



# **Preparing for the National Transition to Single-Family New Homes Version 3.1 Multifamily New Construction Version 1.1**

2022 Residential New Construction Partner Meeting

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October 20, 2022

# Agenda

- Context for the transition to higher Versions
- The key differences between ENERGY STAR Versions
- How to benchmark homes against v3.1 / v1.1 in rating software
- Example compliance paths for homes in different regions
- Q&A

# Timeline for National Transition to: Single-Family New Homes (SFNH) **Version 3.1** Multifamily New Construction (MFNC) **Version 1.1**

- All states still using **SFNH Version 3.0** will transition to **Version 3.1**, with a transition date of **January 1, 2023** (based on permit date).
- All states still using **MFNC Version 1.0** will transition to **Version 1.1**, with a transition date of **January 1, 2024** (based on permit date).
- This means that the SFNH National v3 and MFNC National v1 program requirements will be sunset.



# ENERGY STAR Residential New Construction Eligibility



Single-family detached



Two-family



Townhomes

} **SFNH**



Low-rise MF



Mid-rise MF



High-rise MF



Townhomes

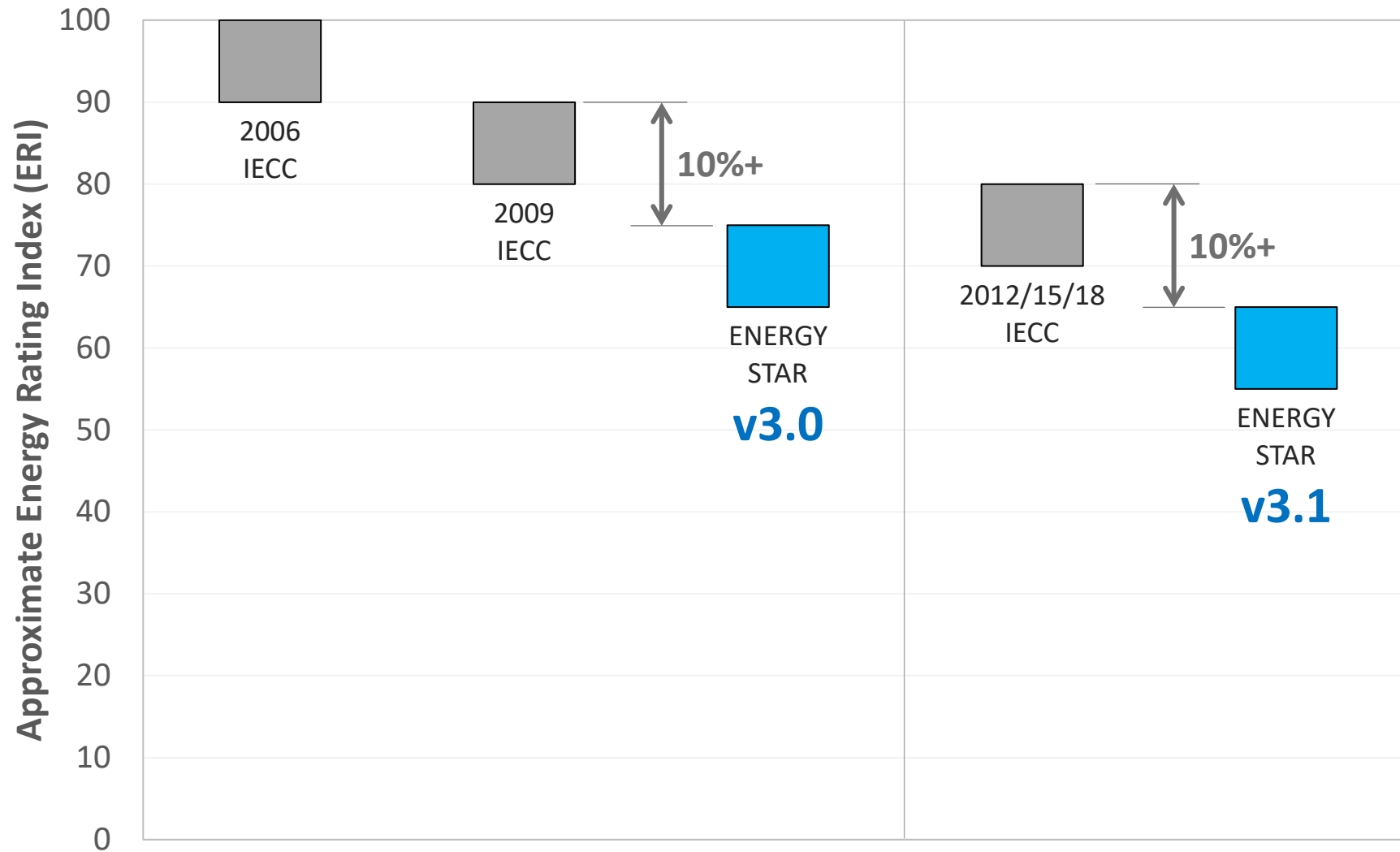
} **MFNC**



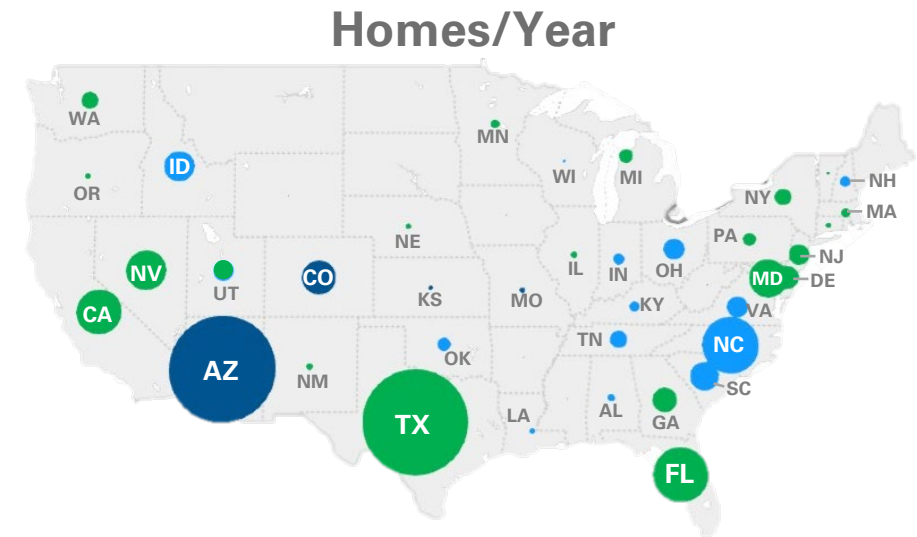
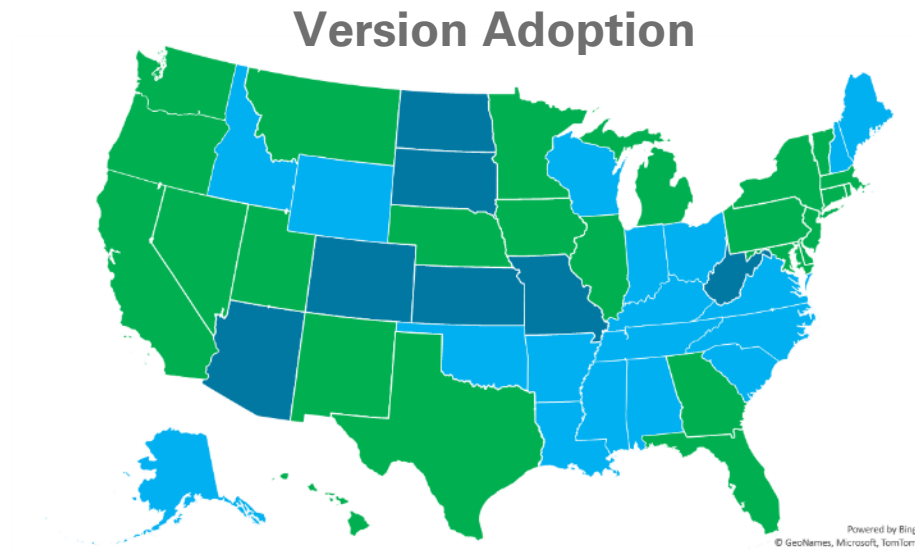
A photograph of a modern two-story house with grey horizontal siding and a white gable. The house features a central red door, a white picket fence, and a two-car garage. The foreground shows a well-maintained lawn with a concrete walkway and several green shrubs. A teal semi-transparent banner is overlaid across the middle of the image, containing white text.

# Context for National Transition to SFNH v3.1 / MFNC v1.1

# Modern code evolution



# Implementation of ENERGY STAR versions as of July 2022



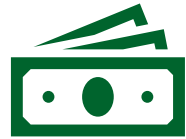
**25** Version 3.1+ (national or regional)

**7** Version 3.0 due to home rule, meaning no statewide code to trigger version change

**18** Version 3.0 due to code  $\leq$  2009 IECC

# Rationale for transitioning to SFNH v3.1 / MFNC v1.1

- Over the next 5 years, transitioning all remaining states to Version 3.1 could help homeowners:



Save over

**\$150 million**

in consumer energy costs



Avoid more than

**800 million**

kilowatt-hours electricity



Achieve nearly

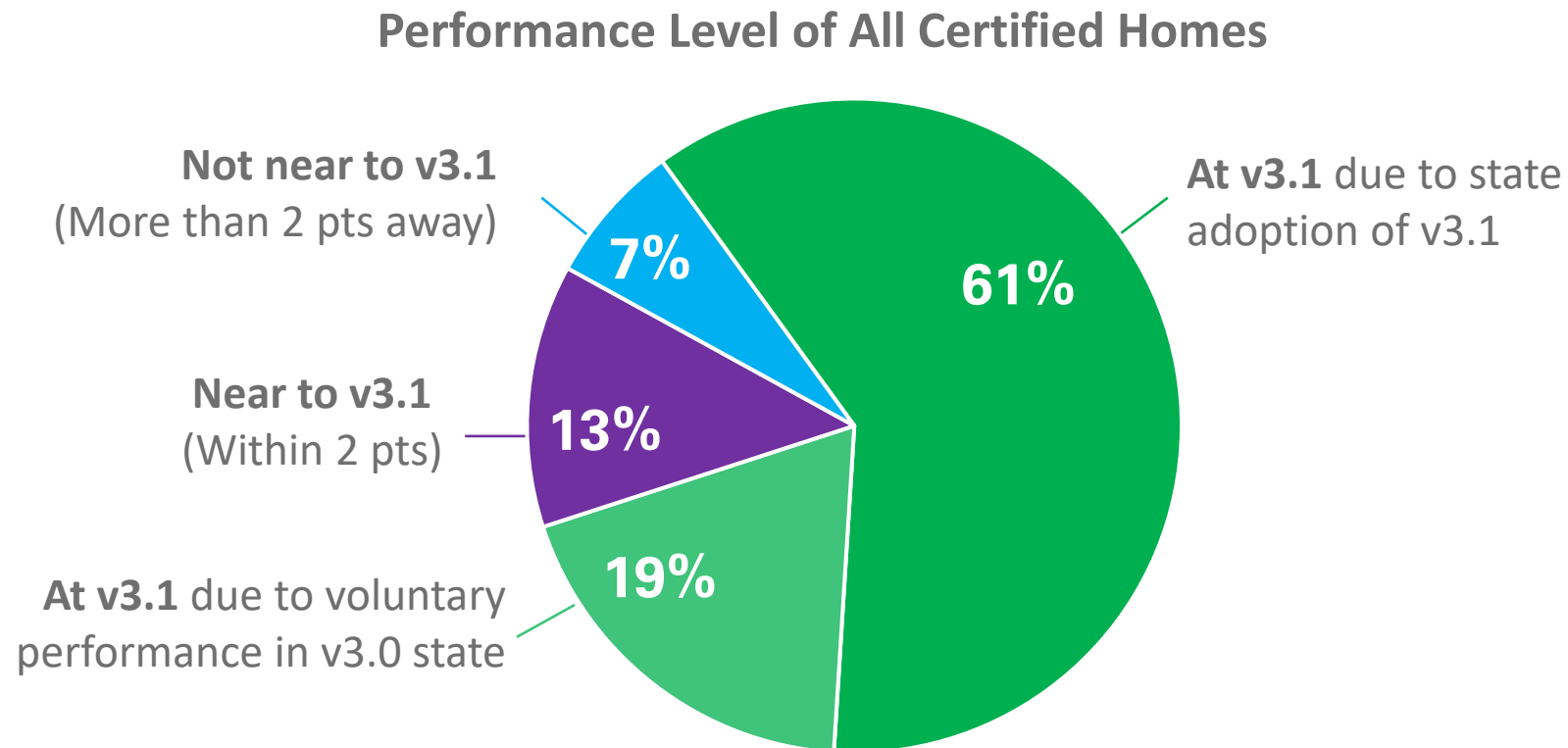
**1 million**

metric tons of carbon dioxide equivalent reductions



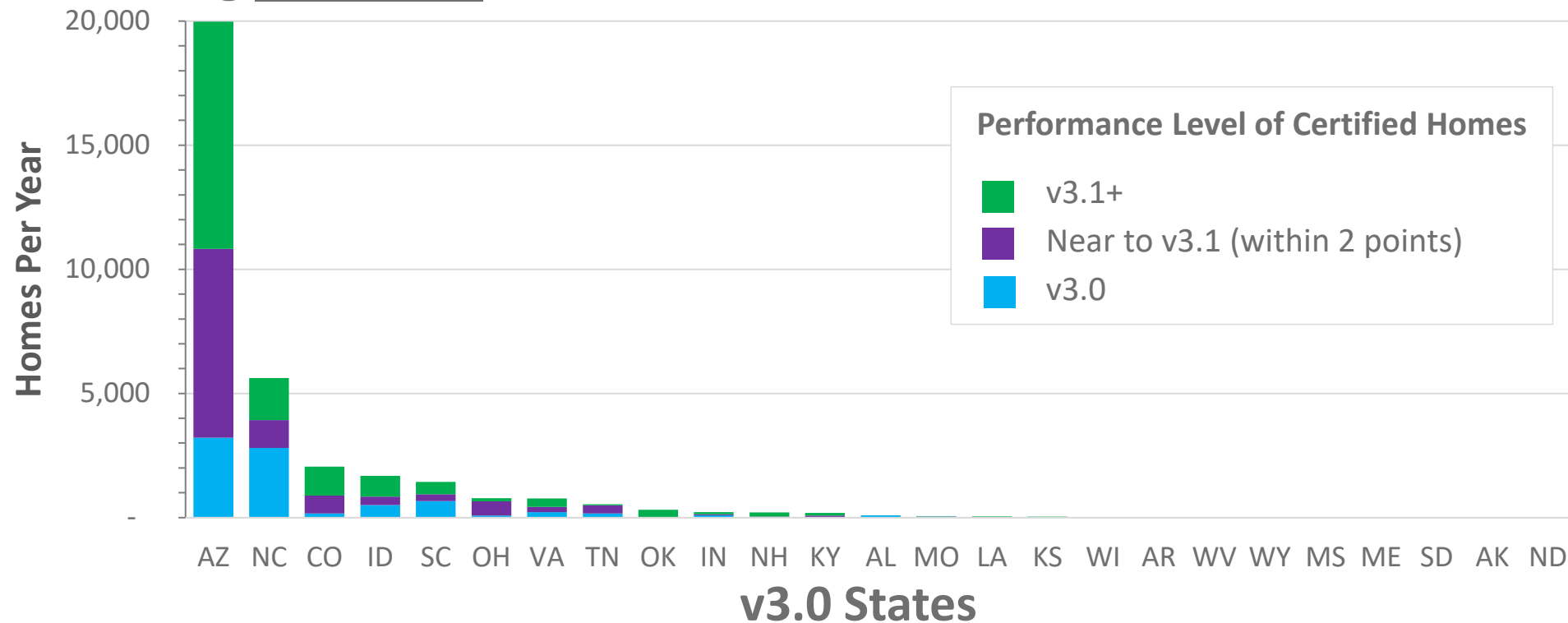
# Partners are well-positioned for the transition to Version 3.1

- 93% of single-family homes certified as ENERGY STAR between 08/2019 and 08/2020 were already at or near the v3.1:



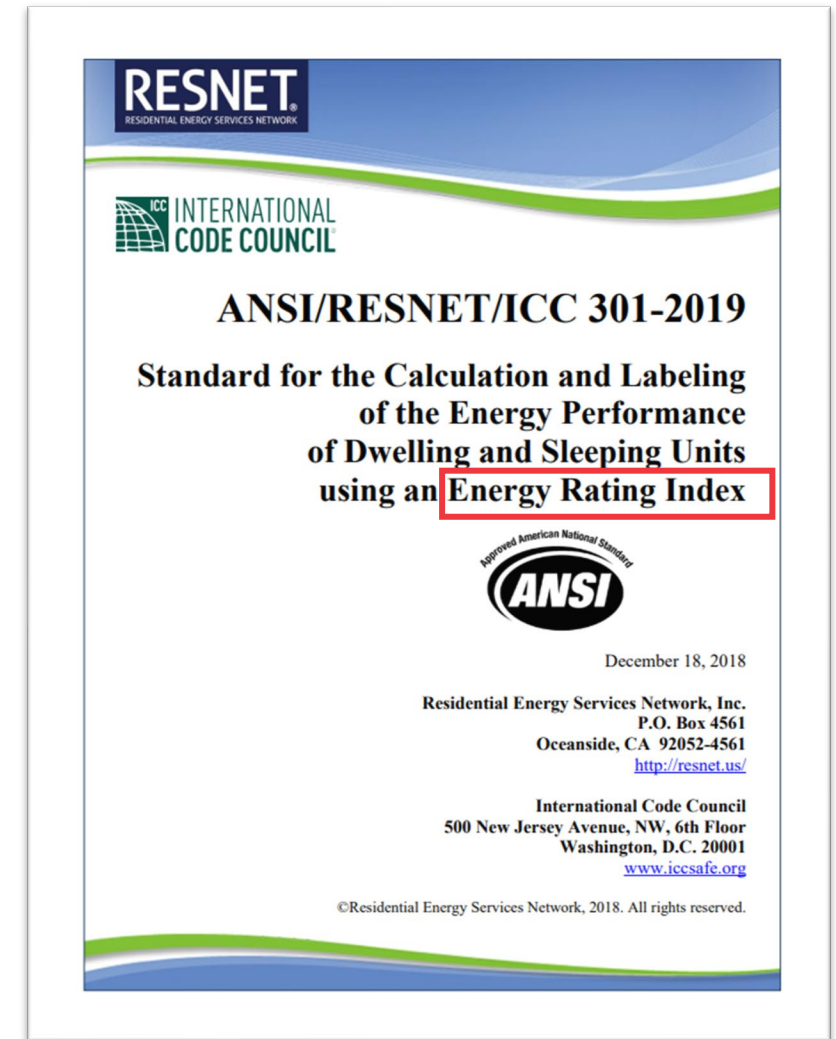
# Partners are well-positioned for the transition to Version 3.1

- Within states still using Version 3.0, most homes are in AZ, NC, CO, ID & SC.
- In states >100 homes/year, at least **half** of the homes are already performing at or near Version 3.1:



# Energy Rating Index (ERI) Definition

- ERI is the generic term defined by the ANSI/RESNET/ICC 301 national standard.
- For ENERGY STAR's purpose, this is a 'stock' ERI (with only minor exceptions for time-limited special circumstances).
- Very different from a 'code' ERI, as IECC heavily modifies the calculation.
- Numerically very similar to a HERS score but note that "HERS" is a proprietary term exclusive to RESNET. (Cross-marketing is allowed)



## Pop quiz question #1:

- What happens to states currently using National Version 3.1 / 1.1?
  - A. Nothing. Transition only affects states using National v3.0 / v1.0.
  - B. States using National v3.1 / v1.1 are required to meet DOE ZERH.
  - C. Homes in states already using National v3.1 / v1.1 get a gold star.

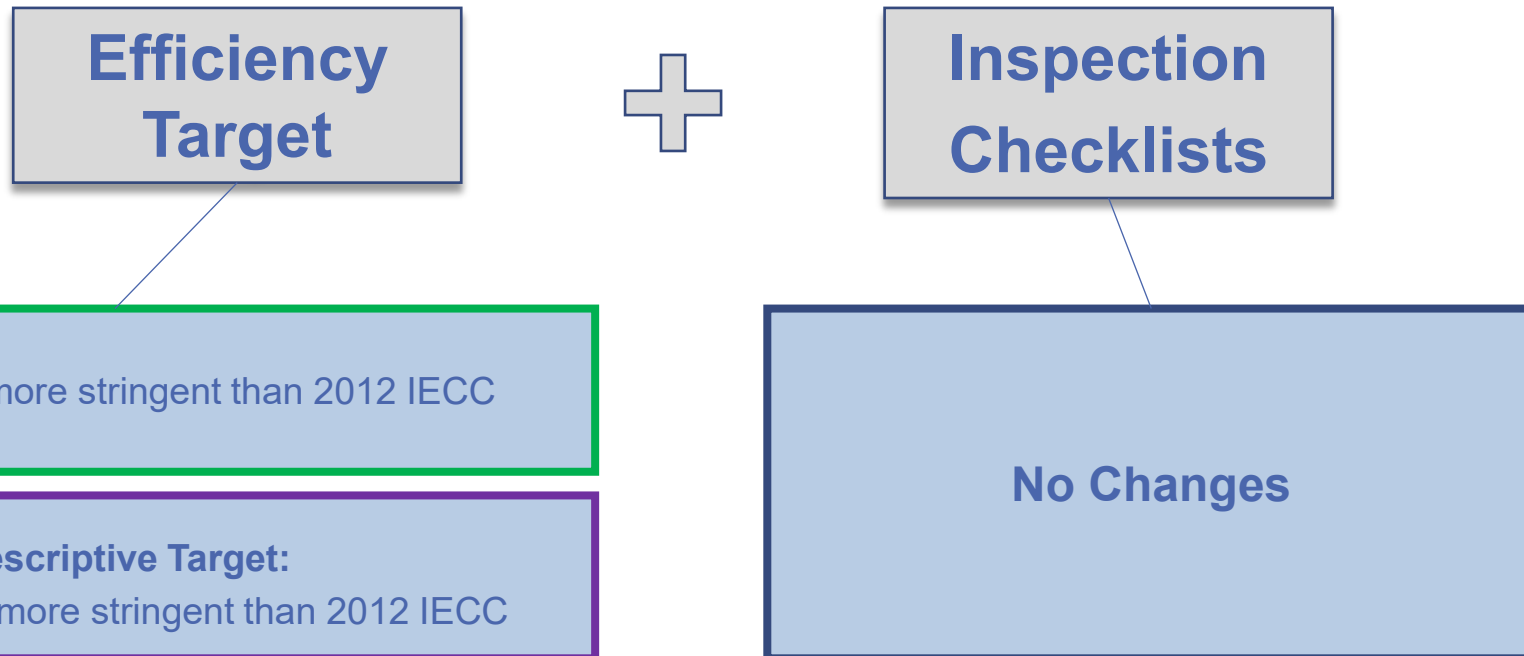


A photograph of a house with a metal roof and a window, partially obscured by a blue semi-transparent banner containing text. The banner is a solid blue color and covers the upper middle portion of the image. The house has a dark metal roof with some snow or ice patches. A window with a white frame and multiple panes is visible on the right side of the house. The sky is a clear, light blue.

# Key Differences Between ENERGY STAR Program Versions

# Key differences between Versions

- Two key components to program requirements:



# Key differences for MFNC ASHRAE Path

- The ASHRAE Performance Target is based on state commercial code adoption.
  - No changes for the 36 states that have already adopted ASHRAE 90.1-2010 or later.
- National minimum baseline is increased with this transition:  
15% savings over ASHRAE 90.1-2007 → 15% savings over ASHRAE 90.1-2010.
- The 14 impacted states include:  
Alaska, Arkansas, Arizona, Colorado, Indiana, Kansas, Louisiana, Mississippi, Missouri, North Dakota, Oklahoma, South Carolina, South Dakota, Wyoming
- No changes to inspection checklists.

# Key differences between Versions

- The more stringent efficiency target (SFNH v3.1 ERI in the range of ~55-65)
- Avg. HERS Index of all rated homes in 2020, not just ENERGY STAR, was 58.
- You can hit the more stringent target using 'off-the-shelf' technologies:
  - Lower infiltration rates; and,
  - Better windows & doors; and,
  - More efficient HVAC equipment; and,
  - Ducts in conditioned space; and,
  - More efficient lighting.
- No new mandatory requirements, use any combo of measures to hit target.



# Key differences between Versions

## Single-Family New Homes Version 3.1 ENERGY STAR Reference Design

Climate Description	Hot		Mixed & Cold				
Climate Zone	2	3	4	5	6	7	8
Air Conditioner (SEER)	15	15	13	13	13	13	13
Gas Furnace (AFUE)	80	80	95	95	95	95	95
Heat Pump (HSPF/SEER)	8.2/15	8.2/15	8.5/15	9.25/15	9.5/15	9.2/16	9.2/16
Duct Location	In Conditioned Space						
Radiant Barrier?	No						
Infiltration Rate (ACH50)	4	3	3	3	3	3	3
Insulation Levels	2012 IECC						
Windows (U-Value)	0.4	0.3	0.3	0.27	0.27	0.27	0.27
Windows (SHGC)	0.25	0.25	0.4	Any	Any	Any	Any
Door (R-value)	5.9	5.9	5.9	5.9	5.9	5.9	5.9
Water Heater (EF)	Gas: 0.61 EF for 40 gal; Elec: 0.93 for 40 gal.						
Thermostat Type	Programmable						
Refrigerator	ENERGY STAR Certified						
Dishwasher	ENERGY STAR Certified						
Lighting	90% ENERGY STAR Certified						

# Key differences between Versions

## Multifamily New Construction Version 1.1 ENERGY STAR Reference Design

Climate Description	Hot		Mixed & Cold				
Climate Zone	2	3	4	5	6	7	8
Air Conditioner (SEER)	15	15	13	13	13	13	13
Gas Furnace (AFUE)	80	80	95	95	95	95	95
Heat Pump (HSPF/SEER)	8.2/15	8.2/15	8.5/15	9.25/15	9.5/15	9.2/16	9.2/16
Duct Location	In Conditioned Space						
Radiant Barrier?	No						
Infiltration Rate ((cfm50/ft2))	0.3	0.3	0.3	0.3	0.3	0.3	0.3
Insulation Levels	2012 IECC- Commercial Chapter						
Windows (U-Value)	0.4	0.3	0.3	0.27	0.27	0.27	0.27
Windows (SHGC)	0.25	0.25	0.4	Any	Any	Any	Any
Door (R-value)	5.9	5.9	5.9	5.9	5.9	5.9	5.9
Water Heater (EF)	Gas: 0.67 EF for 40 gal; Elec: 0.95 for 40 gal.						
Thermostat Type	Programmable						
Refrigerator	ENERGY STAR Certified						
Dishwasher	ENERGY STAR Certified						
Lighting	90% ENERGY STAR Certified						
Plumbing Fixtures	WaterSense						

# Summary of key differences

- More stringent ENERGY STAR ERI target.
  - (or MFNC ASHRAE 90.1 target or Prescriptive requirements).
- No new mandatory measures required.
- No changes at all to the:
  - Rater Design Review Checklist
  - Rater Field Checklist
  - HVAC Commissioning Checklist (SFNH)
  - HVAC Functional Testing Checklist (MFNC)
  - Water Management System Requirements

## Pop quiz question #2:

- What's the key difference between Version 3.0 and Version 3.1?
  - A. You have to add an ERV or HRV to the home.
  - B. The number of checklists doubles.
  - C. The ENERGY STAR ERI target is about 10 points more stringent.





# How to Demonstrate Compliance with SFNH v3.1 & MFNC v1.1

# Demonstrating compliance with Version 3.1

- REM/Rate, EnergyGauge, and Ekotrope all have the ENERGY STAR SFNH Version 3.1 and MFNC Version 1.1 Reference Design programmed in.
- This means that you can run the ENERGY STAR Version 3.1/1.1 compliance report for any home in the country!
- And, because this is the only key difference with the higher Version, you can easily demonstrate compliance with SFNH v3.1 and MFNC v1.1.

# Demonstrating compliance with Version 3.1

## REM/Rate 16.3.1

Report Selection: ENERGY STAR V3.1 Reports

Group of Reports to Consider: Certification Programs

Building Selection: ENERGY STAR V3.1 Reports

Unselected Reports To Consider:

- DOE Zero Energy Ready Home Certificate (1)
- DOE Zero Energy Ready Home Verification S
- ENERGY STAR Inspection Checklist (1)
- ENERGY STAR V3 Home (1)
- ENERGY STAR V3 Summary (1)
- ENERGY STAR V3 Certificate (1)
- ENERGY STAR V3 Label (1)
- ENERGY STAR V3 Pacific Home (1)
- ENERGY STAR V3 Pacific Summary (1)
- ENERGY STAR V3 Pacific Certificate (1)
- ENERGY STAR V3 Pacific Label (1)
- ENERGY STAR V3.1 Summary (1)

Selected Reports:

- ENERGY STAR V3.1 Home (1)

Buttons: Add >>, Add All >>, << Remove

### ENERGY STAR v3.1 Home Report

Property: , 05401  
 Organization: Builder  
 HERS Rater ID:  
 Weather: Portland, ME  
 v3\_1 ES\_gas\_CZ6\_ME.blg

**Projected Rating: Based on Plans - Field Confirmation Required.**  
 Normalized, Modified End-Use Loads (MMBtu/yr)

	ENERGY STAR	As Designed	
Heating	22.0	22.2	
Cooling	3.2	3.3	
Water Heating	10.6	10.6	
Lights and Appliances	21.9	22.3	
<b>Total</b>	<b>57.8</b>	<b>58.3</b>	
ENERGY STAR HERS Index Target	<b>61</b>	61	HERS Index w/o PV
		61	HERS Index

HERS Index w/o PV <= ES HERS Index Target to comply.



# Demonstrating compliance with Version 3.1

## Ekotrope v4.0.1

Select report(s):

- HERS Certificate
- ENERGY STAR V3 Home Report
- ENERGY STAR V3.1 Home Report
- IECC 2015 ERI

### ENERGY STAR V3.1 Home Report

<b>Property</b> AK 64030 <hr/> v3.1 CZ6 ME	<b>Organization</b> U.S. EPA Dean Gamble	<b>Inspection Status</b> Results are projected
<b>Builder</b>		

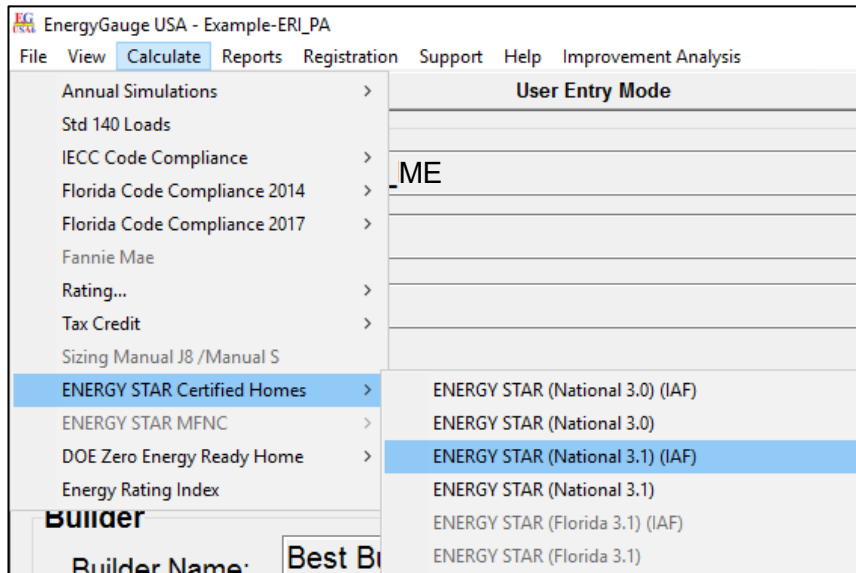
  

Mandatory Requirements	HERS Index Target
✓ Duct leakage at post construction better than or equal to ENERGY STAR v3/3.1 requirements.	Reference Home HERS 59
✓ Envelope insulation levels meet or exceed ENERGY STAR v3/3.1 requirements.	SAF (Size Adjustment Factor) <b>x</b> 1.00
✓ Slab on Grade Insulation must be > R-5, and at IECC 2009 Depth for Climate Zones 4 and above.	SAF Adjusted HERS Target <b>59</b>
✓ Envelope insulation achieves RESNET Grade I installation, or Grade II with insulated sheathing.	As Designed Home HERS 59
✓ Windows meet the 2009 IECC Requirements - Table 402.1.1.	As Designed Home HERS w/o PV 59
✓ Duct insulation meets the EPA minimum requirements of R-6.	
✓ Mechanical ventilation system is installed in the home.	
✓ ENERGY STAR Checklists fully verified and complete.	



# Demonstrating compliance with Version 3.1

## EnergyGauge v7.0.03



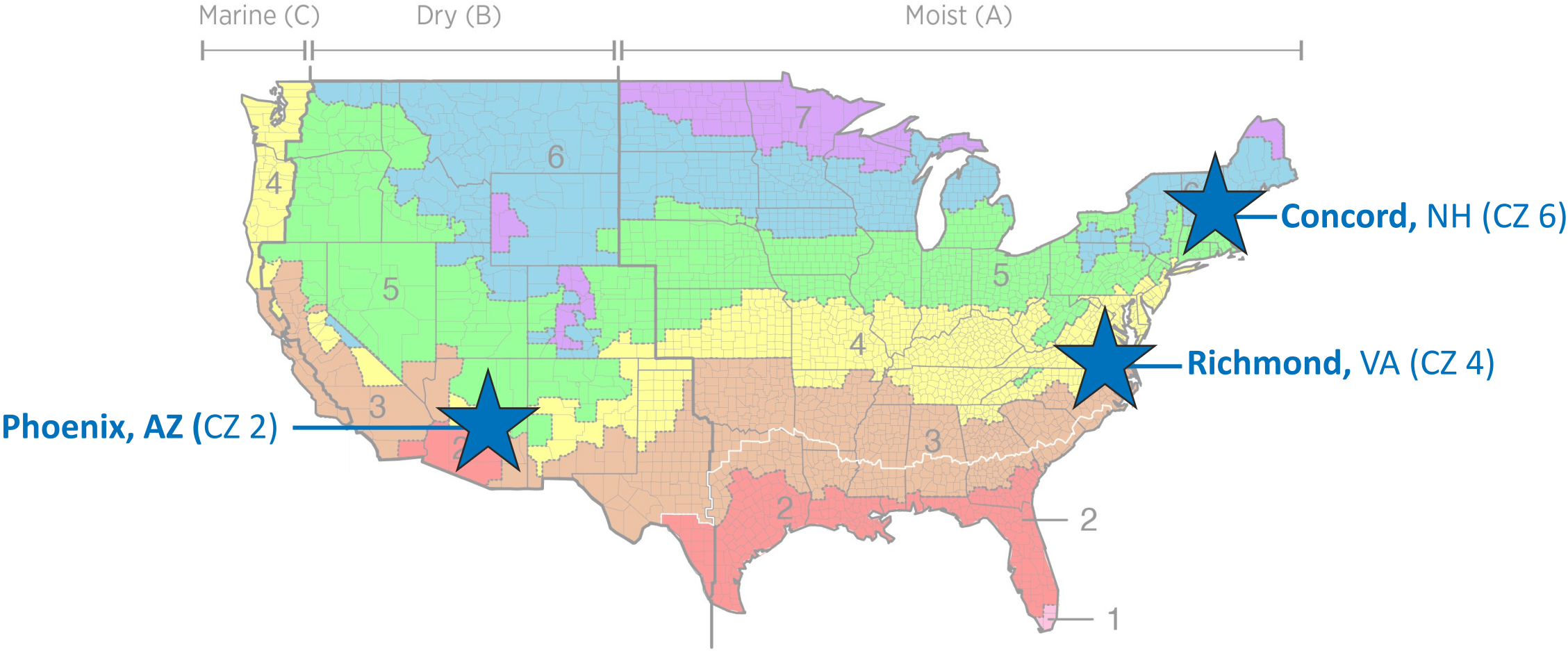
ENERGY STAR Summary (Version 3.1 IAF)		
State:	ME	PA
Building Type:	Single-family detached	
Conditioned Area Non-Basement (sq. ft.):	2400	
Bedrooms Non-Basement:	3	
Conditioned Area Benchmark	0	
Size Adjustment Factor:	1.00	
ENERGY STAR Reference Design Home HERS Index	62	
ENERGY STAR HERS Index Target :	62	
HERS Index (without PV) :	62	
HERS Index (with PV) :	N/A	
<b>ENERGY STAR HERS Index Status V 3.1 *</b>	<b>PASS</b>	
<b>IECC Prescriptive Envelope Requirements:</b>	<b>PASS</b>	



# **SFNH Version 3.1 Example Homes**



# Version 3.1 Example Homes



## Version 3.1 Example – Typical Home in Phoenix, AZ

- Main architectural features:

Feature	Description
Foundation Type	Slab
Number of Stories	2
House size	2,400 sq. ft. CFA
WFA	15%
HVAC System	Gas Furnace with Central AC

## Version 3.1 Example – Phoenix, AZ (CZ 2)

- ENERGY STAR v3 Target: 71; ENERGY STAR v3.1 Target: 58
- 13 points needed

Measure	v3 Efficiency Measures	v3.1 Efficiency Measures	Alternative Path
Walls (R-value)	R-13	R-13 -	R-15 -
Ceiling (R-value)	R-30	R-38 1	R-38 1
Windows (U / SHGC)	0.60 / 0.27	0.27 / 0.25 4	0.27 / 0.22 5
Infiltration (ACH50)	6	4 1	3 2
Duct Location	Uncond. Space	Cond. Space 5	Uncond. Space 0
DHW (gas, EF)	0.61	0.61 -	0.90 2
Central AC (SEER)	14.5	15 1	16 2
Furnace (AFUE)	80	80 -	80 -
Lighting (% CFL)	80%	90% 1	90% 1
		Total 13	Total 13



# Version 3.1 Example – Typical Home in Richmond, VA

- Main architectural features:

Feature	Description
Foundation Type	Unconditioned Basement
Number of Stories	2
House size	2,400 sq. ft. CFA
WFA	15%
HVAC System	Electric Heat Pump

## Version 3.1 Example – Richmond, VA (CZ 4)

- ENERGY STAR v3 Target: **75**; ENERGY STAR v3.1 Target: **60**
- **15** points needed

Measure	v3 Efficiency Measures	v3.1 Efficiency Measures	Alternative Path
Walls (R-value)	R-13	R-20 <b>4</b>	R-20 <b>4</b>
Floor Insulation	R-19	R-19 <b>-</b>	R-30 <b>1</b>
Ceiling (R-value)	R-38	R-49 <b>~1</b>	R-49 <b>~1</b>
Windows (U / SHGC)	0.32 / 0.40	0.30 / 0.40 <b>0</b>	0.27 / 0.22 <b>1</b>
Infiltration (ACH50)	5	3 <b>2</b>	3 <b>2</b>
Duct Location	Uncond. Space	Cond. Space <b>6</b>	Uncond. Space <b>0</b>
DHW (elec, EF)	0.93	0.93 <b>-</b>	0.95 <b>1</b>
Heat Pump (SEER / HSPF)	13 / 8.2	13 / 8.5 <b>1</b>	16 / 9.2 <b>4</b>
Lighting (% CFL)	80%	90% <b>~1</b>	90% <b>~1</b>
		Total <b>15</b>	Total <b>15</b>

# Version 3.1 Example – Typical Home in Concord, NH

- Main architectural features:

Feature	Description
Foundation Type	Unconditioned Basement
Number of Stories	2
House size	2,400 sq. ft. CFA
WFA	15%
HVAC System	Gas Furnace with Central AC

## Version 3.1 Example – Concord, NH (CZ 6)

- ENERGY STAR v3 Target: 68; ENERGY STAR v3.1 Target: 56
- 12 points needed

Measure	v3 Efficiency Measures	v3.1 Efficiency Measures	Alternative Path
Walls (R-value)	R-20	R-20 + 5ci <b>1</b>	R-21 <b>0</b>
Floor Insulation	R-30	R-30 -	R-38 <b>1</b>
Windows (U / SHGC))	0.30 / 0.40	0.27 / 0.40 <b>1</b>	0.27 / 0.40 <b>1</b>
Infiltration (ACH50)	4	3 <b>2</b>	3 <b>2</b>
Duct Location	Uncond. Space	Cond. Space <b>5</b>	Uncond. Space <b>0</b>
DHW (gas, EF)	0.61	0.61 -	0.90 <b>5</b>
Central AC (SEER)	13	13 -	13 -
Furnace (AFUE)	90	95 <b>2</b>	95 <b>2</b>
Lighting (% CFL)	80%	90% <b>~1</b>	90% <b>~1</b>
		Total <b>12</b>	Total <b>12</b>

## Version 3.1 Examples – Summary

- None of the upgrade options are mandatory. The only requirement is to hit the v3.1 ERI target.
- Most partners have pursued high-efficiency water heaters, high-efficiency HVAC systems, or ducts in conditioned space to get the bulk of their points.

## Pop quiz question #3:

- Are ducts in conditioned space mandatory for SFNH Version 3.1 and MFNC Version 1.1?
  - Yes
  - No
  - Who knows?



# Summary

- Inspection checklists do not change, but performance target is ~10 ERI points more stringent; 55-65 for most homes.
- It is not mandatory for ducts to be in conditioned space.
- All states still using SFNH Version 3.0 will transition to **Version 3.1**, with a transition date of **January 1, 2023** (based on permit date).
- For MFNC, all states still using Version 1.0 will transition to **Version 1.1**, with a transition date of **January 1, 2024** (based on permit date).

# ENERGY STAR Single-Family New Homes

## Web:

Home: [www.energystar.gov/newhomespartners](http://www.energystar.gov/newhomespartners)

Technical: [www.energystar.gov/newhomesrequirements](http://www.energystar.gov/newhomesrequirements)

MESA: [www.energystar.gov/mesa](http://www.energystar.gov/mesa)

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