HERS Ratings:
More than just a Score

November 16, 2017

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Agenda

- HERS dataset background
- How can we use the data?
- Comparison to the Michigan Energy Code
- A closer look at jurisdictional level
- New home construction programs
- Comparison with other states
- Questions

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Michigan HERS Data Set

Background

- MEEA received a dataset for all HERS rated homes in Michigan from RESNET (2014 – 2016)
- Dataset includes HERS score, plus all features that impact building efficiency (e.g. wall insulation level, envelope air sealing, etc.)
- MEEA conducted an analysis to determine:
  - Typical construction practices of HERS rated homes
  - How rated homes compare to the energy code
  - What changes do we see comparing two code cycles

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Using the Data
Policy and Program Improvements

- **State**
  - State energy code update or stretch code
  - Better understand components of code compliance
  - Targeted training or educational campaign

- **Jurisdictions**
  - Better understand local construction practices
  - Benchmark for building efficiency
  - Inform future policies

- **Utility/Builder**
  - Better understand program penetration
    - Including incented equipment
  - Determine how builders meet a HERS target
  - Inform future programs

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HERS Data set

- New Construction (2014 – 2016)
- Home types:
  - Single Family
- # of homes: 4,270
- Average size: 3400 Sq. Ft. (Conditioned)
- Applicable Code
  - 2009 IECC: ~ 66% of Homes
  - 2015 IECC: ~ 34% of Homes
- HERS Rated vs. 1-family permits statewide
  - 2014: 12%
  - 2015: 10%
  - 2016: 10%

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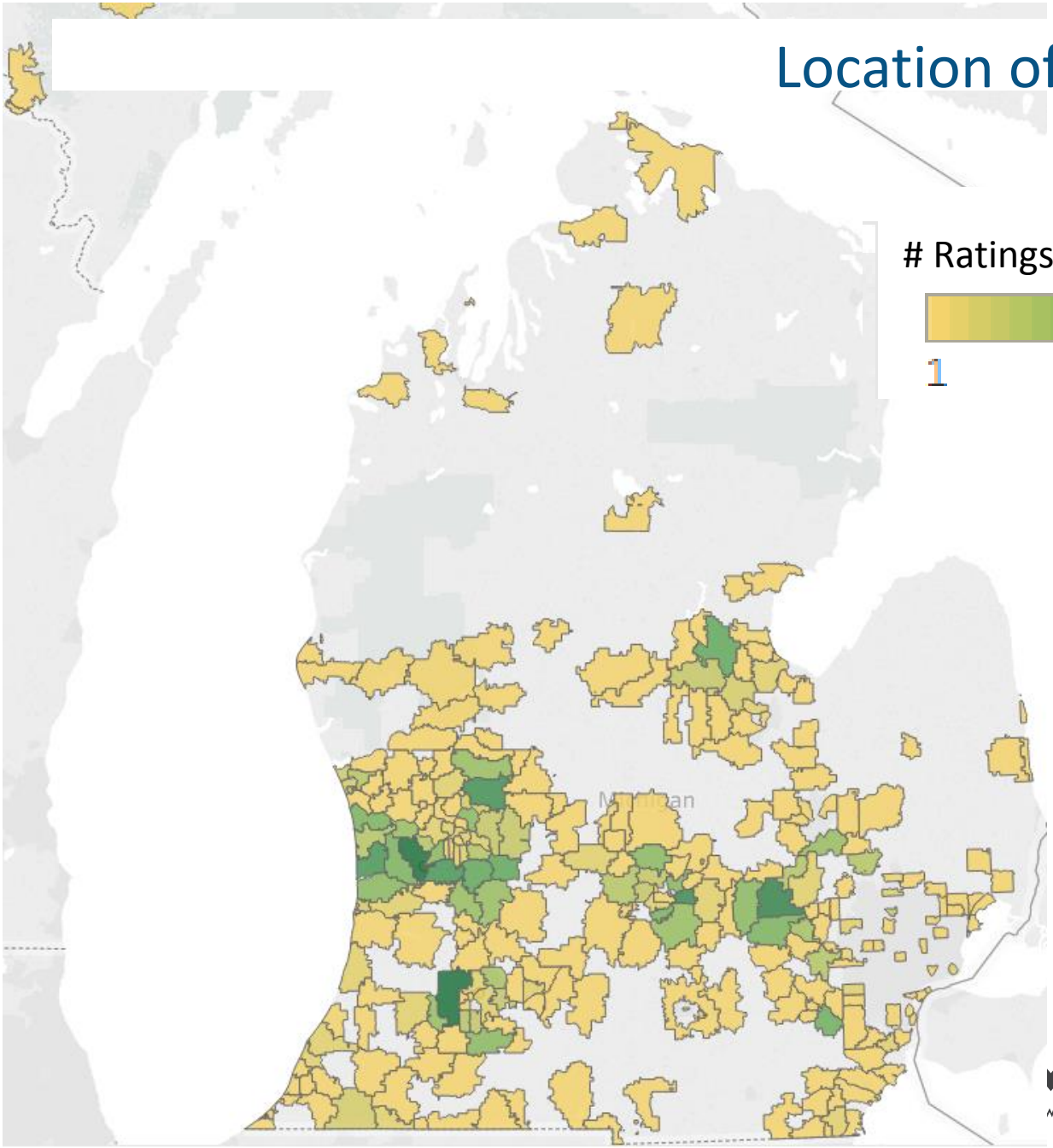
Location of Ratings



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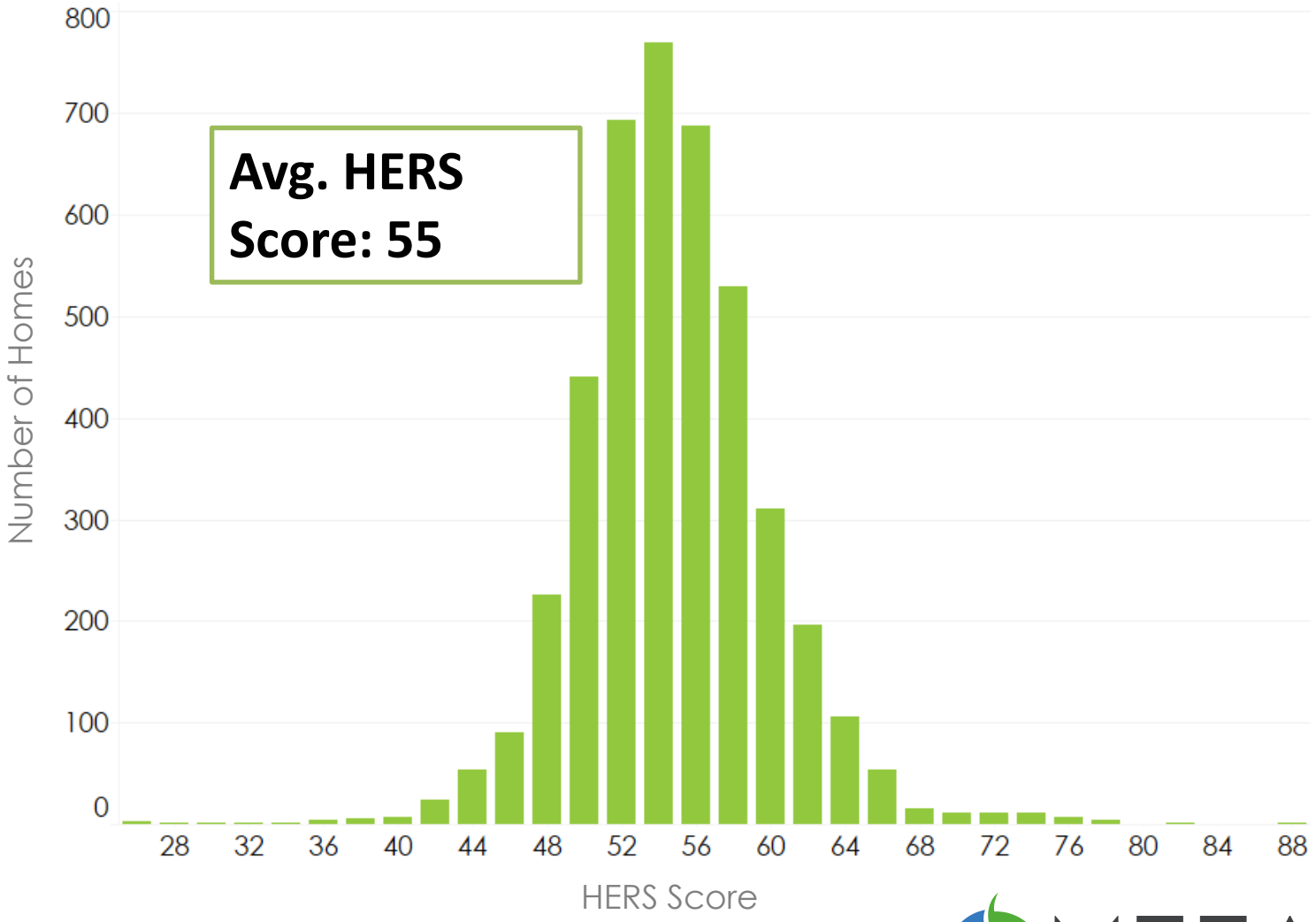
HERS Score Breakdown

All Homes



REMRate v. 14.6 or lower

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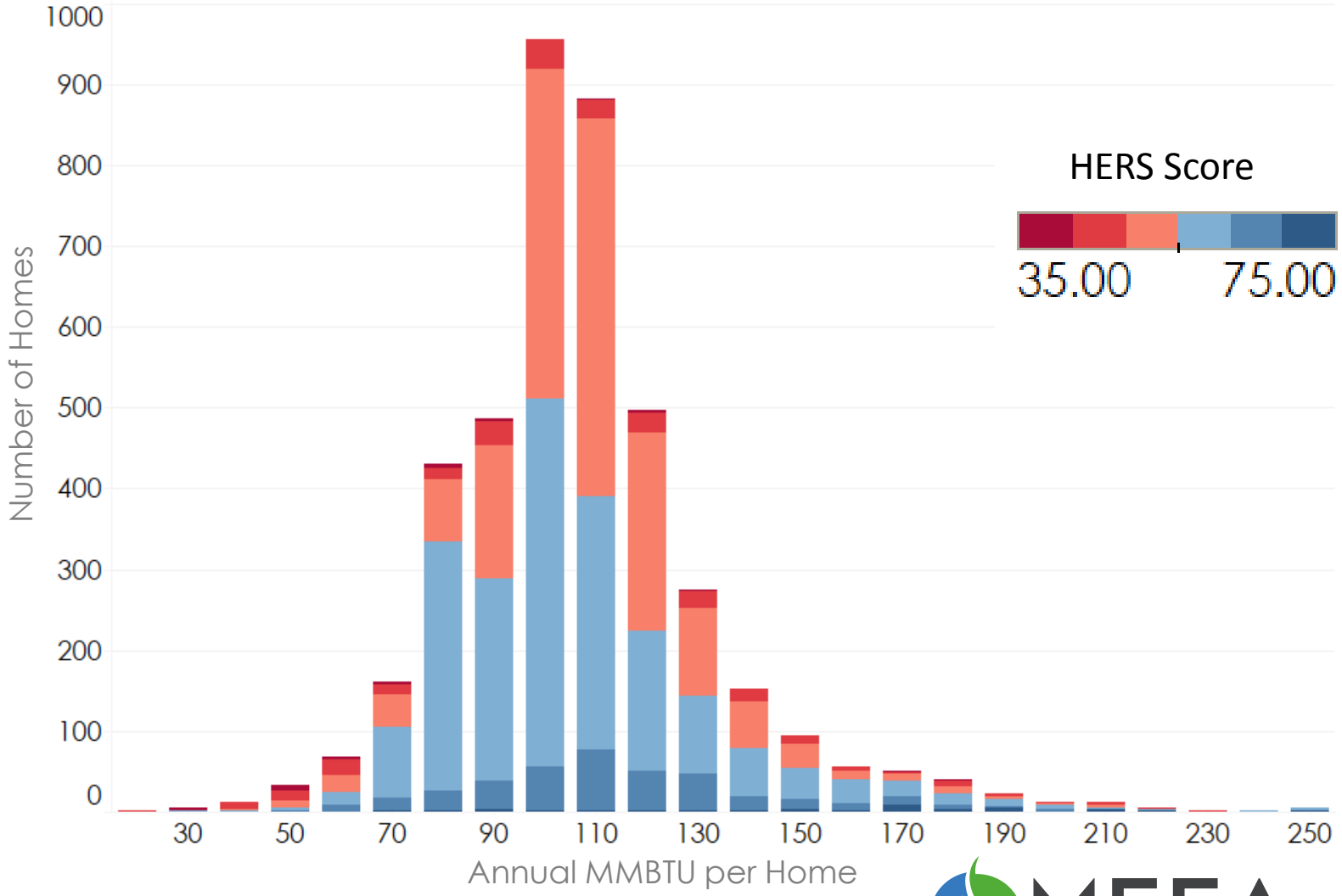
Energy Use
All Homes



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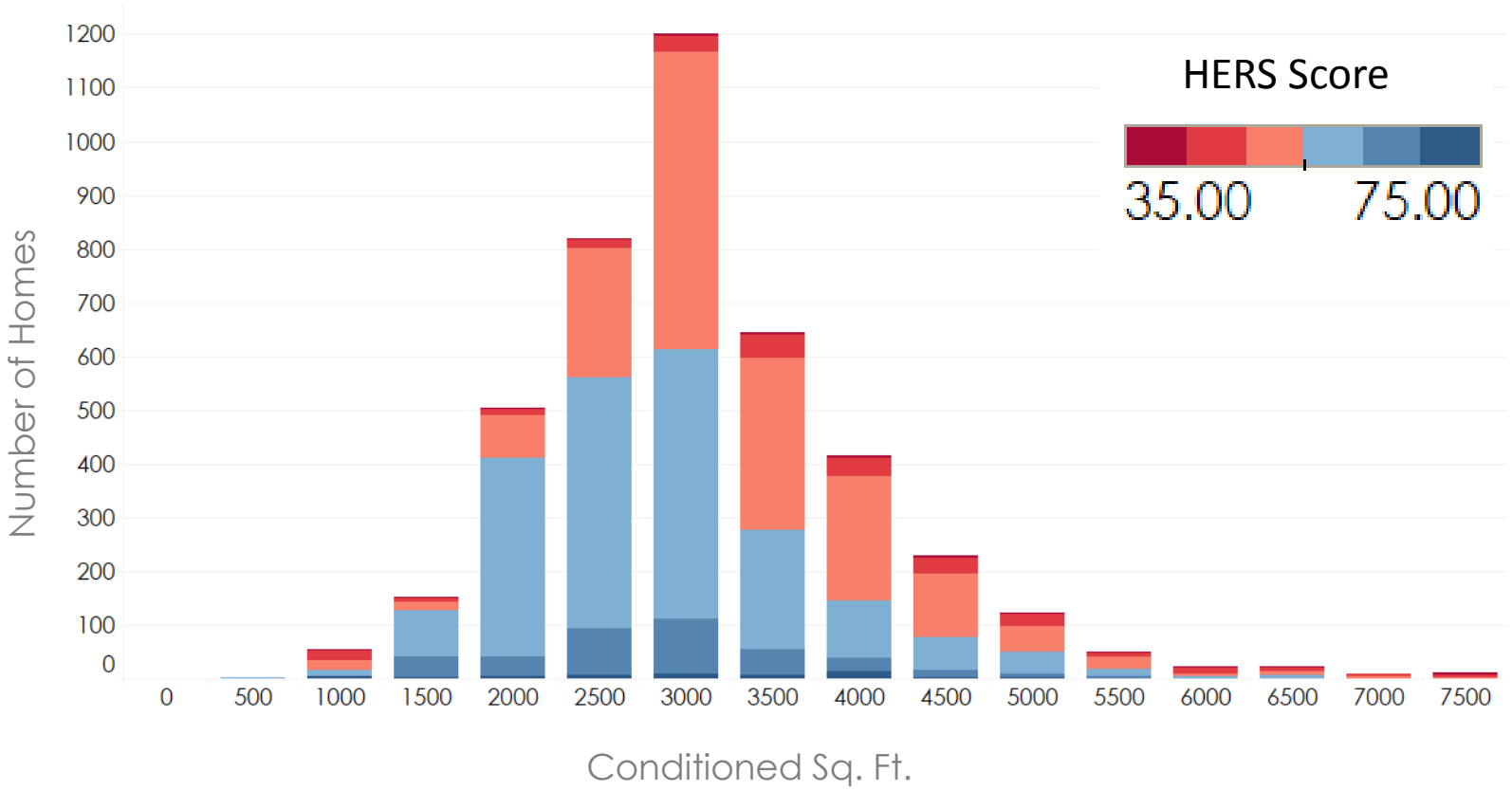
Conditioned Sq. Ft.

All Homes



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Michigan Energy Code

w/ Amendments (CZ-5)

Code Measures	2009 IECC	2015 IECC
Foundation Insulation	R-10/13	R-10/13
Wall Insulation	R-20 or 13+5	R-20 or 13+5
Ceiling Insulation	R-38	R-38
Window Efficiency	U-.35	U-.32
Air Leakage	7 ACH50	4 ACH50
Duct Leakage	8 % to outside	4% to outside
High Efficacy Lighting	50%	75%
AC Efficiency	13 SEER	13 SEER
Furnace Efficiency	80 AFUE	80 AFUE

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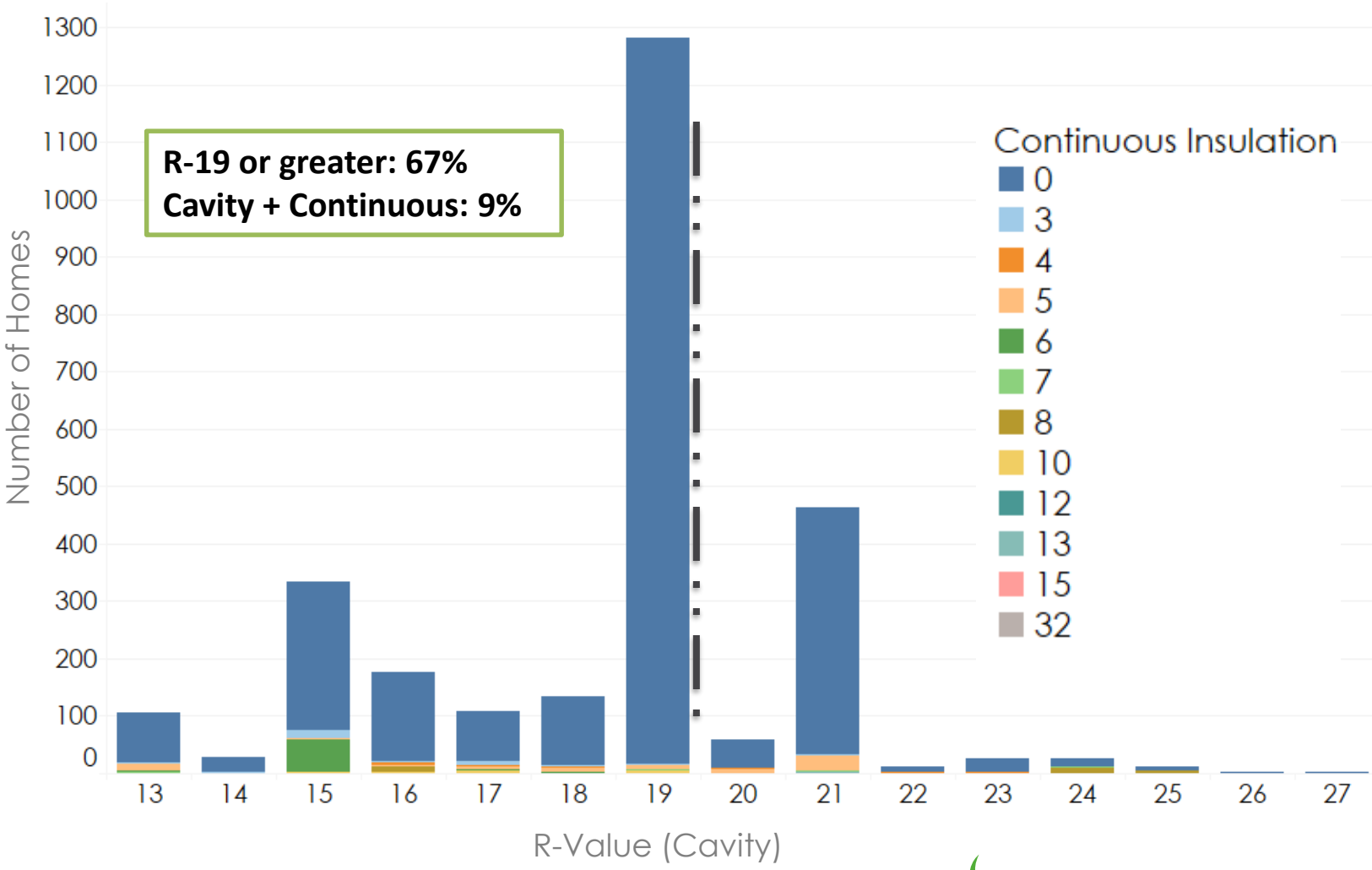
Above Grade Wall Insulation

2009 IECC



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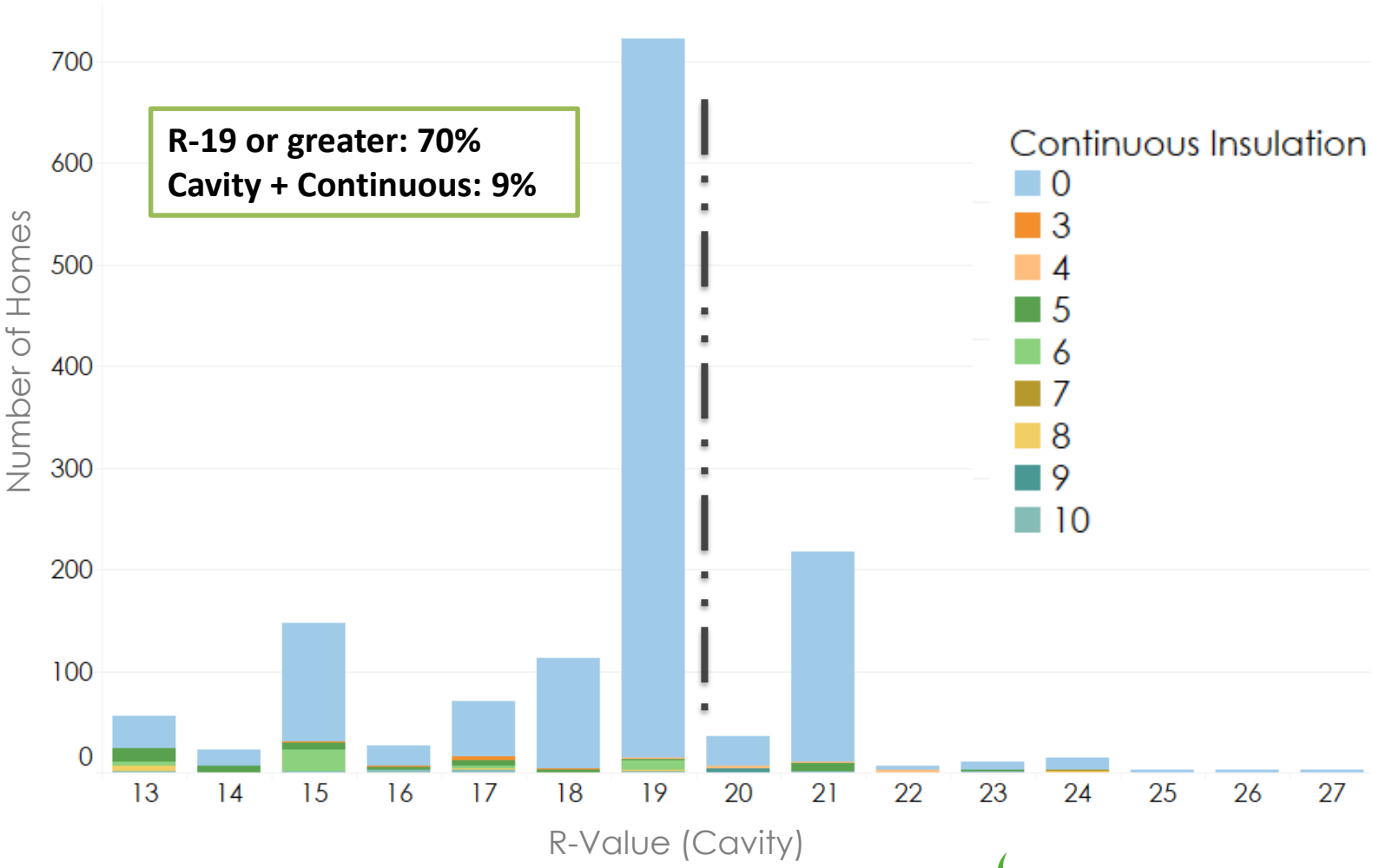
Above Grade Wall Insulation

2015 IECC



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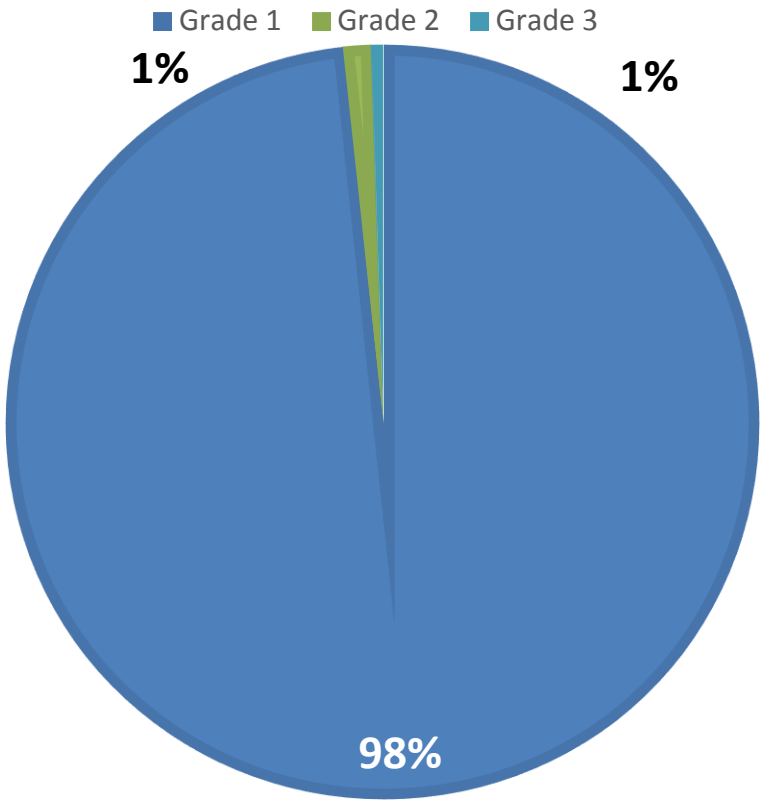
Above Grade Wall Insulation Quality

Installations Rated with a Value of 1,2,3 – All Homes



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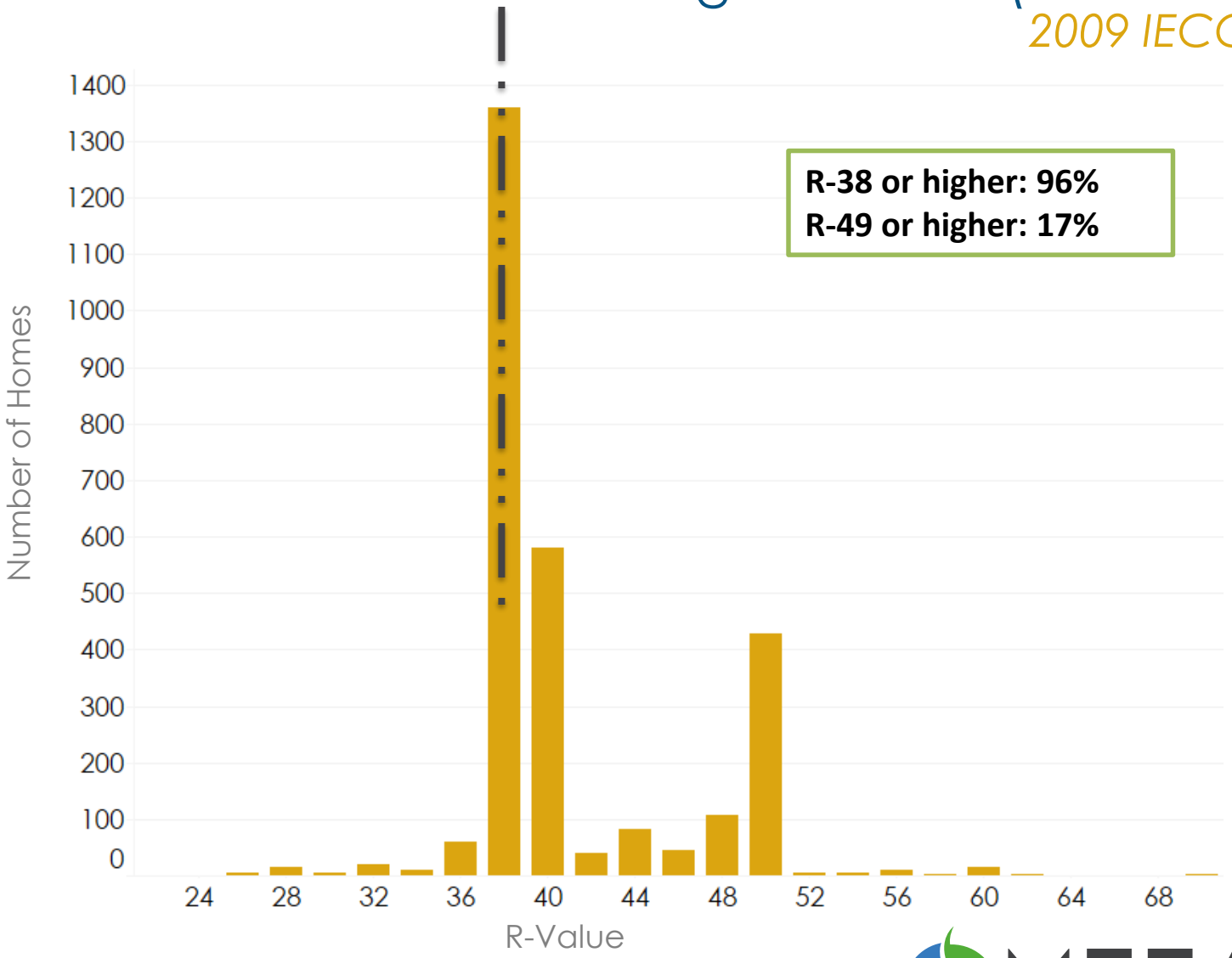
Ceiling Insulation (R-Value)

2009 IECC



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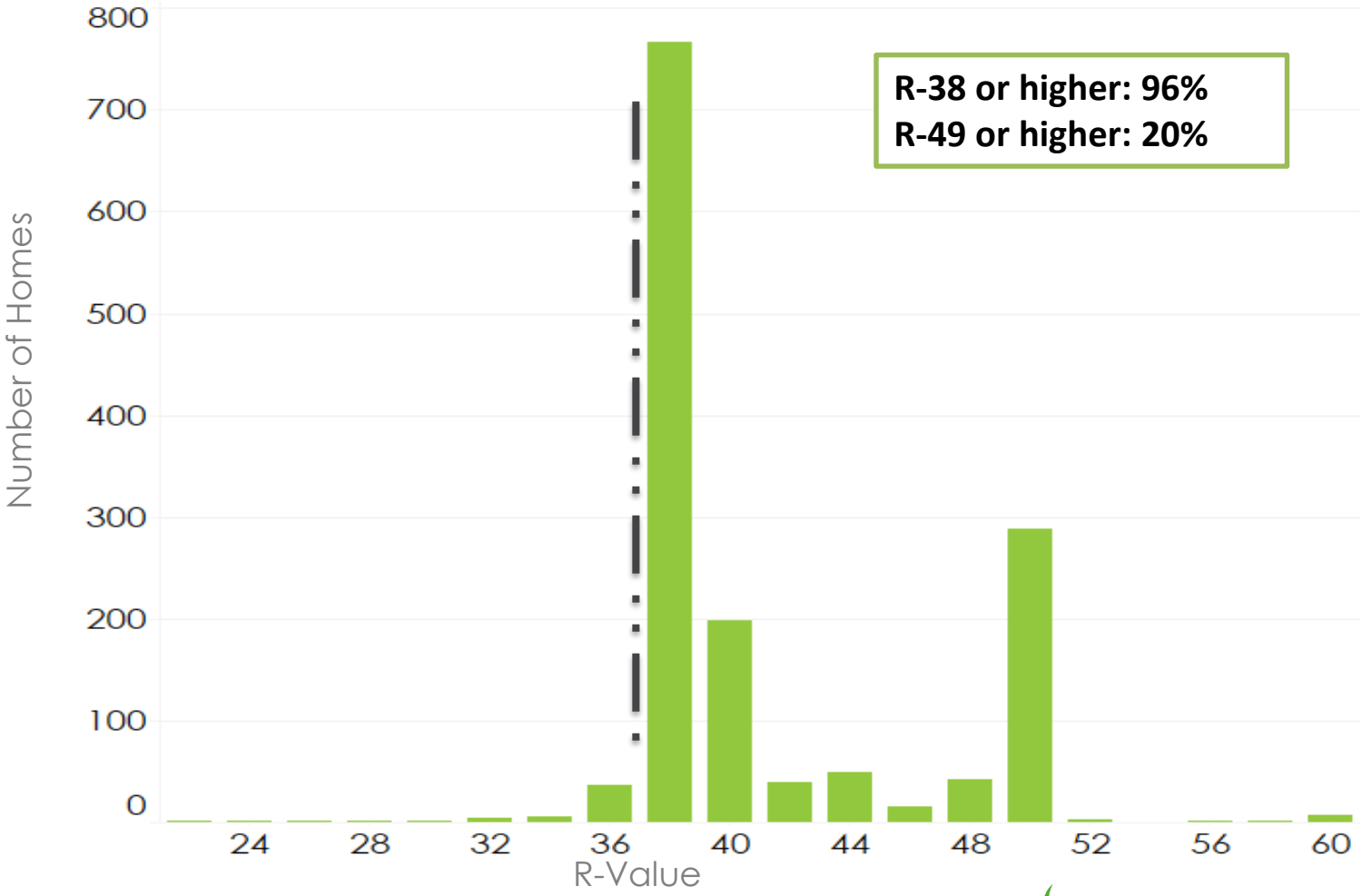
Ceiling Insulation (R-Value)

2015 IECC



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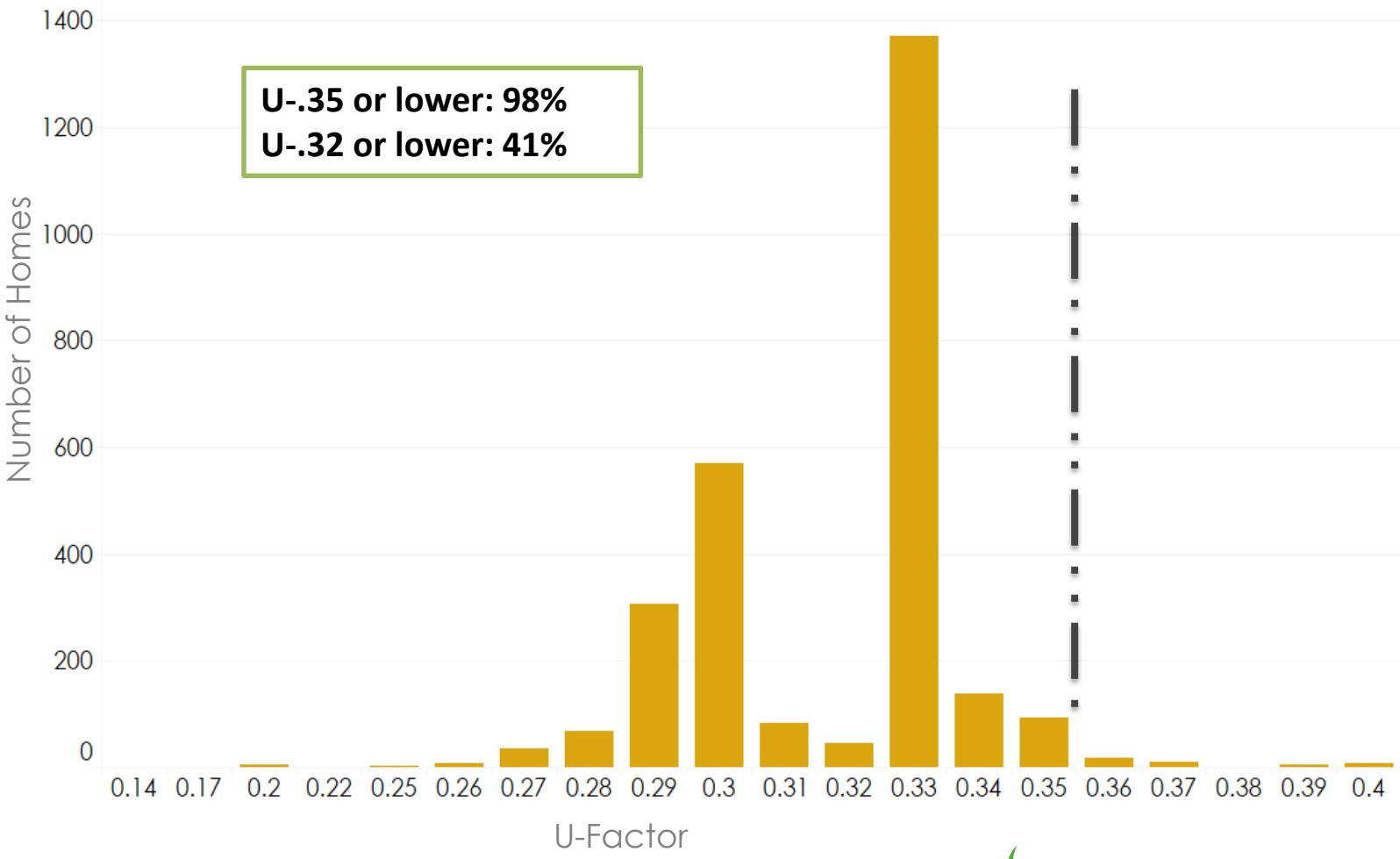
Window U-Factor

2009 IECC



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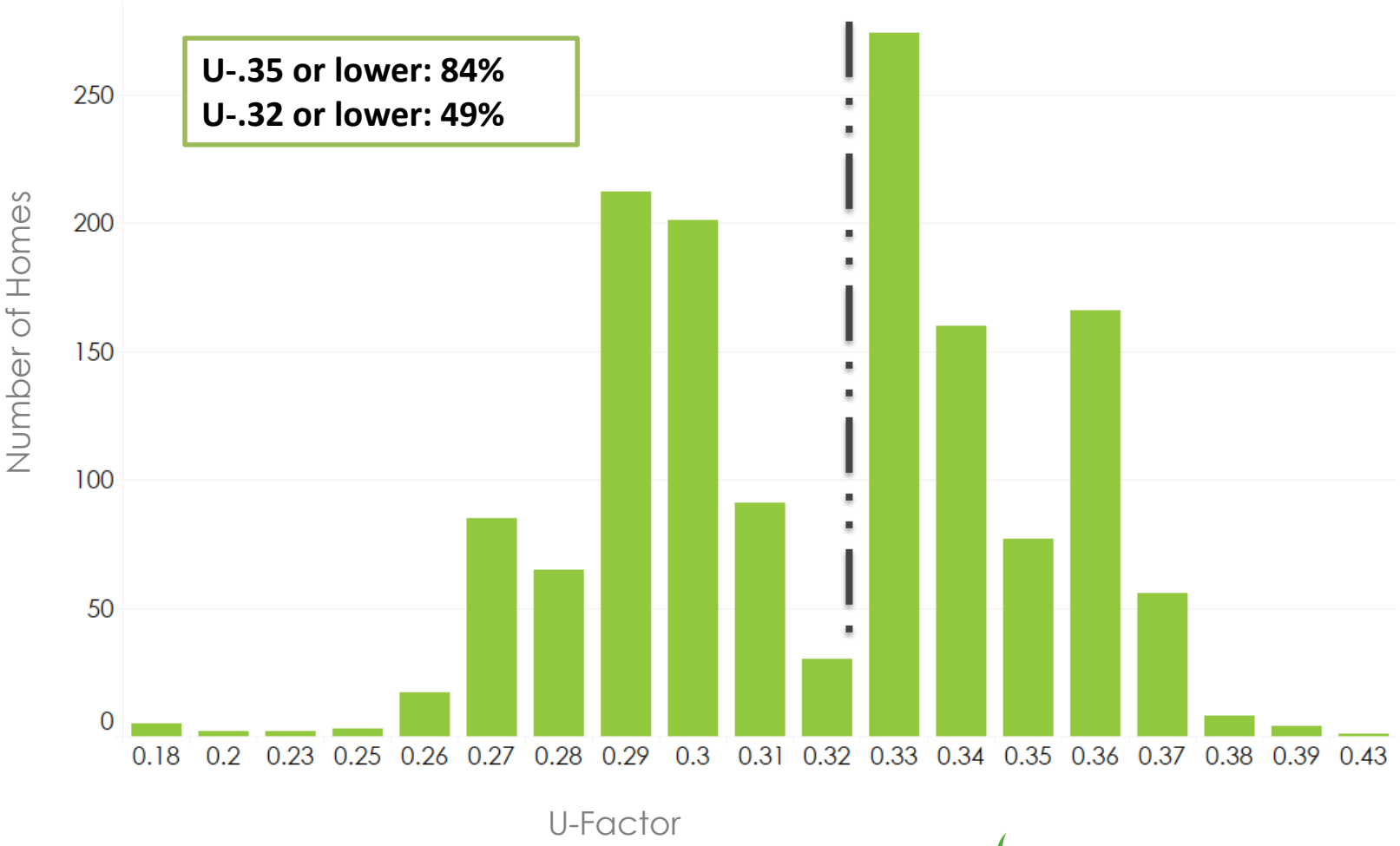
Window U-Factor

2015 IECC



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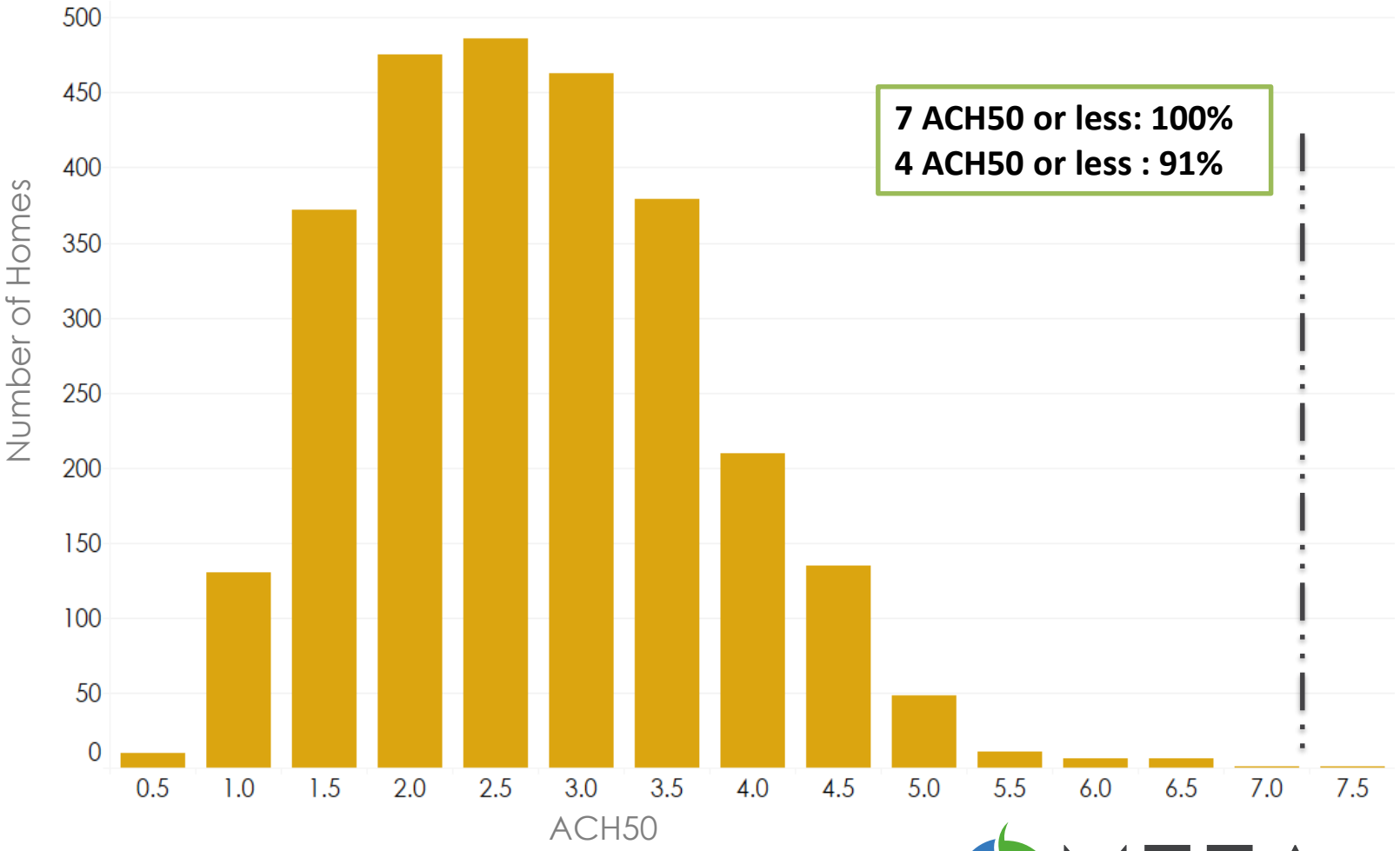
Air Leakage (ACH50) - Mandatory

2009 IECC



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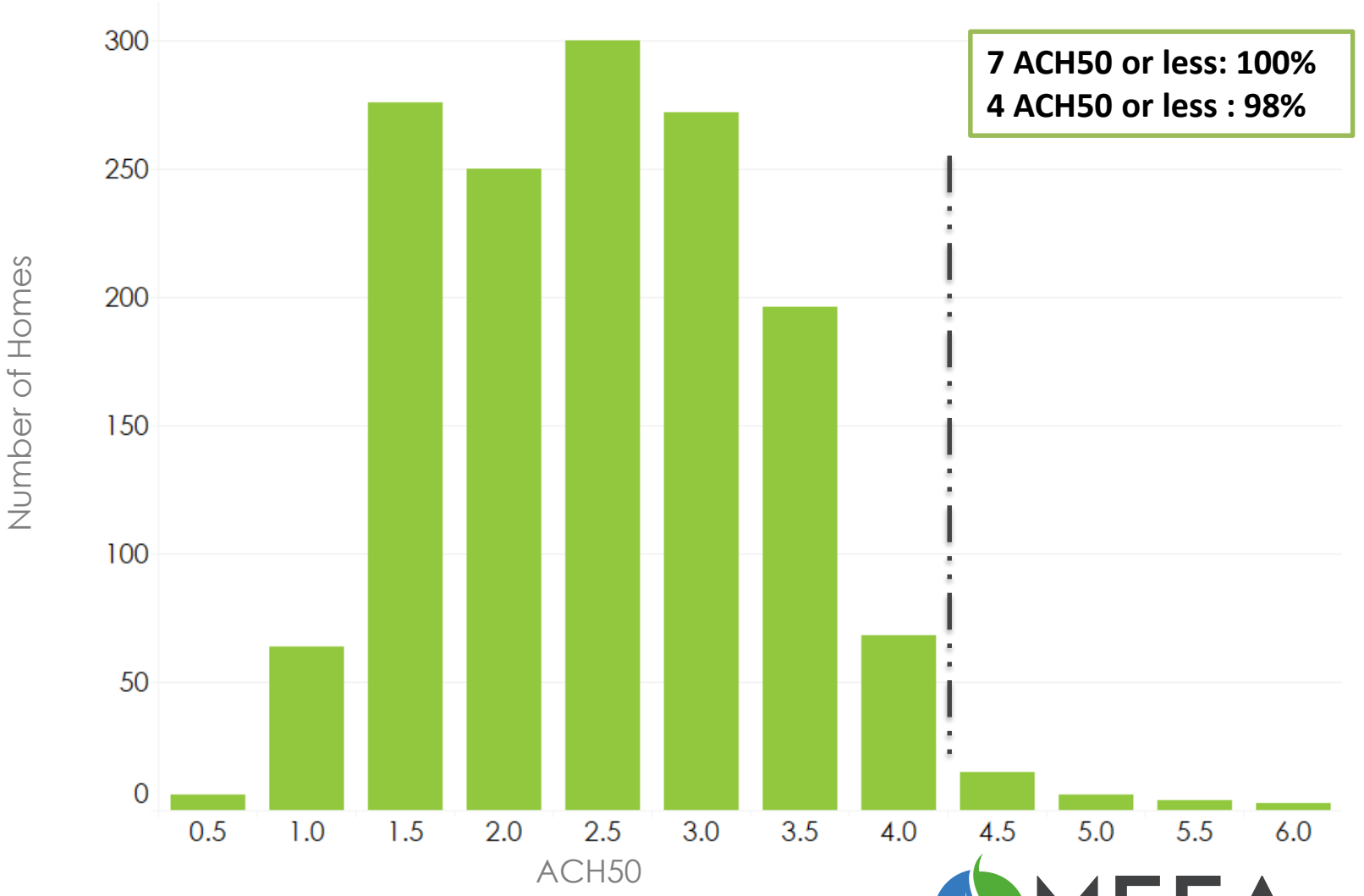
Air Leakage (ACH50) - Mandatory

2015 IECC



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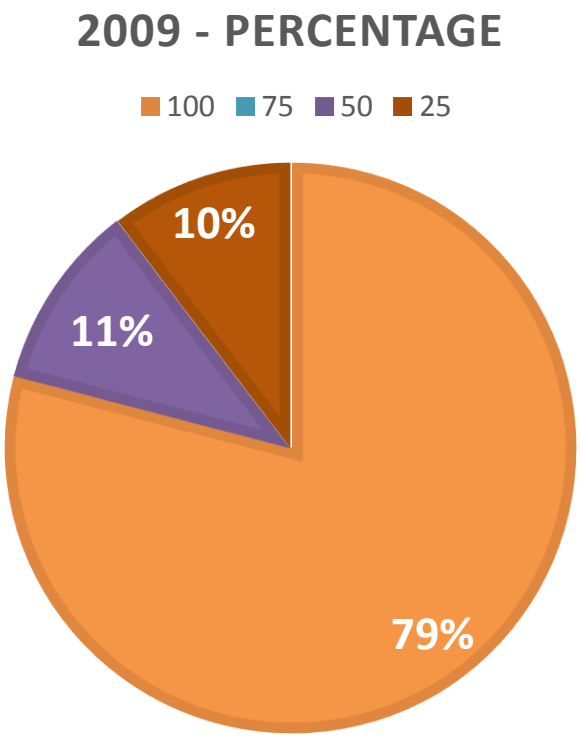
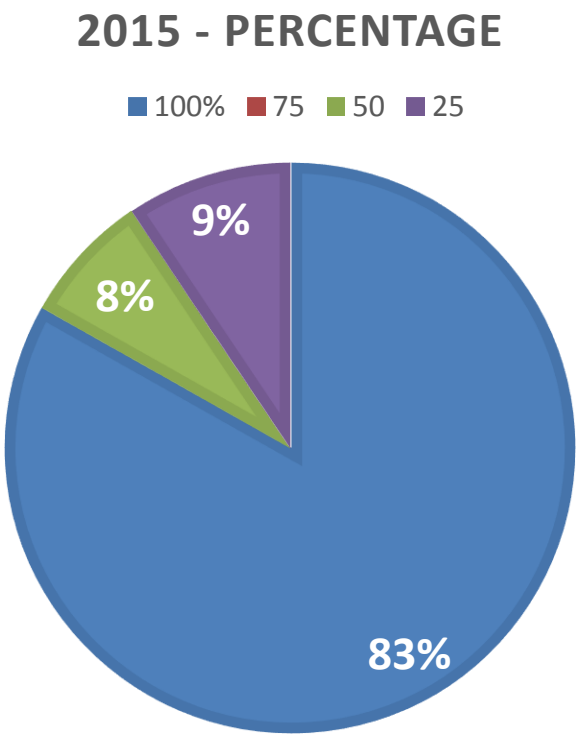
Ducts in Conditioned Space (%)

2009 and 2015 IECC Homes





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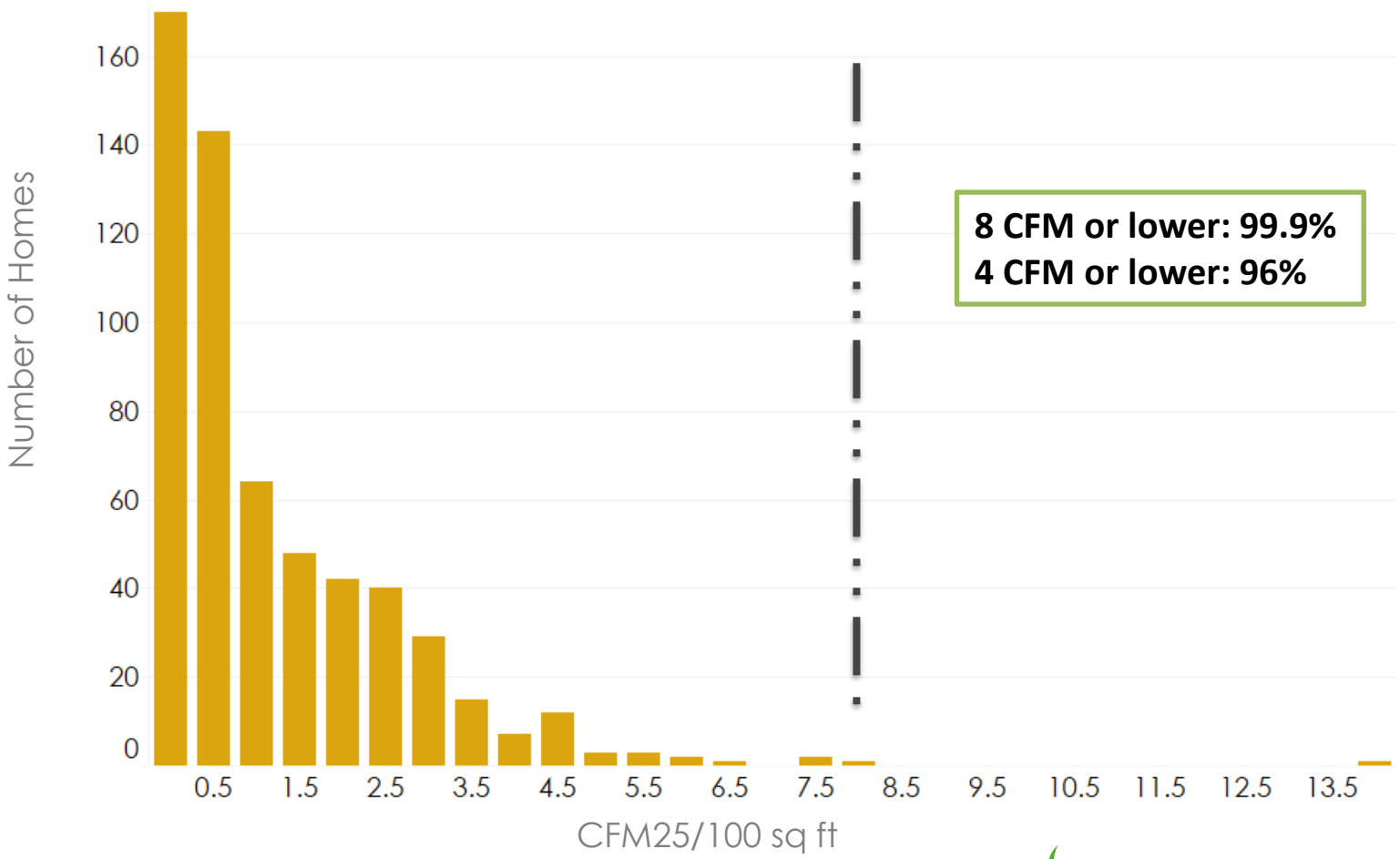
Duct Leakage to Outside - Unconditioned

2009 IECC



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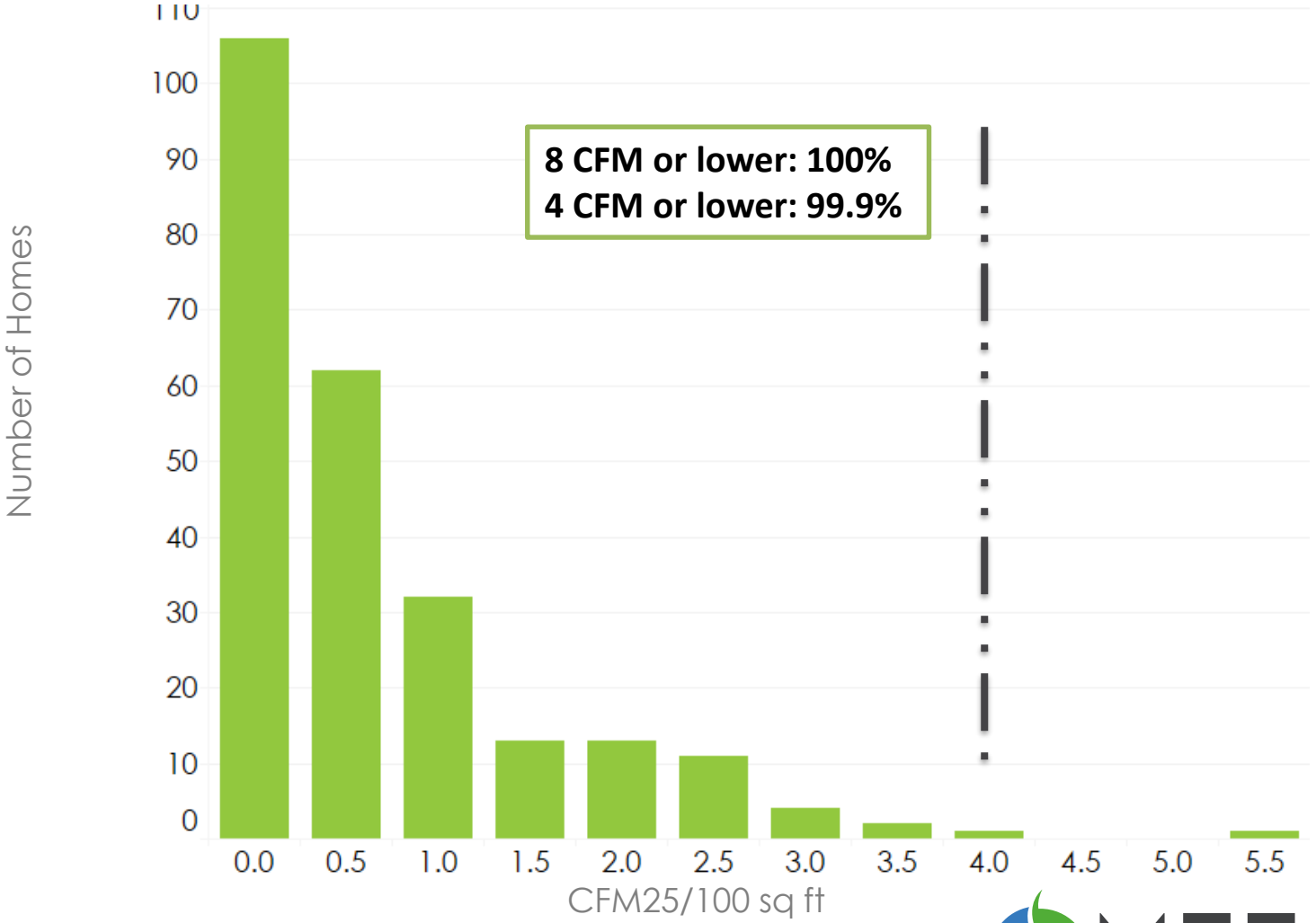
Duct Leakage to Outside - Unconditioned

2015 IECC



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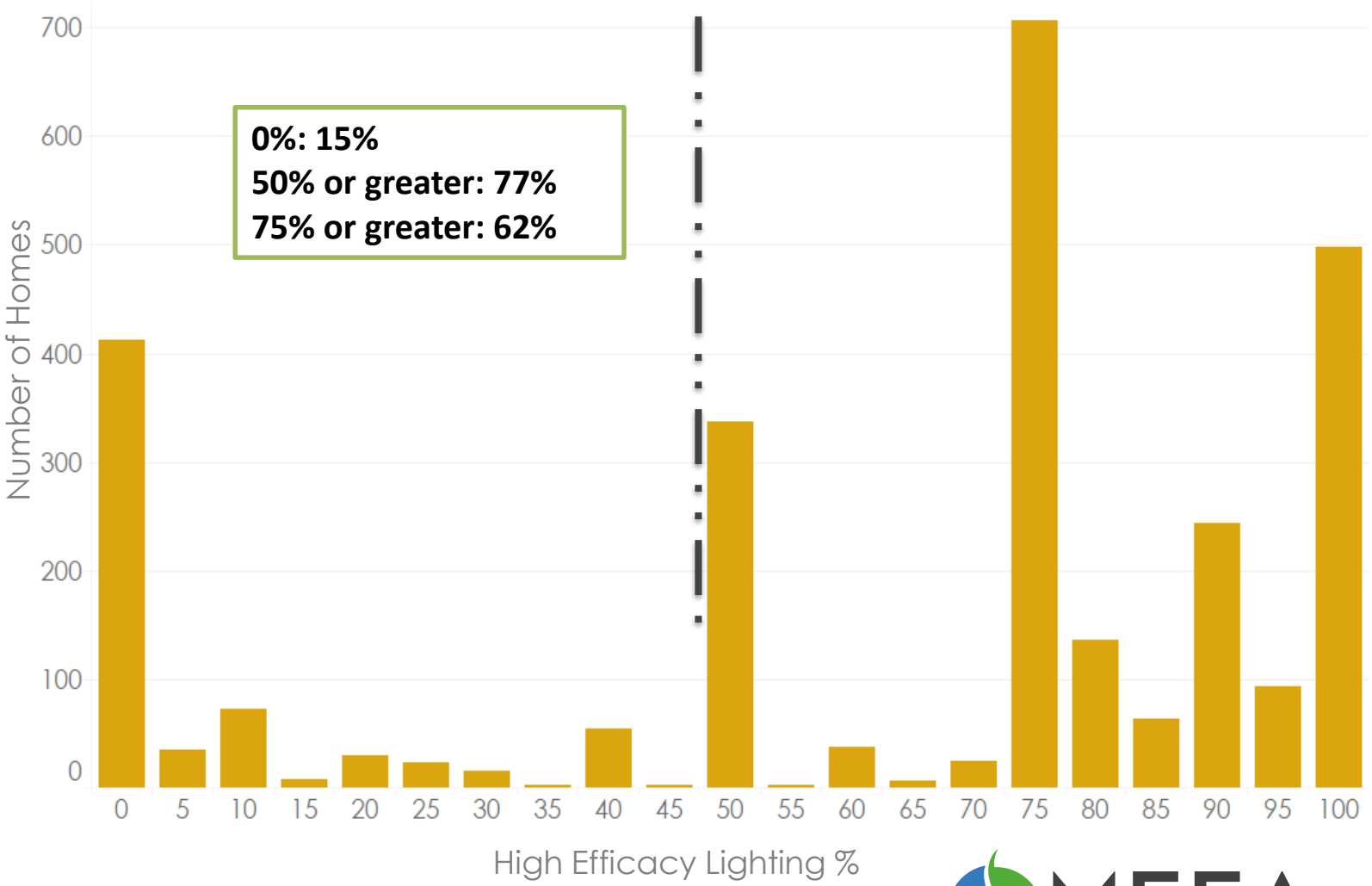
High Efficacy Lighting (%) - Mandatory

2009 IECC



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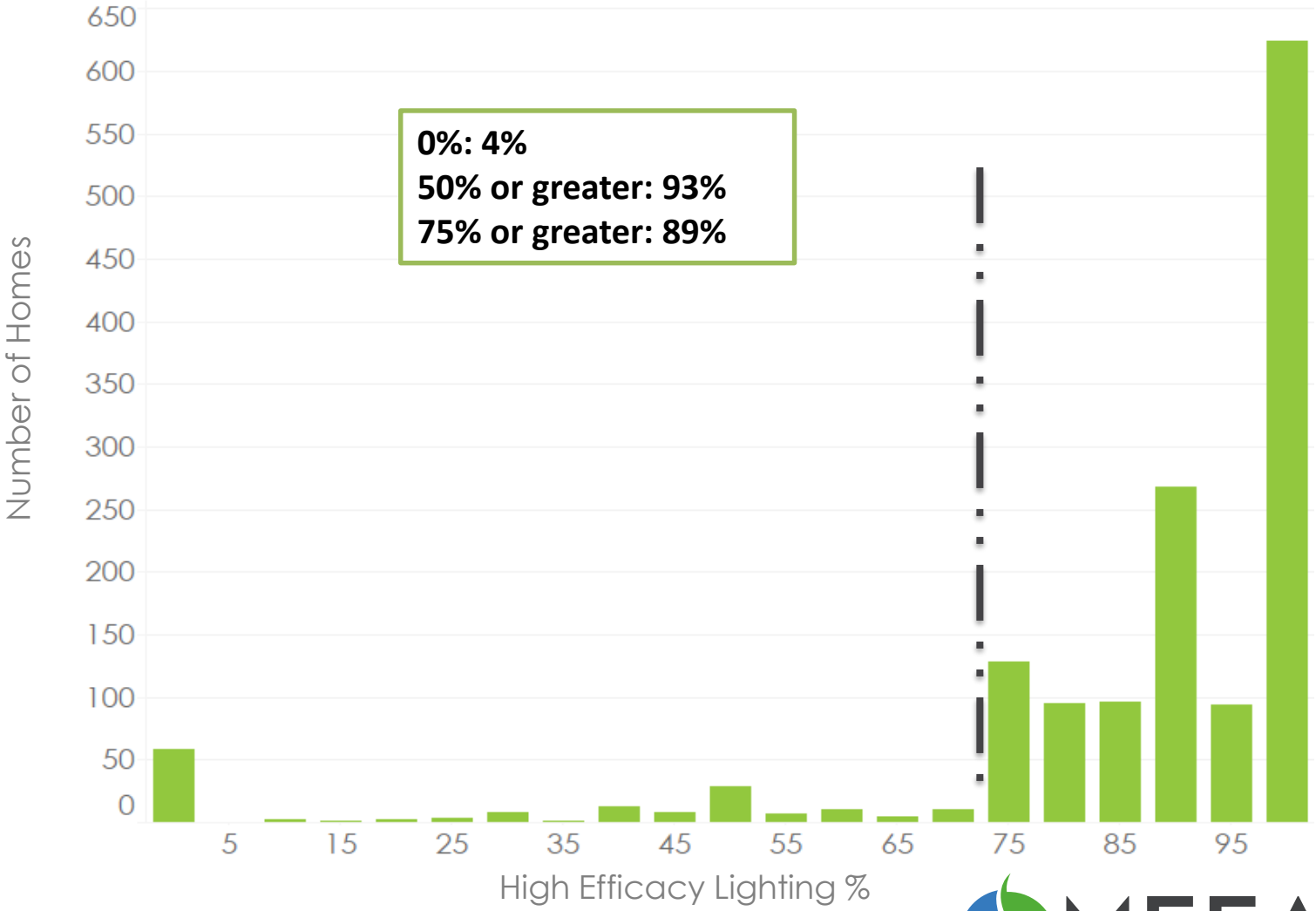
High Efficacy Lighting (%) - Mandatory

2015 IECC



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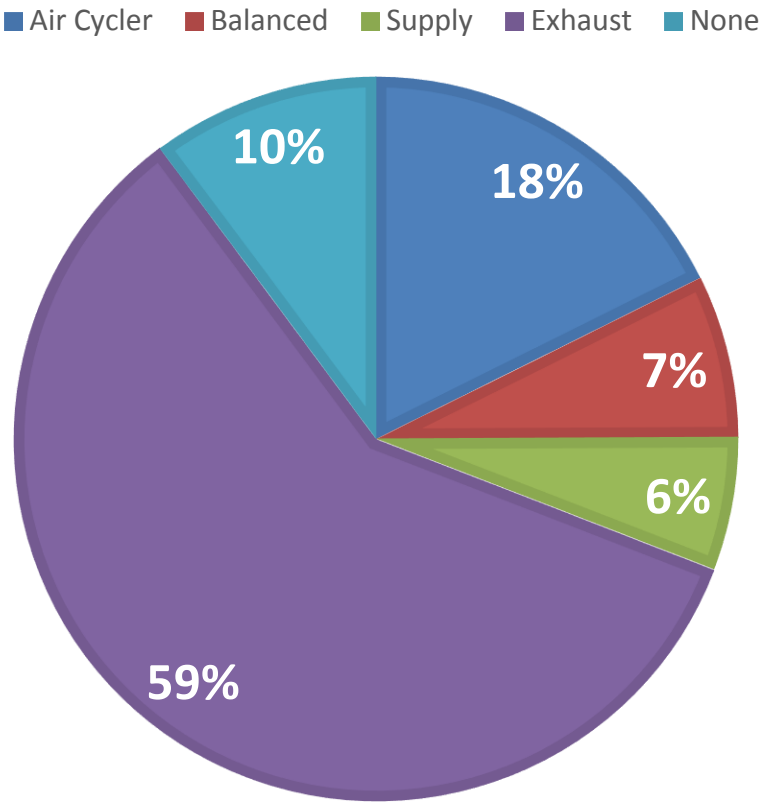
Ventilation Type
All Homes



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Jurisdiction Level

How can data help?

- **Holland Info:**
  - Percentage of new single-family rated homes ~100%
  - Avg. HERS score = 55
  - Energy Star = 15%
  - How resilient are new homes in Holland?
    - Avg. Features
      - R-18 wall insulation; R-41 Ceiling; U-.31 Windows;
      - 2.6 ACH50; 94AFUE; 13 SEER
- **With this info Holland could:**
  - Develop an above code program/green tax abatement
  - Develop more effective training for builders/code officials
  - Attract residents – *Holland homes are healthier for your family!!*
  - Info could be added to Green MLS

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Utility/Builder

How can data help?

- **Utility Programs**
  - Understand building measures to meet program reqs.
  - Help builders meet and exceed reqs.
  - Use data as a benchmark to develop programs with deeper savings
  - Determine program penetration in the market

- **Builders**
  - Learn from other builders on how to meet a HERS score
  - Standout in the marketplace by building healthier, more resilient, more efficient homes

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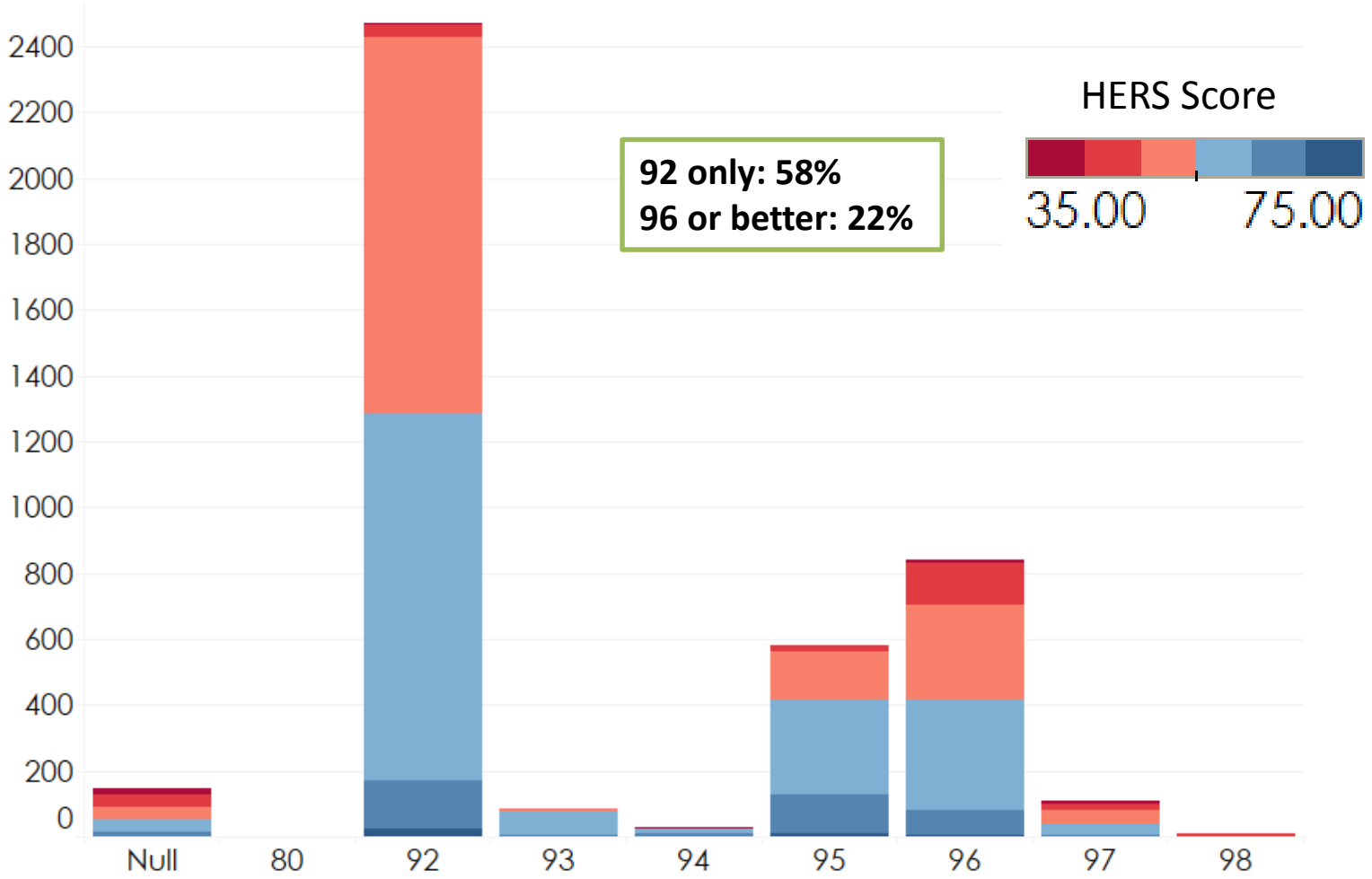
Heating Efficiency (AFUE)

All Homes



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Typical Home Features

HERS 53-55; HERS 42-45

HERS 53-55 – 1147 Homes

Building Envelope

- AGW – R-19 or 17+5
- Ceiling – R-41
- Windows – U-.32
- Air Leakage – 3.0 ACH50

Lighting/Equipment

- Duct Leakage – 1.0%*
- Lighting – 80%
- AC Eff. – 13 SEER
- Furnace Eff. – 93 AFUE

Conditioned Area– 3300 Sq. Ft.

HERS 42-45 – 77 Homes

Building Envelope

- AGW – R-20 or 18+8
- Ceiling – R-47
- Windows – U-.28
- Air Leakage – 1.8 ACH50

Lighting/Equipment

- Duct Leakage – .5%*
- Lighting – 88%
- AC Eff. – 13.5 SEER**
- Furnace Eff. – 96 AFUE**

Conditioned Area– 4000 Sq. Ft.

* Or in conditioned space

** Or GSHP

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How does Michigan compare to other states?

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Average HERS score

OH, IN, IL, WI, MI

Score | Ratings | % permitted homes

- Ohio – 59 | 13,347 | 32%
- Indiana – 66 | 20,456 | 53%
- Illinois – 55 | 4,287 | 14%
- Wisconsin – 55 | 5,889 | 20%
- Michigan – 55 | 4,583 | 11%

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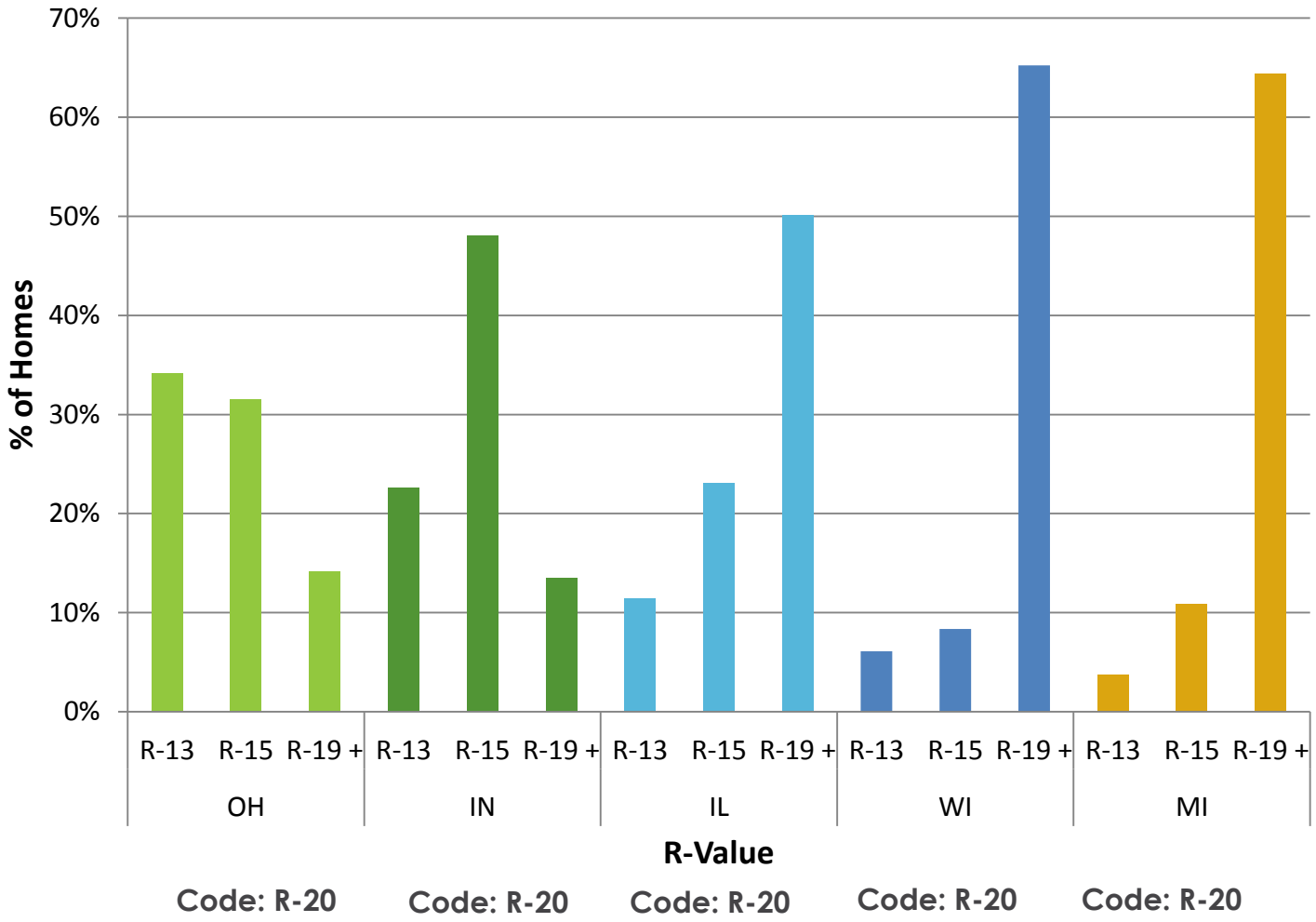
Above Grade Wall Insulation (Cavity Only)

OH, IN, IL, WI, MI



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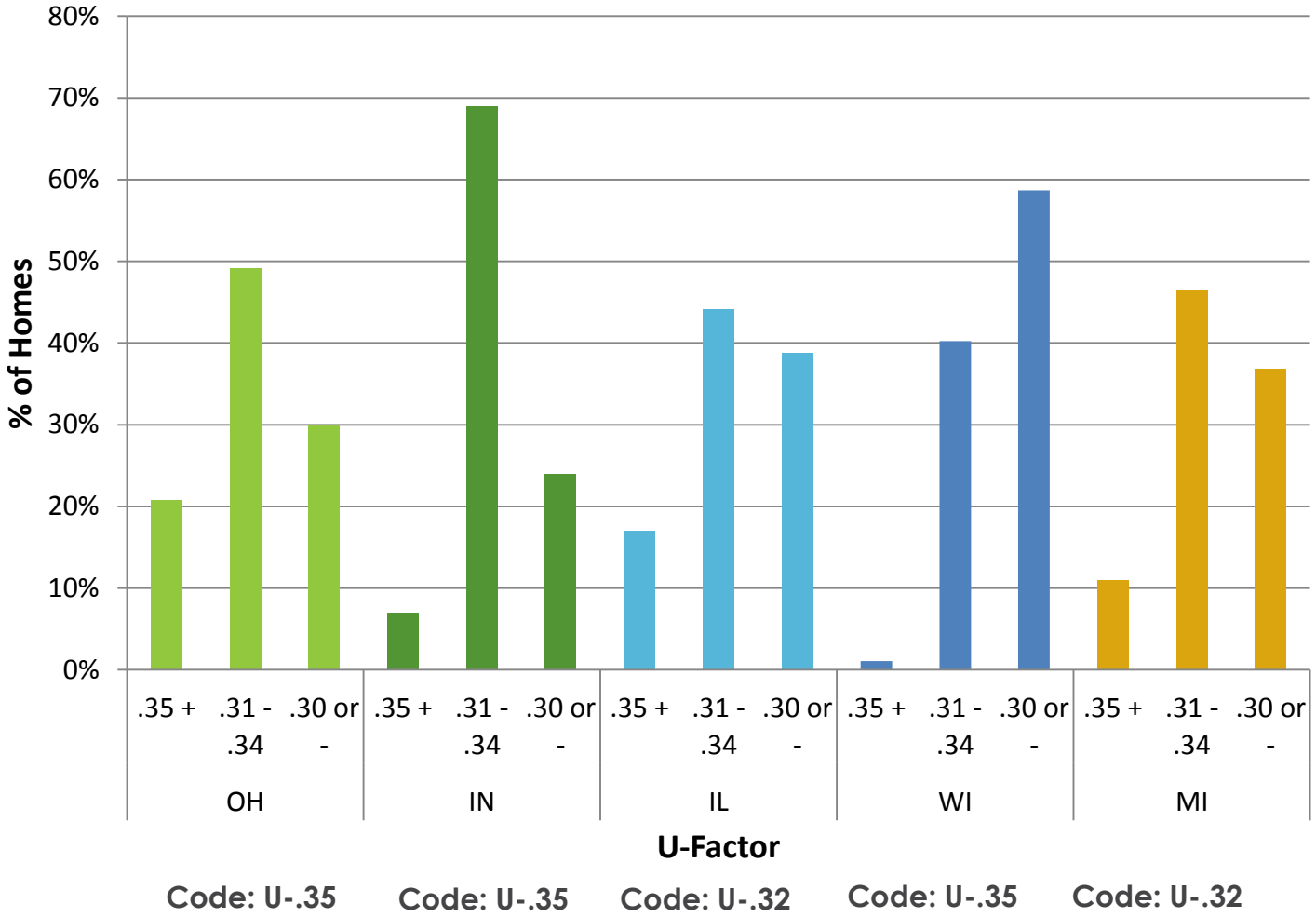
Windows (U-Factor)

OH, IN, IL, WI, MI



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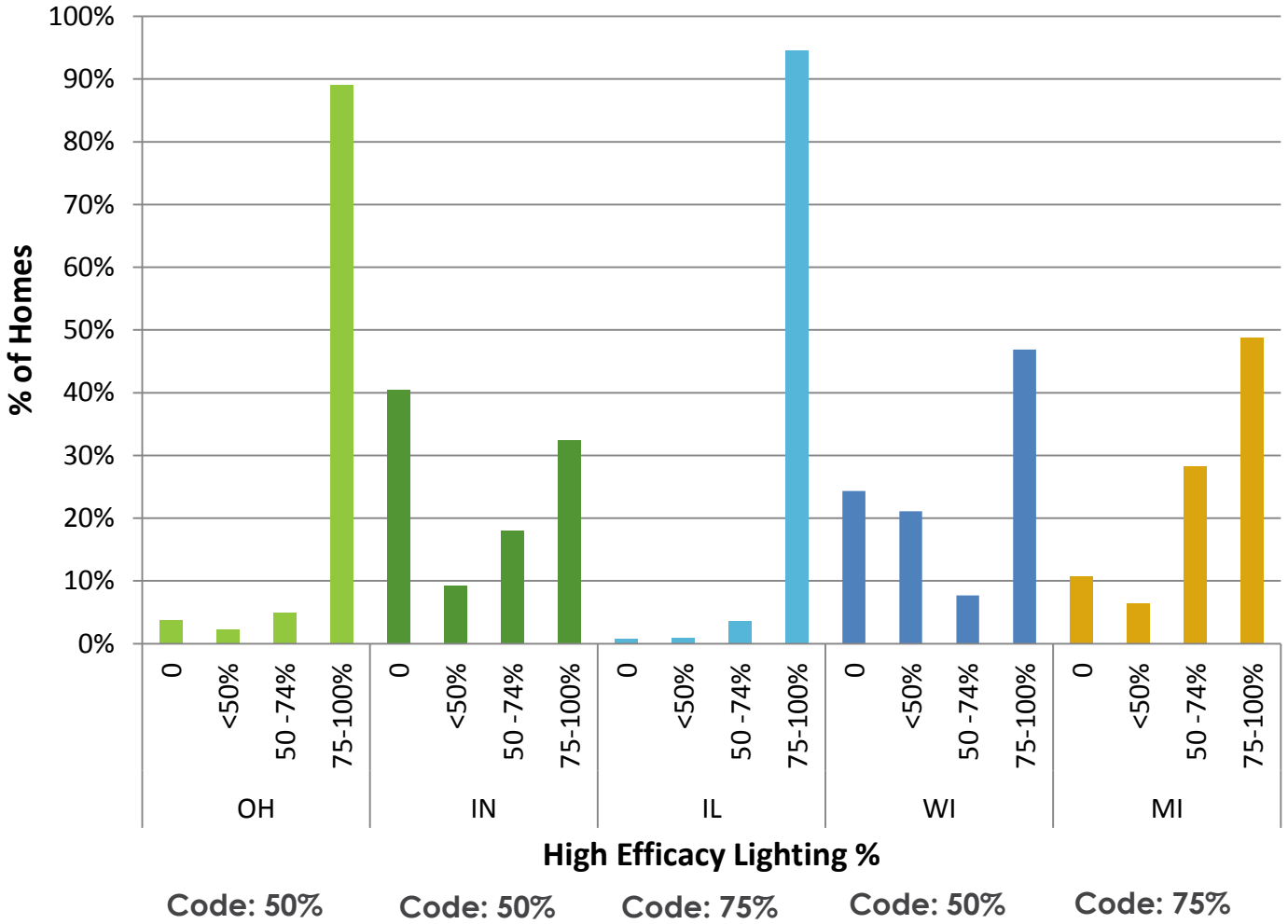
High Efficacy Lighting (%)

OH, IN, IL, WI, MI



Code: 50% **Code: 50%** **Code: 75%** **Code: 50%** **Code: 75%**

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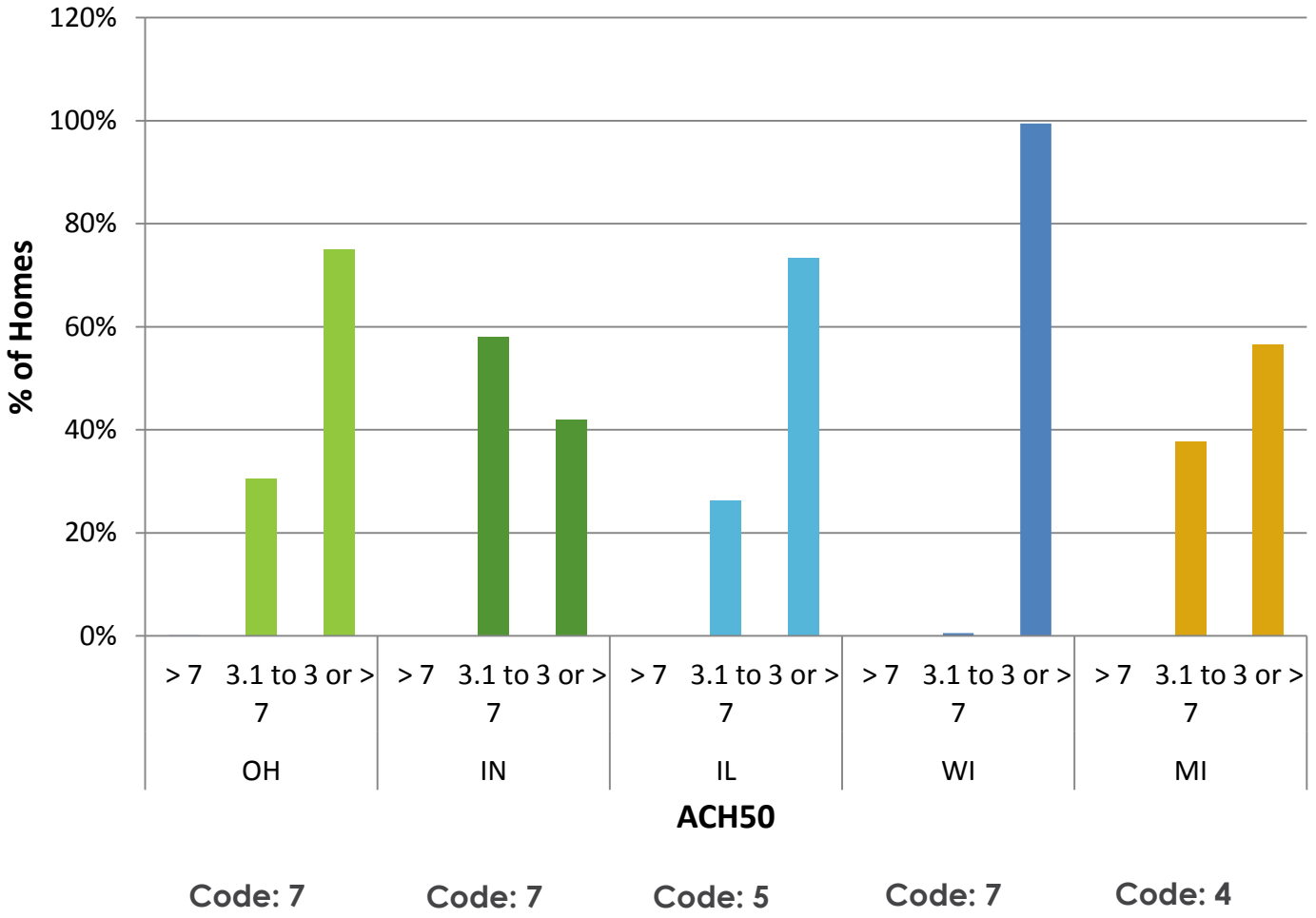
Air Leakage (ACH50)

OH, IN, IL, WI, MI



Code: 7 **Code: 7** **Code: 5** **Code: 7** **Code: 4**

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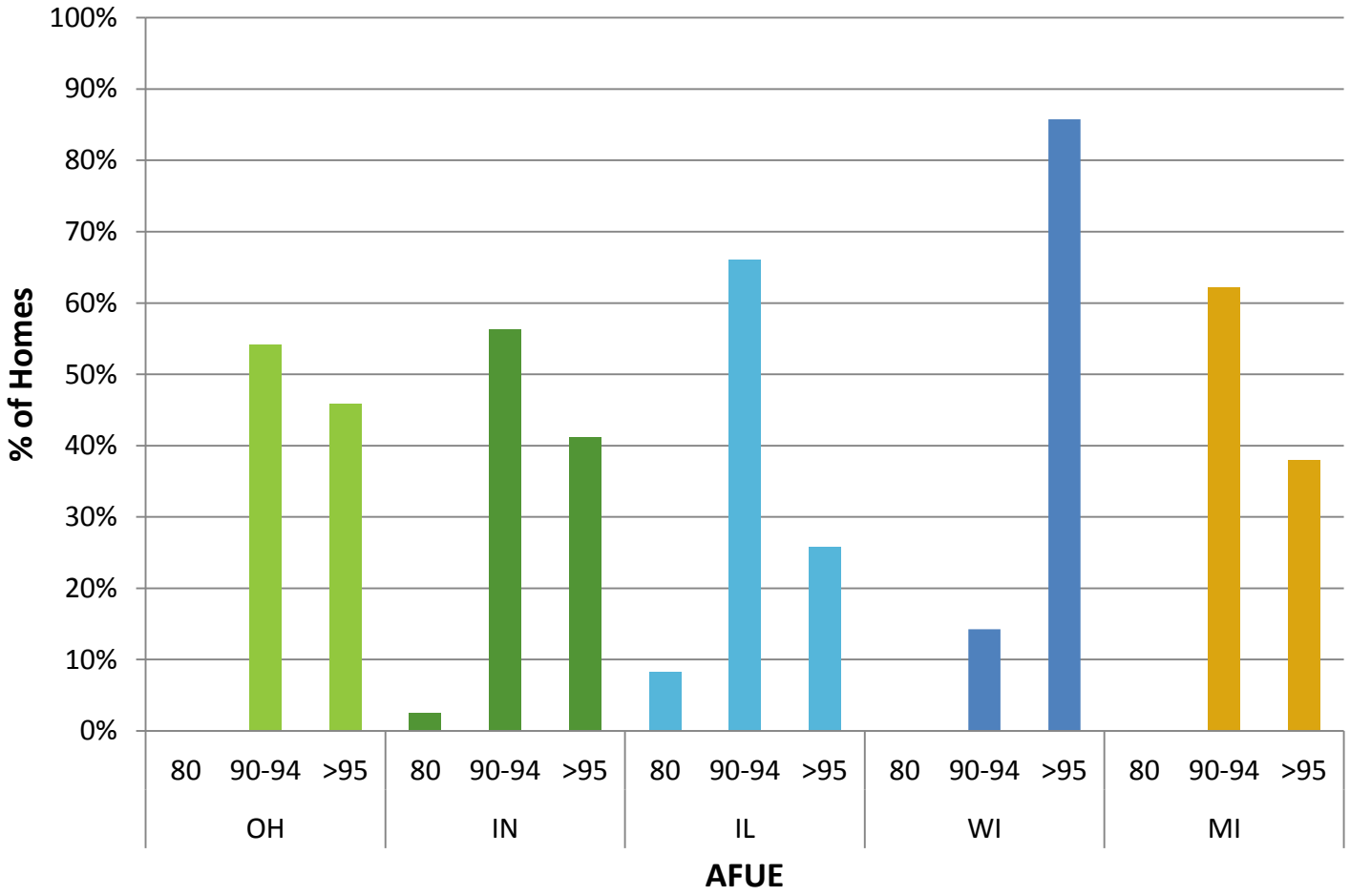
Furnace Efficiency (AFUE)

OH, IN, IL, WI, MI



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Summary

Key Takeaways

- The average HERS rated home meets the 2015 IECC ERI number
- Homes are efficient and have a well sealed and well insulated building envelope
- Homes are complying with most 2015 IECC mandatory code reqs., except lighting
- New construction programs have significant market penetration
- Michigan has similar construction practices to states in Midwest w/ same CZs

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Thank you!

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