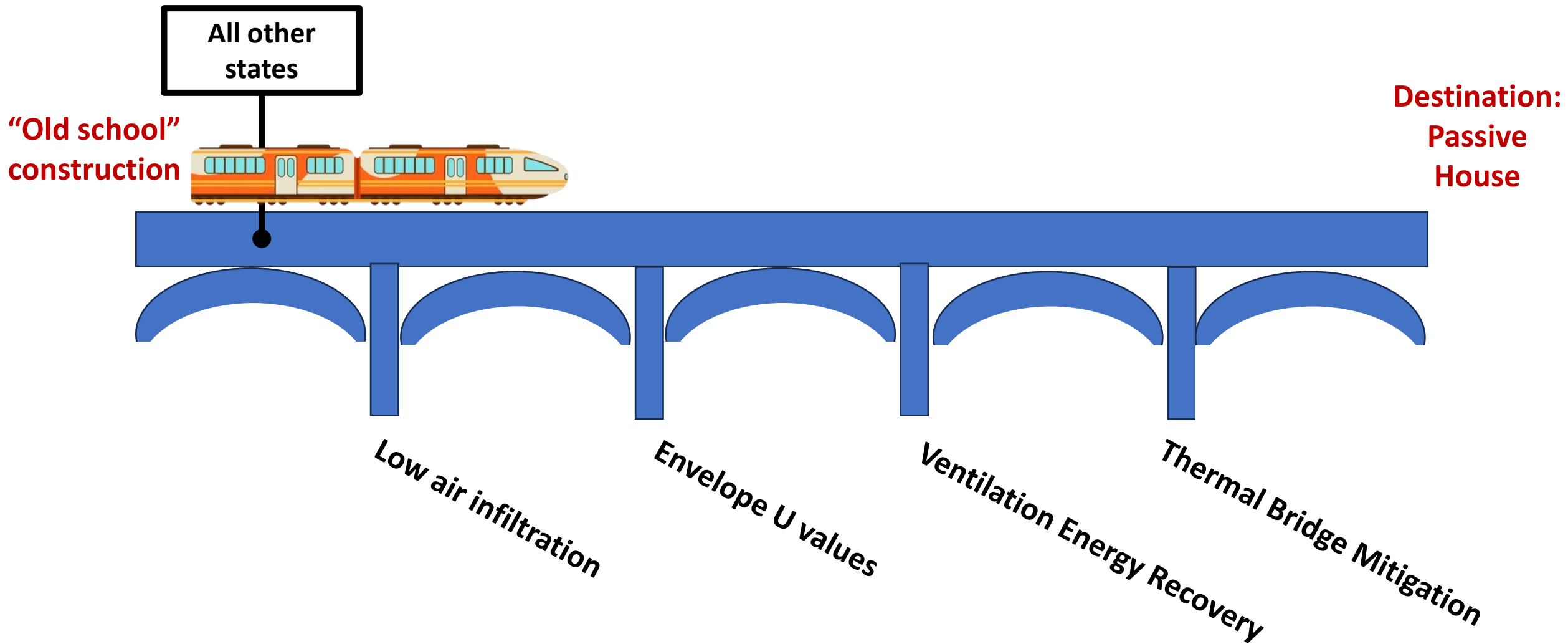
Passivehouse
(MF>12,000-sf)



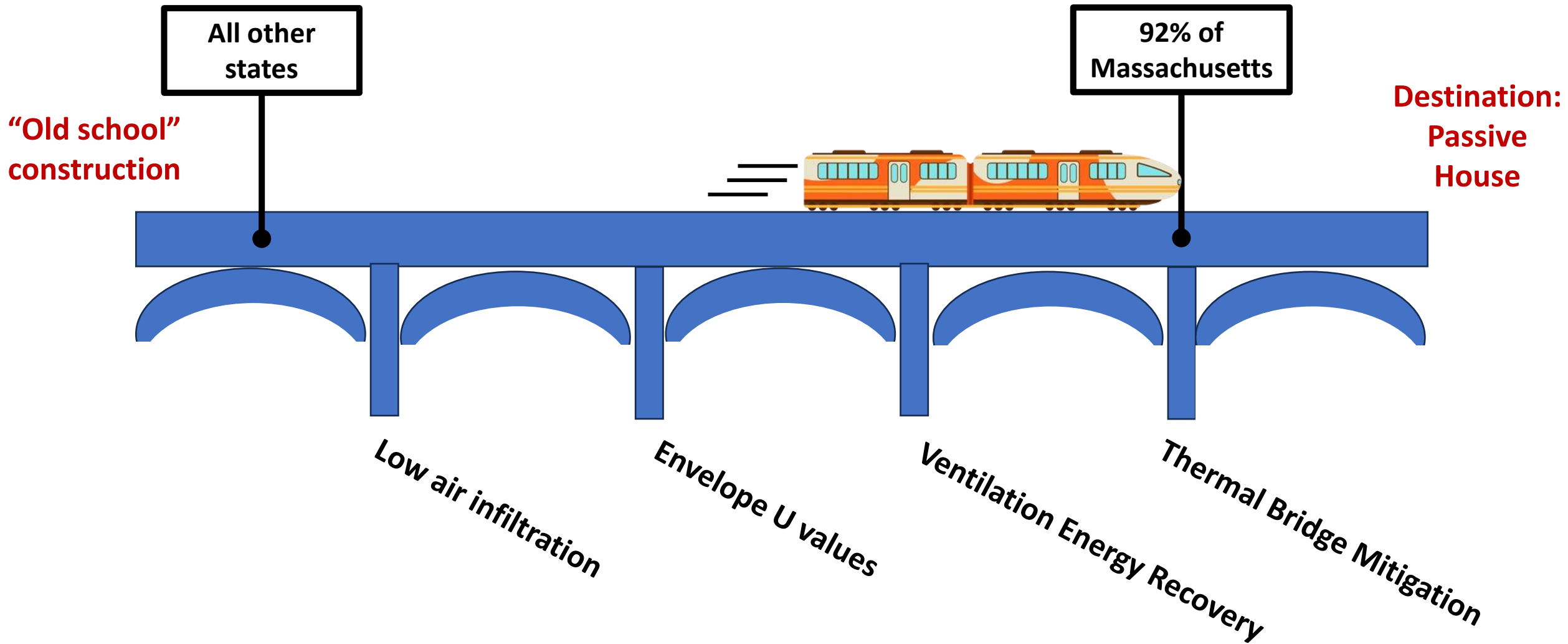
Electrification and
electrification ready



92% of Massachusetts has mandatory high standards for envelope, air infiltration, ventilation energy recovery, and thermal bridge mitigation



Without the thermal code approach, other states have not gone far across the bridge from old school to Passive House



With the four pillars in Massachusetts thermal code, **92%** of Massachusetts is almost all the way to Passive House

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