Driving Performance & Cost Effectiveness in New Homes Programs

Participation Tiers and Performance Based Incentives

Ben Adams

benadams@magrann.com

ENERGY STAR Homes Sponsor Meeting 2013

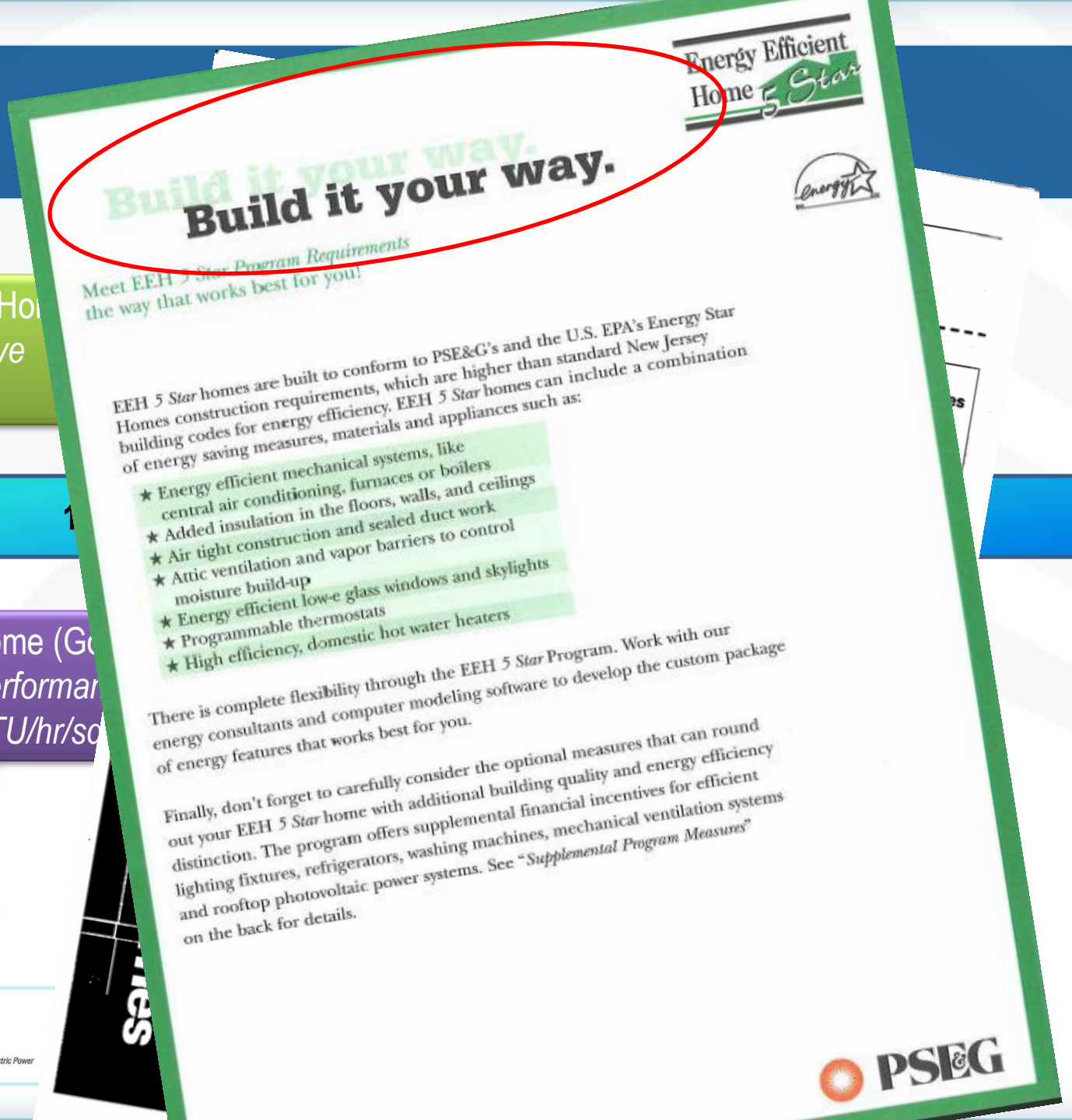
Columbia Gas of Ohio — A NiSource Company | AEP OHIO — A unit of American Electric Power | ENERGY STAR® NEW HOMES

MaGrann

Energy Thrift Ho
Prescriptive
20%

1988 1

BEST Home (G
Performan
BTU/hr/sq



Energy Efficient Home 5 Star

Build it your way.

Meet EEH 5 Star Program Requirements the way that works best for you!

EEH 5 *Star* homes are built to conform to PSE&G's and the U.S. EPA's Energy Star Homes construction requirements, which are higher than standard New Jersey building codes for energy efficiency. EEH 5 *Star* homes can include a combination of energy saving measures, materials and appliances such as:

★ Energy efficient mechanical systems, like central air conditioning, furnaces or boilers
★ Added insulation in the floors, walls, and ceilings
★ Air tight construction and sealed duct work
★ Attic ventilation and vapor barriers to control moisture build-up
★ Energy efficient low-e glass windows and skylights
★ Programmable thermostats
★ High efficiency, domestic hot water heaters

There is complete flexibility through the EEH 5 *Star* Program. Work with our energy consultants and computer modeling software to develop the custom package of energy features that works best for you.

Finally, don't forget to carefully consider the optional measures that can round out your EEH 5 *Star* home with additional building quality and energy efficiency distinction. The program offers supplemental financial incentives for efficient lighting fixtures, refrigerators, washing machines, mechanical ventilation systems and rooftop photovoltaic power systems. See "*Supplemental Program Measures*" on the back for details.

PSE&G

Columbia Gas of Ohio — A NiSource Company
AEP OHIO — A unit of American Electric Power

MaGrann

“Should” Doesn’t Always Work

Columbia Gas of Ohio
A NiSource Company

AEP OHIO
A unit of American Electric Power

MaGrann

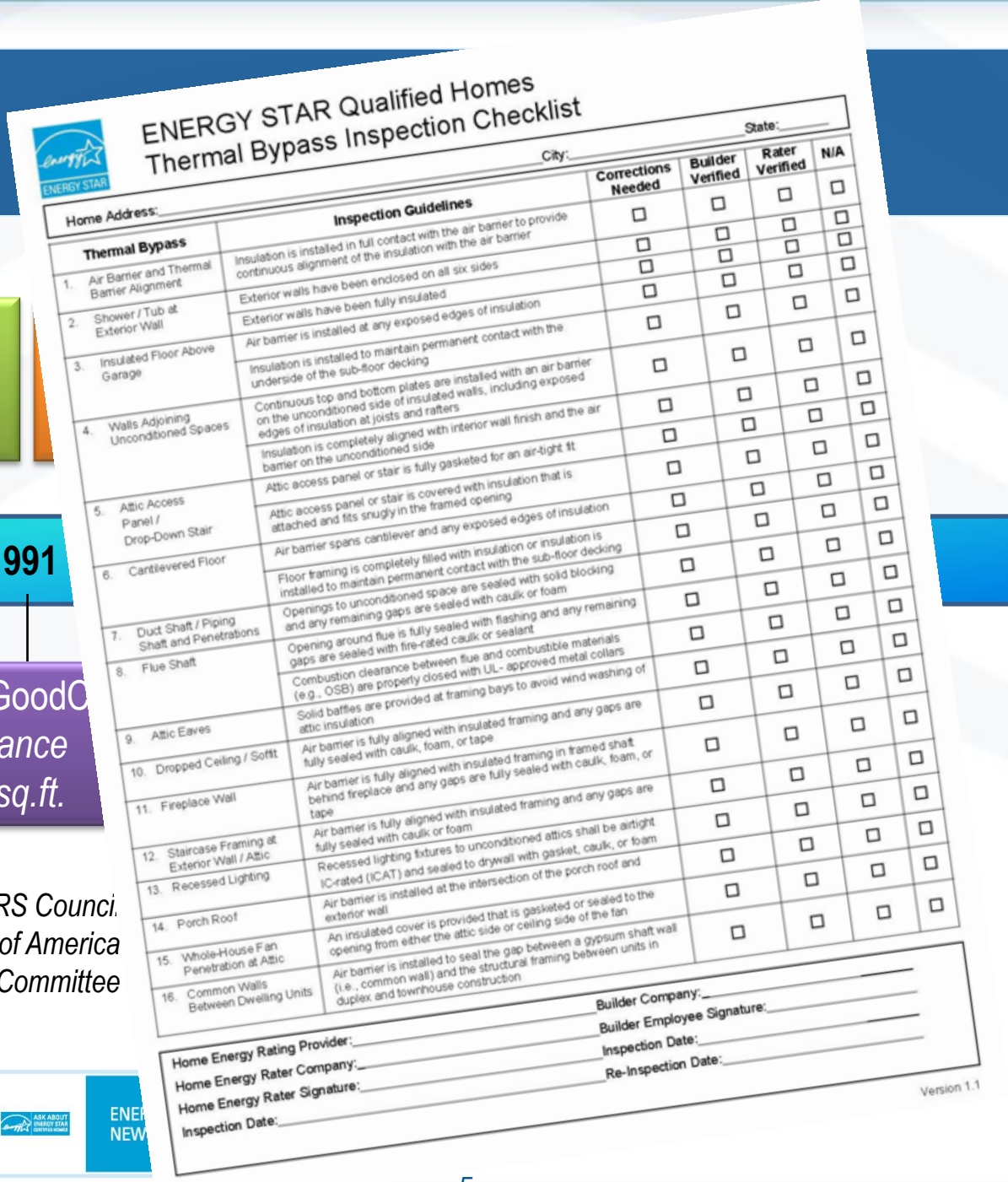
Prescriptive Building Practices

Energy Thrift Home
Prescriptive
20%

1988 **1991**

BEST Home (GoodC
Performance
BTU/hr/sq.ft.

HERS Counci
Energy Rated Homes of America
RESNET Steering Committee



ENERGY STAR Qualified Homes
Thermal Bypass Inspection Checklist

Home Address: City: State:

Thermal Bypass	Inspection Guidelines	Corrections Needed	Builder Verified	Rater Verified	N/A
1. Air Barrier and Thermal Barrier Alignment	Insulation is installed in full contact with the air barrier to provide continuous alignment of the insulation with the air barrier	☐	☐	☐	☐
2. Shower / Tub at Exterior Wall	Exterior walls have been enclosed on all six sides	☐	☐	☐	☐
3. Insulated Floor Above Garage	Exterior walls have been fully insulated	☐	☐	☐	☐
	Air barrier is installed at any exposed edges of insulation	☐	☐	☐	☐
	Insulation is installed to maintain permanent contact with the underside of the sub-floor decking	☐	☐	☐	☐
4. Walls Adjoining Unconditioned Spaces	Continuous top and bottom plates are installed with an air barrier on the unconditioned side of insulated walls, including exposed edges of insulation at joists and rafters	☐	☐	☐	☐
	Insulation is completely aligned with interior wall finish and the air barrier on the unconditioned side	☐	☐	☐	☐
5. Attic Access Panel / Drop-Down Stair	Attic access panel or stair is fully gasketed for an air-tight fit	☐	☐	☐	☐
	Attic access panel or stair is covered with insulation that is attached and fits snugly in the framed opening	☐	☐	☐	☐
6. Cantilevered Floor	Air barrier spans cantilever and any exposed edges of insulation	☐	☐	☐	☐
	Floor framing is completely filled with insulation or insulation is installed to maintain permanent contact with the sub-floor decking	☐	☐	☐	☐
7. Duct Shaft / Piping Shaft and Penetrations	Openings to unconditioned space are sealed with solid blocking and any remaining gaps are sealed with caulk or foam	☐	☐	☐	☐
8. Flue Shaft	Opening around flue is fully sealed with flashing and any remaining gaps are sealed with fire-rated caulk or sealant	☐	☐	☐	☐
	Combustion clearance between flue and combustible materials (e.g., OSB) are properly closed with UL- approved metal collars	☐	☐	☐	☐
9. Attic Eaves	Solid baffles are provided at framing bays to avoid wind washing of attic insulation	☐	☐	☐	☐
10. Dropped Ceiling / Soffit	Air barrier is fully aligned with insulated framing and any gaps are fully sealed with caulk, foam, or tape	☐	☐	☐	☐
11. Fireplace Wall	Air barrier is fully aligned with insulated framing in framed shaft behind fireplace and any gaps are fully sealed with caulk, foam, or tape	☐	☐	☐	☐
12. Staircase Framing at Exterior Wall / Attic	Air barrier is fully aligned with insulated framing and any gaps are fully sealed with caulk or foam	☐	☐	☐	☐
13. Recessed Lighting	Recessed lighting fixtures to unconditioned attics shall be airtight IC-rated (ICAT) and sealed to drywall with gasket, caulk, or foam	☐	☐	☐	☐
14. Porch Roof	Air barrier is installed at the intersection of the porch roof and exterior wall	☐	☐	☐	☐
15. Whole-House Fan Penetration at Attic	An insulated cover is provided that is gasketed or sealed to the opening from either the attic side or ceiling side of the fan	☐	☐	☐	☐
16. Common Walls Between Dwelling Units	Air barrier is installed to seal the gap between a gypsum shaft wall (i.e., common wall) and the structural framing between units in duplex and townhouse construction	☐	☐	☐	☐

Home Energy Rating Provider:
Home Energy Rater Company:
Home Energy Rater Signature:
Inspection Date:
Builder Company:
Builder Employee Signature:
Inspection Date:
Re-Inspection Date:

Version 1.1

Some “Shoulds” now “Must Do”

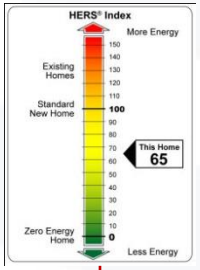
Some "Shoulds" now "Must Do"


Energy Thrift
Prescriptive
20%
1988
BE
Energy Rate
RESNET Ste
ENERGY STAR Qualified Homes, Version 3 (Rev. 06)
Water Management System Builder Checklist
Columbia Gas of Ohio
A NiSource Company
AEP OHIO
A unit of American Electric Power
MaGrann
www.MaGrann.com

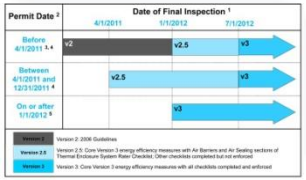
A Brief History

Energy Thrift Home
Prescriptive
20%

Energy Efficient Home
Combination
Tiers (EEH/EEH+)



v2.5/3.0



1988 1991 1994 1997 2001 2006 2011-12

BEST Home (GoodCents)
Performance
BTU/hr/sq.ft.

EEH 5-Star
ENERGY STAR Homes
Performance Threshold

v2.0

HERS Council
Energy Rated Homes of America
RESNET Steering Committee

1995 v1

2002

MaGrann

Preparing for Version 3

Challenges

- Lingering IECC 2006 baseline
- Cold climates (CZ>4)
- HVAC certification and checklists
- "Non-energy" requirements and checklists
- Incremental cost vs. value (selling the benefits)
- Incremental cost vs. incremental savings
- EPA schedule and projected dropout
- "Fear factor"

Structures in 2011

New Jersey

Tier 1*
Energy Star v2.0
Flat rate $ by building type

Tier 2 *
Tier 1 + HERS 65
Flat rate $ by building type

Kentucky

Tier 1*
Energy Star v2.0
Flat rate $ by house size and building type

Tier 2 *
Version 2.5
Flat rate $ by building type

Ohio

Tier 1*
Energy Star v2.0
Flat rate $ by building type

Tier 2*
Tier 1 + HERS 65
or Version 2.5
Flat rate $ by building type

* Plus Additional Prescriptive Requirements

Tiers + HERS Index

New Jersey

Incentives by Tier, Code & Index		
	vs. IECC 2006	
HERS	Tier 1 NJ *ENERGY*Efficient Home	Tier 2 ENERGY STAR Home
85	$1,500	$2,500
80	$1,750	$2,750
75	$2,000	$2,000

Ohio

HERS	Tier 1 ("Energy Path") v2.0/2.5	Tier 2 (ENERGY STAR) v3.0
85		
80	$350	$850
75	$500	$1,000
70	$750	$1,250
65	$1,500	$2,000
60	$1,750	$2,250
55	$2,250	$2,750
≤50	$3,000	$3,500

Kentucky

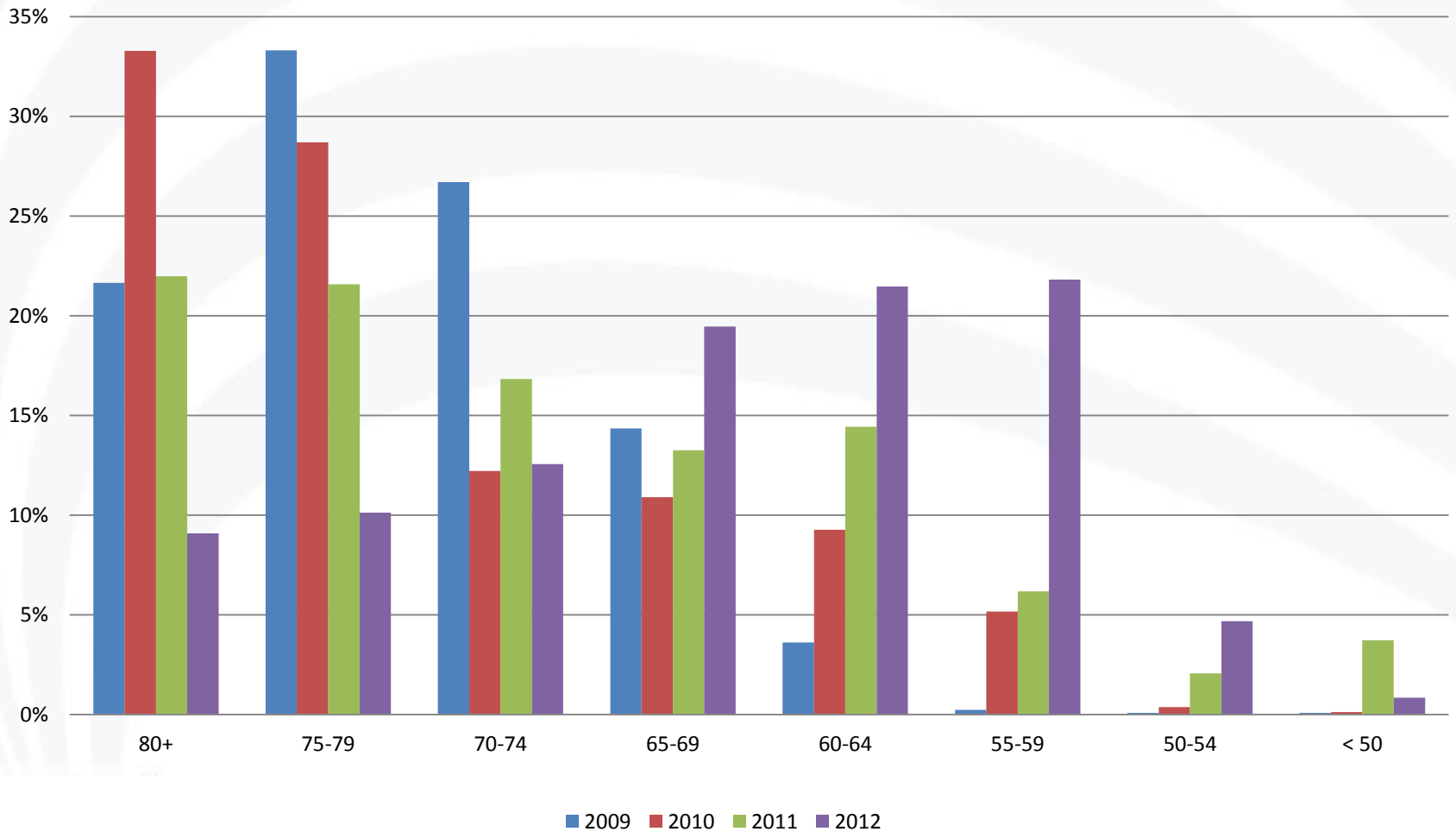
Energy Saving Home			
85-81	$440	ENERGY STAR Version 2.5/3 Qualified Home	$1200
80-71	$500		
70-61	$640		
60-51	$900		
50-0	$1200		

Multi Single x 75%
Multifamily x 50%
Tier 1 programs require min. ES 2.0 w/TBC

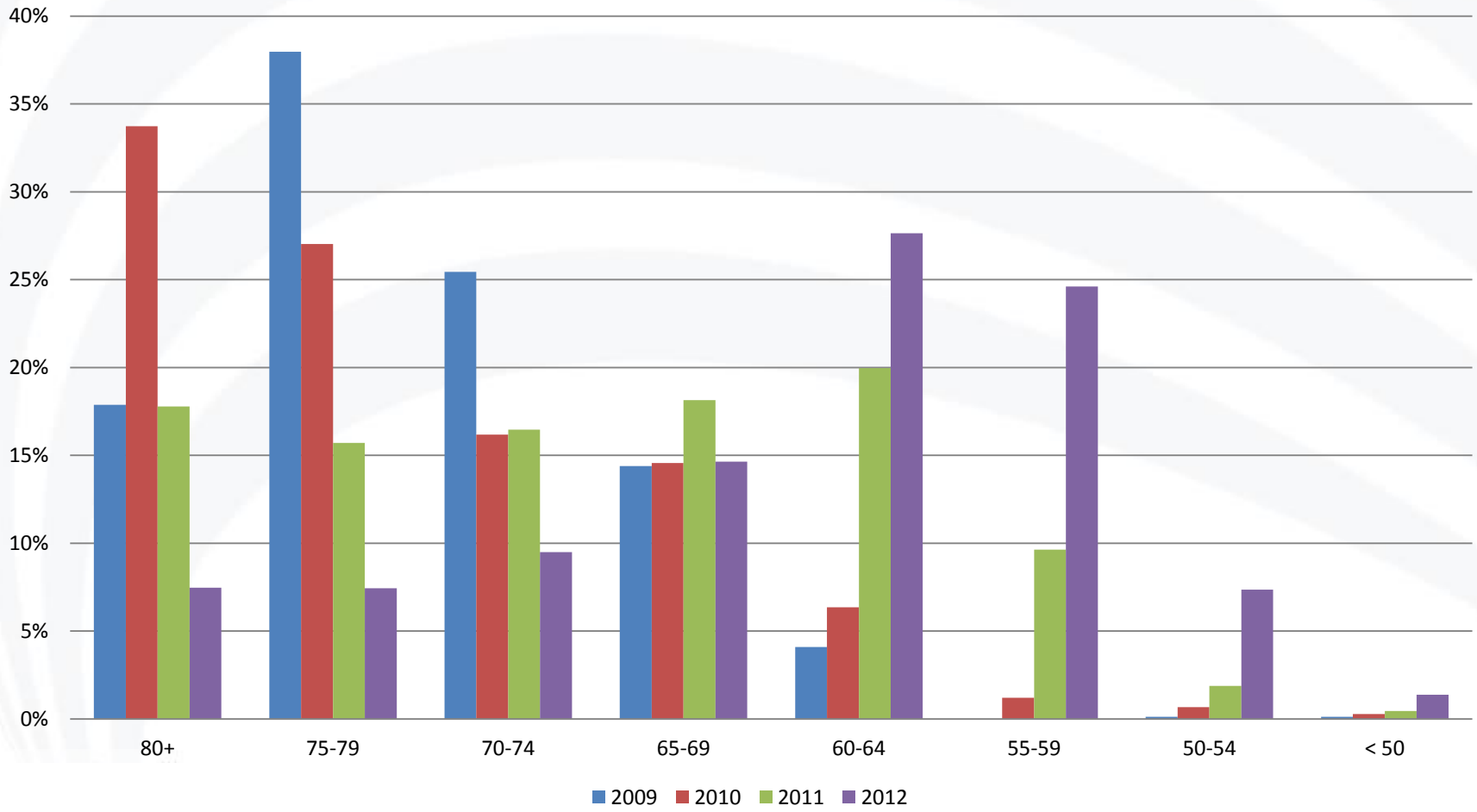
Columbia Gas of Ohio — A NiSource Company | AEP OHIO — A unit of American Electric Power | ENERGY STAR® NEW HOMES

MaGrann

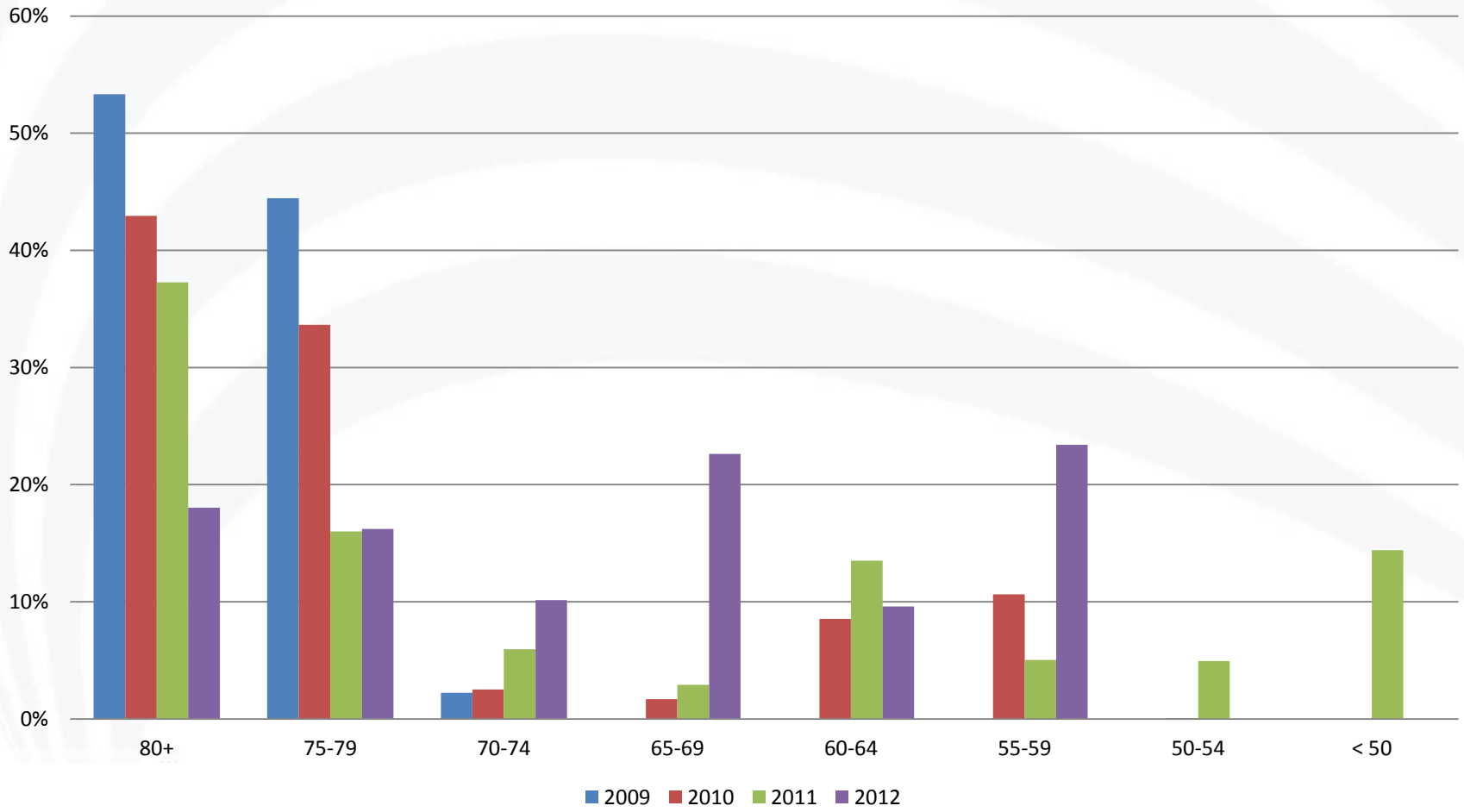
HERS Distribution by Year



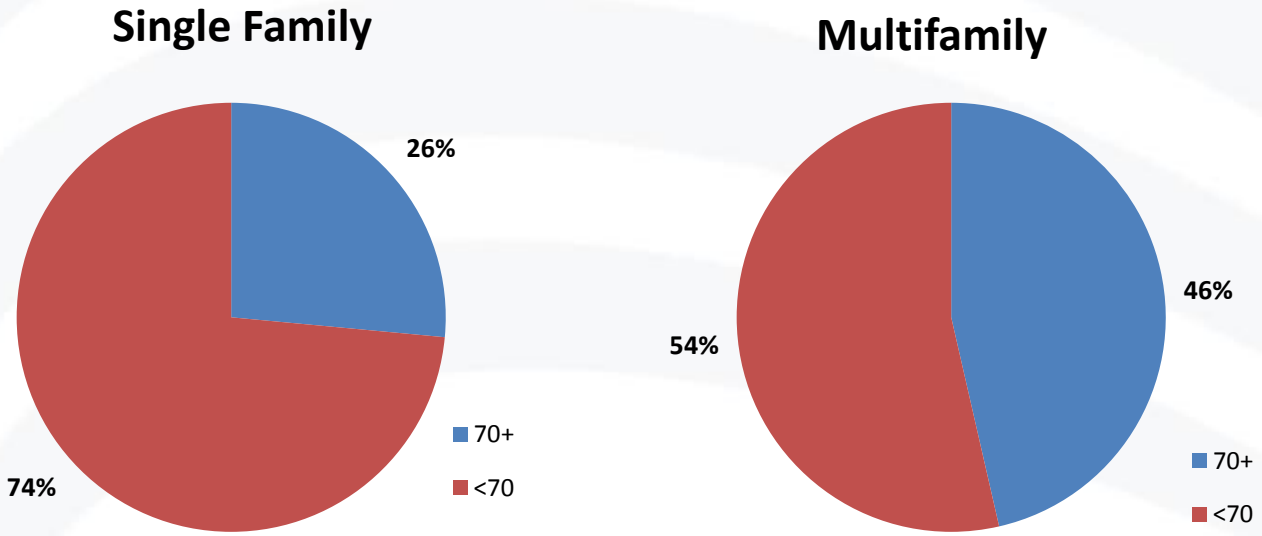
Single Family



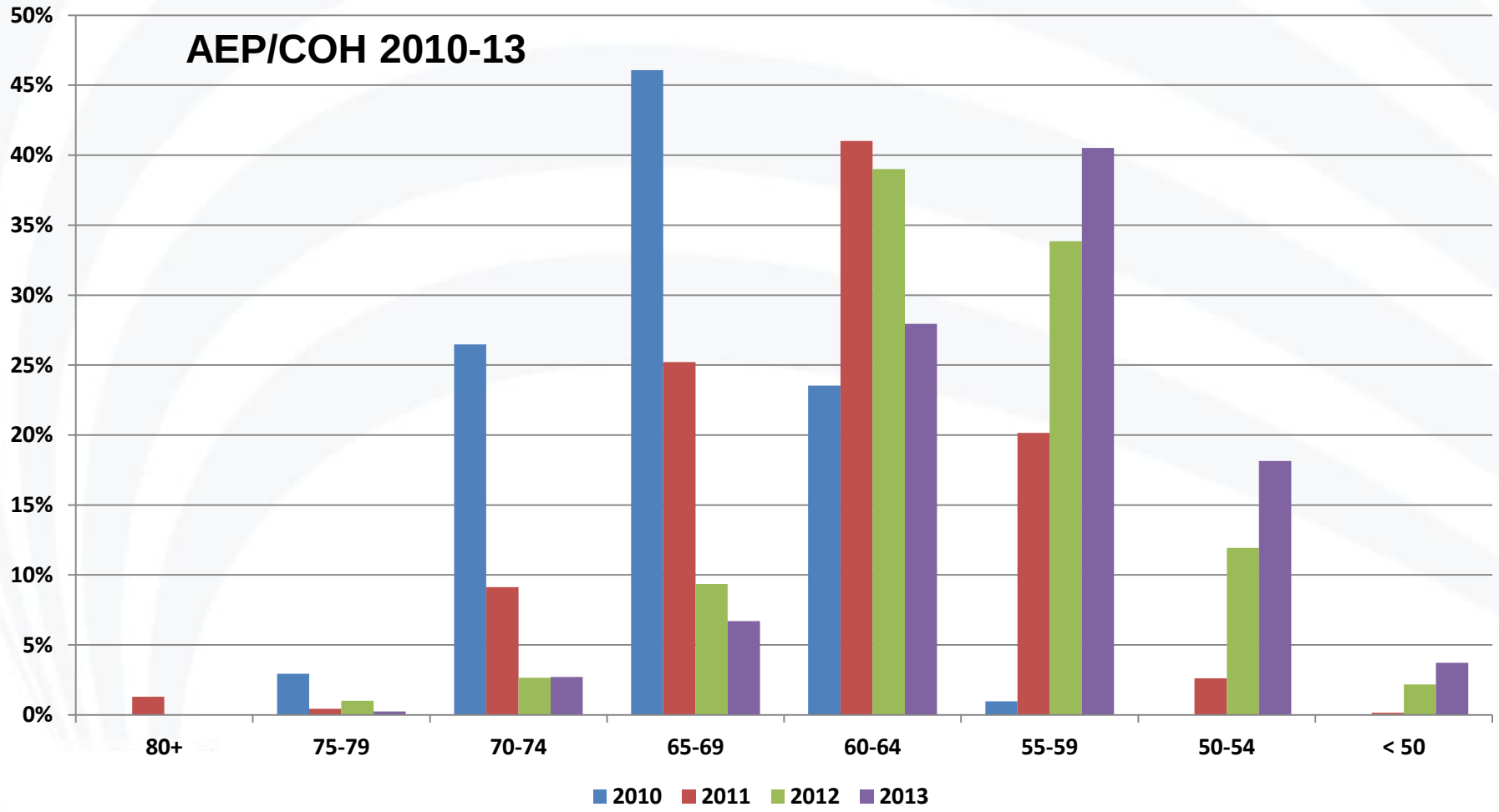
Multifamily



HERS by Building Type 2012



How is This Being Achieved?



Columbia Gas of Ohio
A NiSource Company
AEP OHIO
A unit of American Electric Power
ENERGY STAR® NEW HOMES

Getting to Better HERS Scores

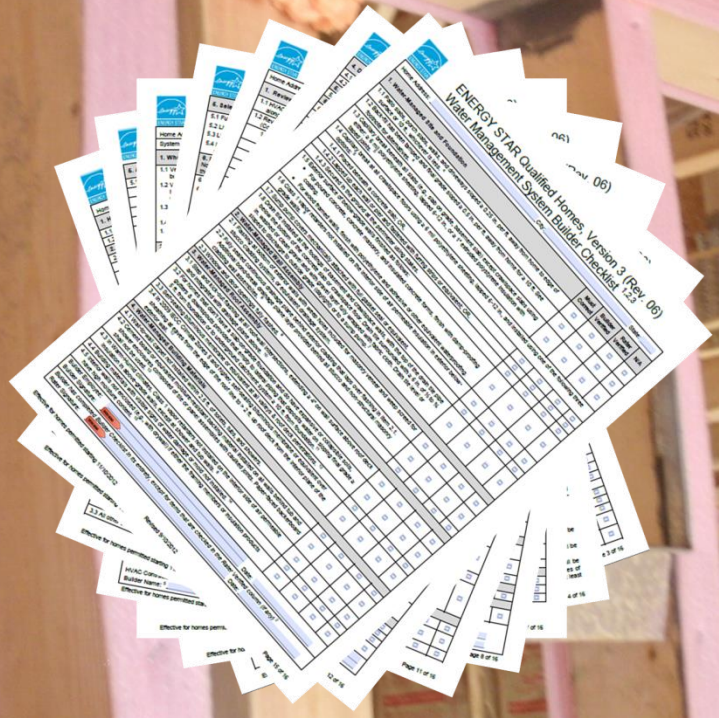
- Program additional prescriptive specifications
  - HVAC
  - Lighting & appliances
- "Voluntary" specificat
  - HVAC
  - Lighting & applianc
  - Window efficiency
  - Insulation…

Getting to Better HERS Scores

Advanced Framing

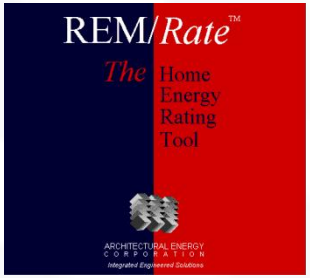
Columbia Gas of Ohio — A NiSource Company
AEP OHIO — A unit of American Electric Power
ENERGY STAR® NEW HOMES

Duct Leakage

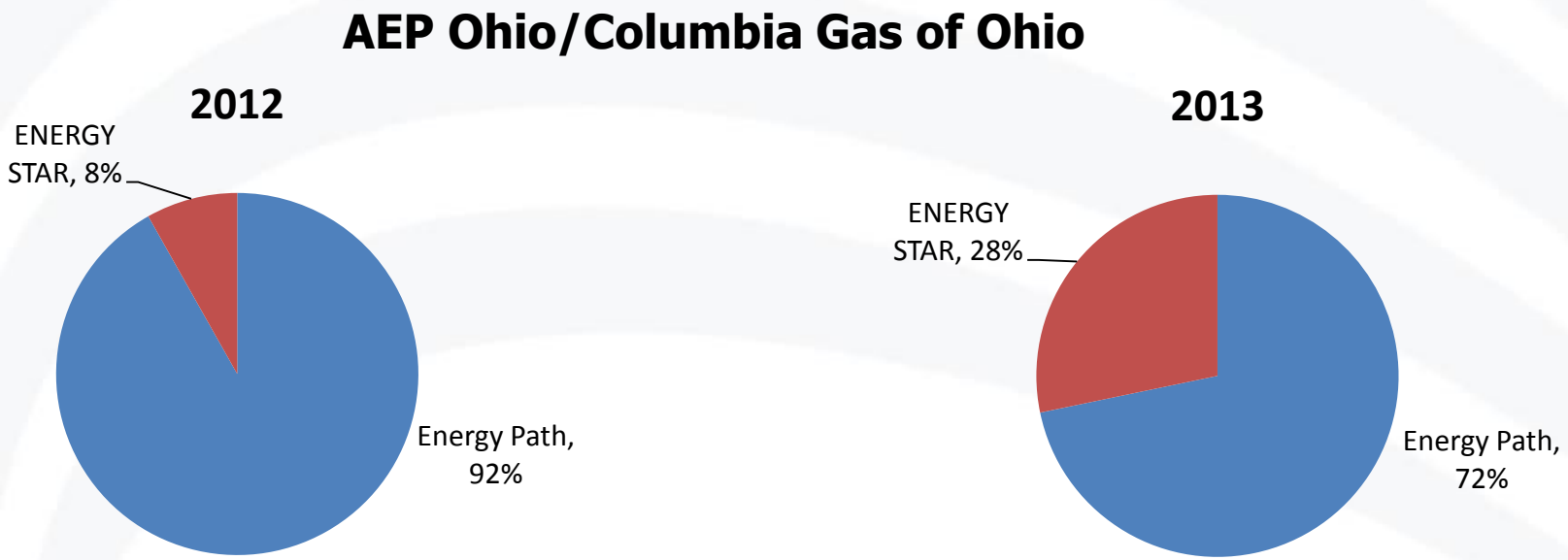


Getting to Better HERS Scores

- Rating to a scale not a threshold
  - Builder engagement (early and often)
  - Count everything

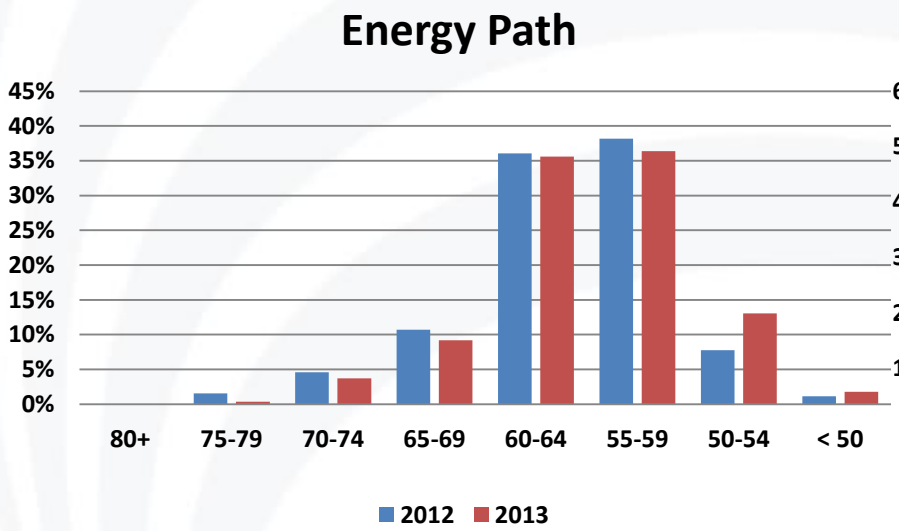


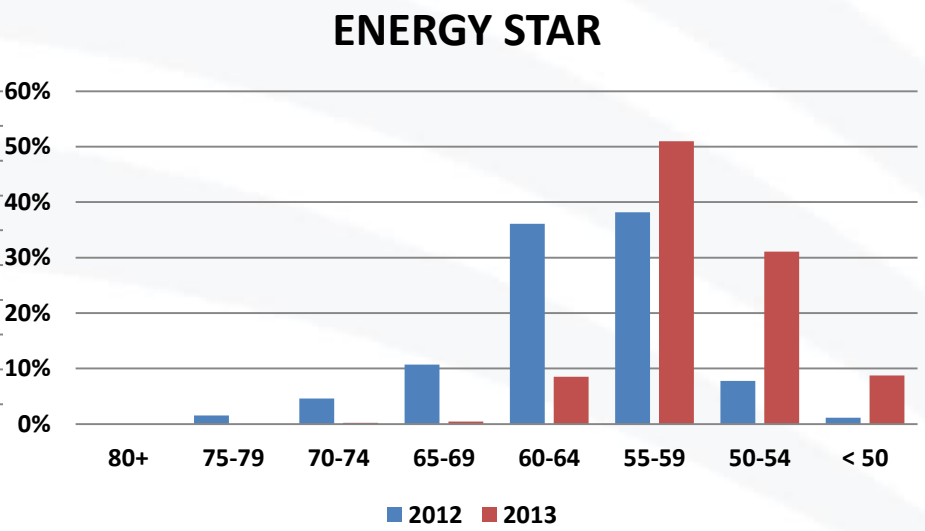
Growth in ENERGY STAR Participation



Change in HERS Scores by Tier

AEP Ohio/Columbia Gas of Ohio

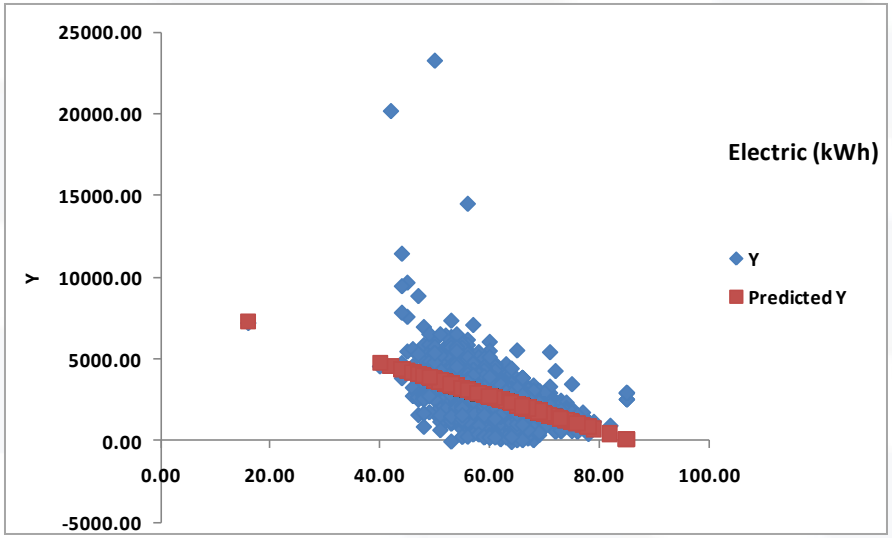




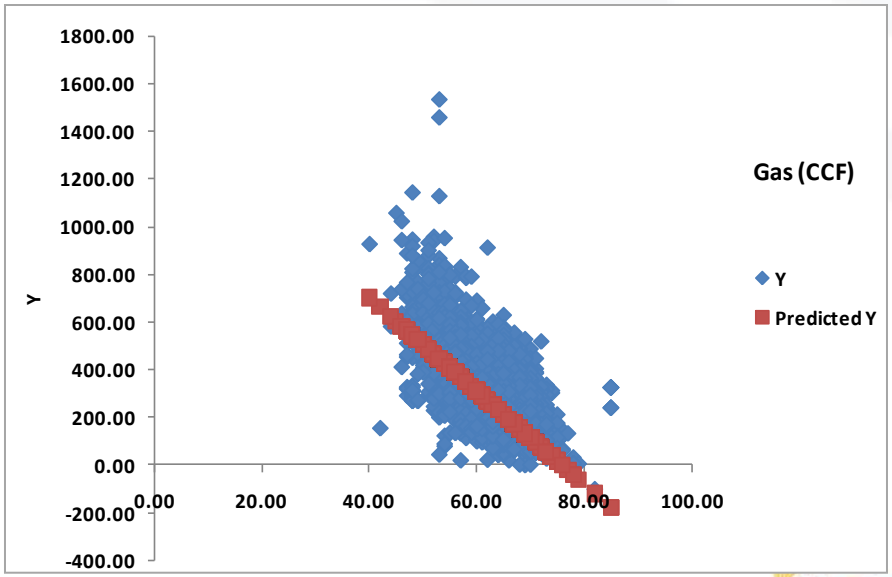
Shift in HERS Index greatest at the ENERGY STAR tier
Average score 5.4% lower than Energy Path in 2012; 7.8% in 2013

Correlation With Savings

- kWh: 30% correlation with HERS score
  - 4162 units



- CCF: 42% correlation with HERS score
  - 4144 units

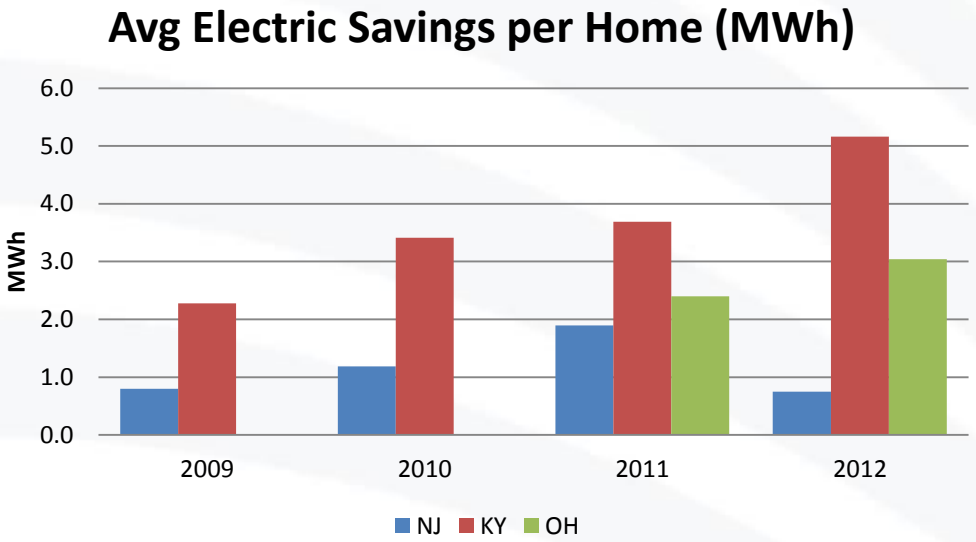


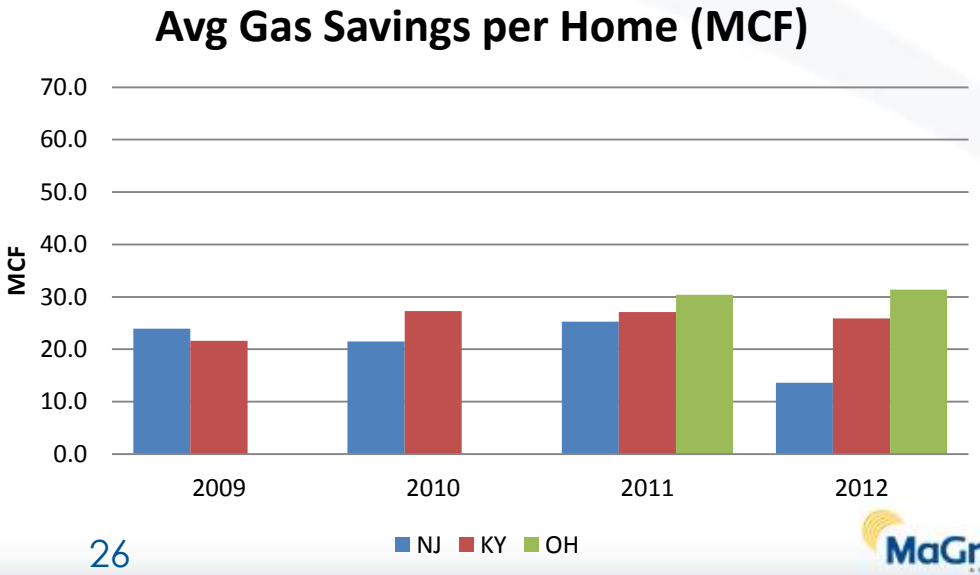
Columbia Gas of Ohio — A NiSource Company
AEP OHIO — A unit of American Electric Power
ENERGY STAR® NEW HOMES

Savings

HERS score may be an effective proxy but savings are a function of many factors:

- Climate zone
- Building type mix
- Fuel mix
- Prescriptive requirements
- Whole house vs code
- State TRM
- Code…

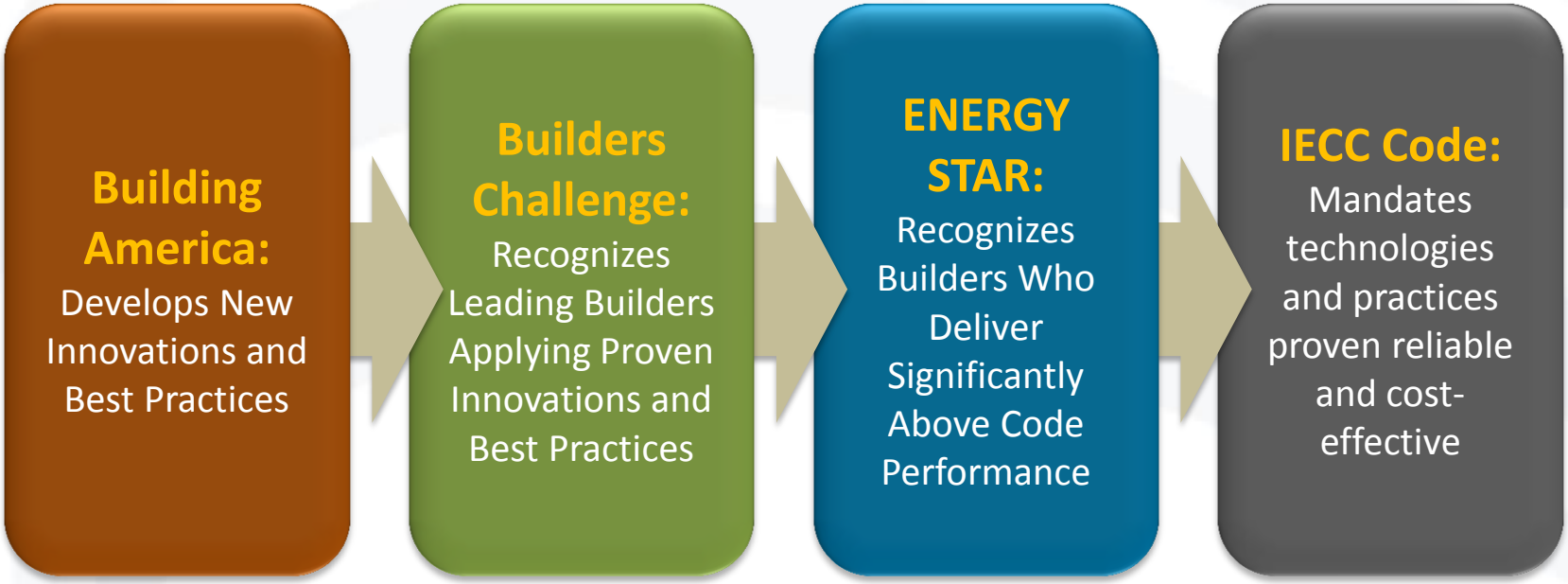




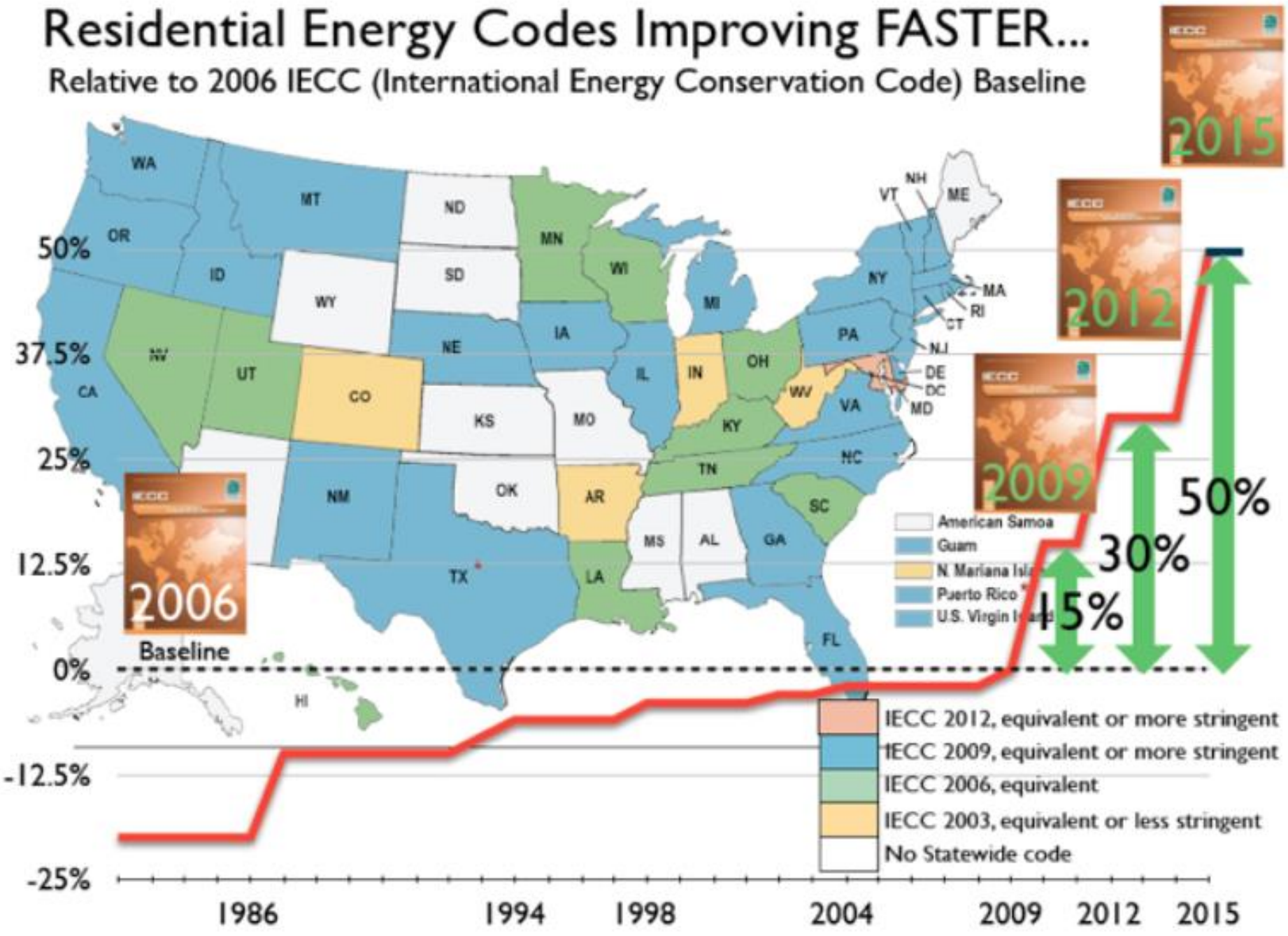
Columbia Gas of Ohio — A NiSource Company
AEP OHIO — A unit of American Electric Power
ENERGY STAR® NEW HOMES

MaGrann

The Problem with Success



EPA ENERGY STAR



Interpreted from: www.energycodes.gov; Jan. 2012, J.Brew, RMI

Responding to the Challenge

Program Design:

- Programs linked to HERS score can be adjusted for changes in codes and standards…
- And overlaid on other programs (ENERGY STAR, etc.)…
- To maintain the required savings differential and continue to drive performance
- But what is the true differential in costs and savings…?

Max HERS	IECC 2006	IECC 2009	IECC 2012
80	$		
75	$		
70	$	$	
65	$	$	
60	$	$	$
55	$	$	$
50	$	$	$

Adoption, Enforcement & Compliance

- Adoption can vary significantly:
  - IECC 2009: Tested leakage must be <7 ACH50
  - But states can modify
    - Defer (NJ ~ 3 years)
    - Alternative paths (Ohio <6 ACH50 tradeoff for 2x6 framing)
    - Jurisdictional variation
- What are the standards for verification…?
  - Who (builder, contractor, rater, code official)?
  - Credentials? Training? QA?
- Builder compliance
  - Performance vs. specification
  - Inertia vs. verification

Opportunity

- AEP Ohio and Columbia Gas of Ohio are embarking on a code support pilot to:
  - Quantify baseline compliance
  - Engage code officials as "ambassadors"
  - Provide training for builders and trade allies
  - Provide "hotline" and field technical support

Conclusions

- ENERGY STAR v3 provides…
  - A strong technical foundation for upcoming codes
  - Value differentiation as codes catch up
  - Peace of mind for both builders and consumers

- Utility programs can produce real savings while preparing the market for new codes and standards
  - Tiered ENERGY STAR and HERS based programs can keep builders in the game while emphasizing performance
  - As new codes become effective, lower tiers can fall away

Conclusions

- Together, ENERGY STAR and Utility Programs have been driving the market for the last 2 decades
- And deserve credit for improving performance in **all** homes as codes and standards catch up
- Utilities have an important role to play in supporting code transitions

Discussion