



Consortium for Energy Efficiency

Residential New Construction Initiative

Alice Rosenberg and David Goldstein
February 28, 2018
Orlando, FL
RESNET Conference

Agenda

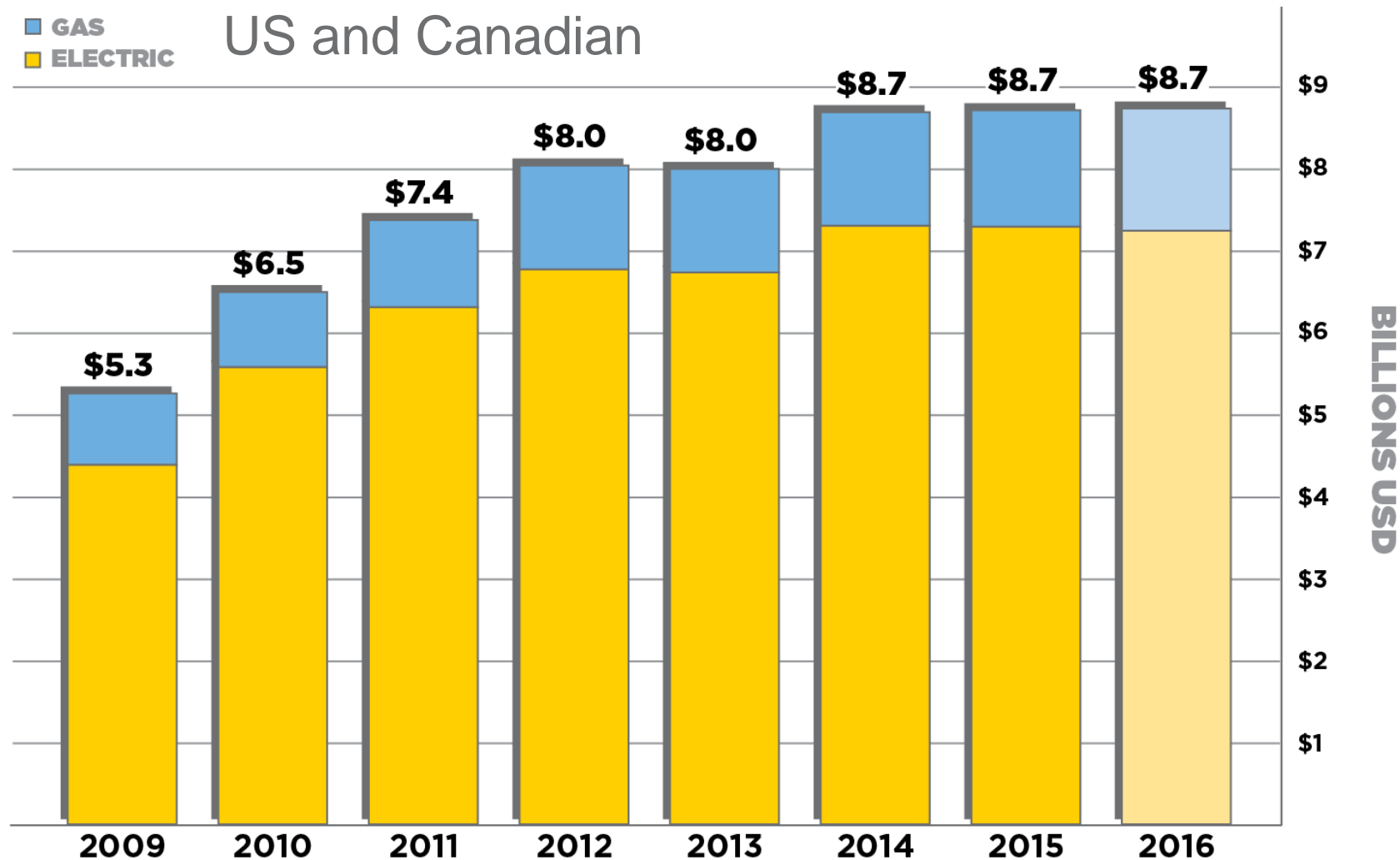
- ▶ Who is CEE, what is national market transformation, and why is it important?
- ▶ What is the *CEE Residential New Construction Initiative*?
- ▶ What do YOU think? Discussion and Q&A

CEE MISSION

As the Consortium for Energy Efficiency, United States and Canadian efficiency program administrators develop cutting-edge strategies to accelerate commercialization of energy efficient solutions to benefit gas and electric customers, utility systems, and the environment.

- ▶ CEE brings together 100 program administrators serving all or part of 45 states and 7 provinces
- ▶ CEE is a member-driven nonprofit, governed by a Board of Directors from member organizations
- ▶ Program administrators formed CEE to reach binational markets and accelerate market uptake of efficient products and services, which achieves lasting public benefit of energy efficiency

Energy Efficiency Expenditures



Preliminary data as of September 1, 2017

What is a CEE Initiative?

- ▶ Designed to assist program administrators in meeting their savings targets by influencing binational markets
- ▶ Initiatives are voluntarily adopted by efficiency program administrators for use in local programming
- ▶ CEE typically supports initiatives through:

SPECIFICATION

QUALIFYING
PRODUCT LIST

PROGRAM
SUMMARY

ENERGY STAR®
for market differentiation



CEE Specifications
for Programs

CEE Advanced Tier

ENERGY STAR Most Efficient

- ▶ Truly exceptional, aspirational energy efficiency performance
- ▶ Above and beyond Advanced Tier
- ▶ Ideally, two or more manufacturers
- ▶ Brings attention to annual top performers
- ▶ Cost-effectiveness not considered

Save More.
Energy. Money. Environment.

CEE Tier 2 and Above

- ▶ Tiers above ENERGY STAR minimum when performance merits differentiated treatment with incentives
- ▶ Typically 3 or more manufacturers relative to category
- ▶ Cost-effective for customer with incentive
- ▶ Cost-effective for most market transformation programs
- ▶ Tied with Save More if incentives are offered
- ▶ CEE Advanced Tier reserved for stretch target

CEE Tier 1

- ▶ Cost-effective for programs when CEE Tier 1 aligns with ENERGY STAR®
- ▶ ENERGY STAR minimum identifies top 25% of models
- ▶ Cost-effective for customer

INCREASING ENERGY PERFORMANCE

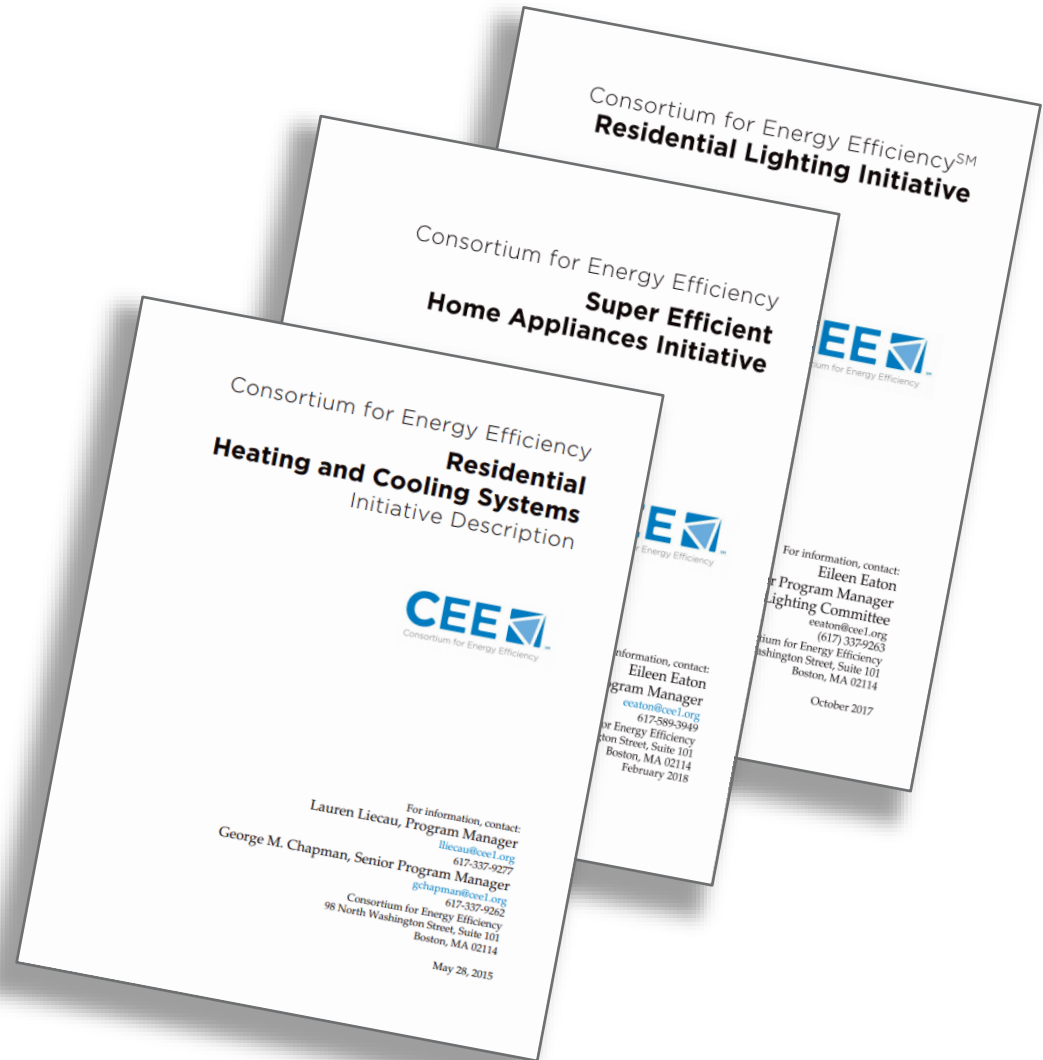


Top 25% of Energy Performers in a Product Category

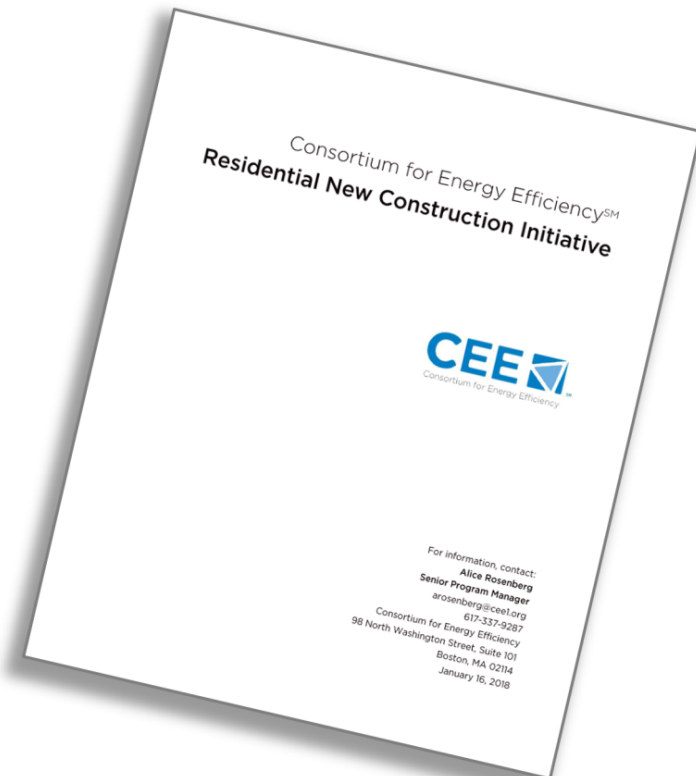
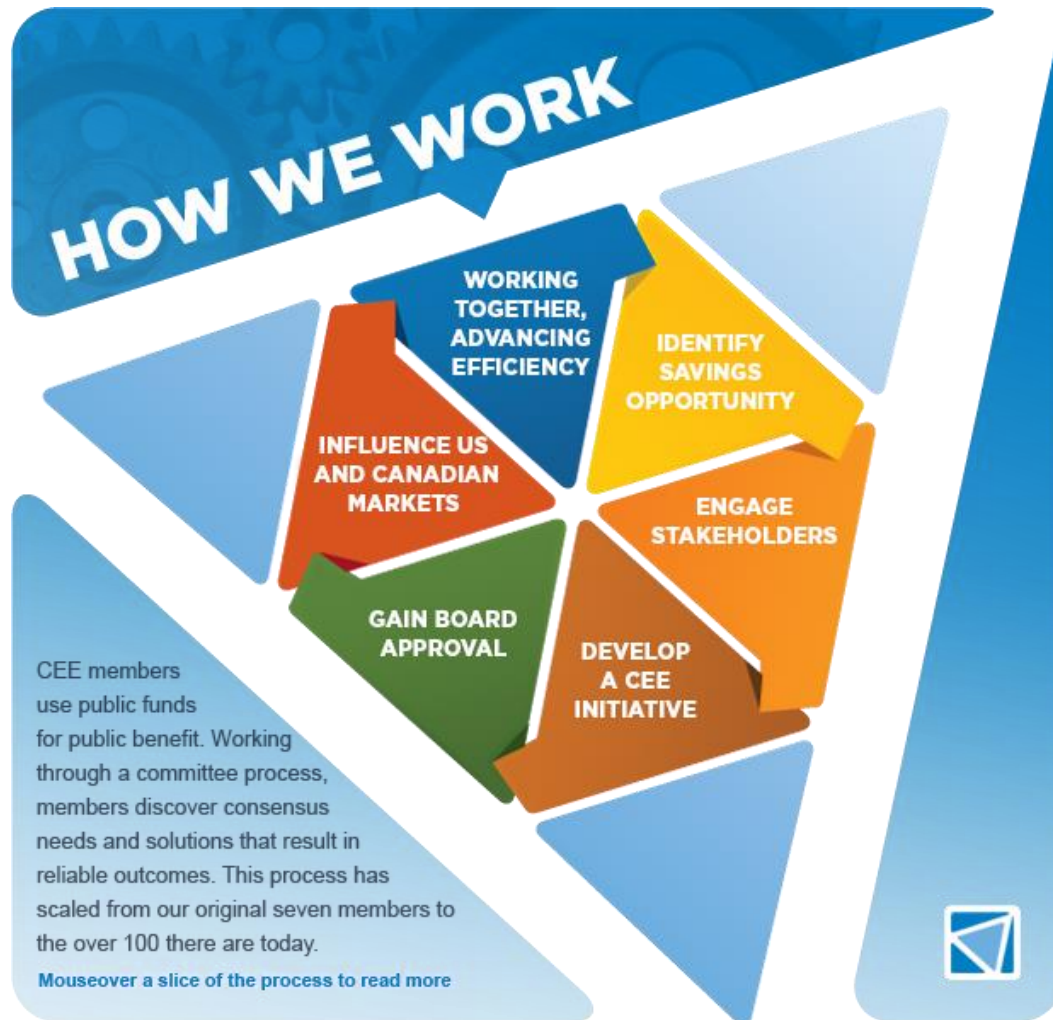


Other CEE Residential Initiatives

- ▶ HVAC
- ▶ Water Heating
- ▶ Lighting
- ▶ Appliances
- ▶ Electronics
- ▶ Swimming Pools

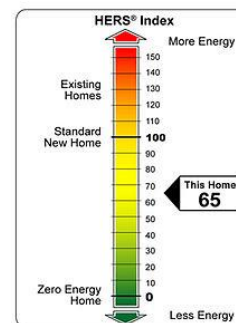
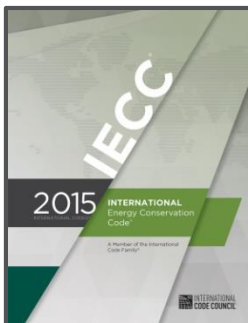


Can This Model Apply to New Homes?

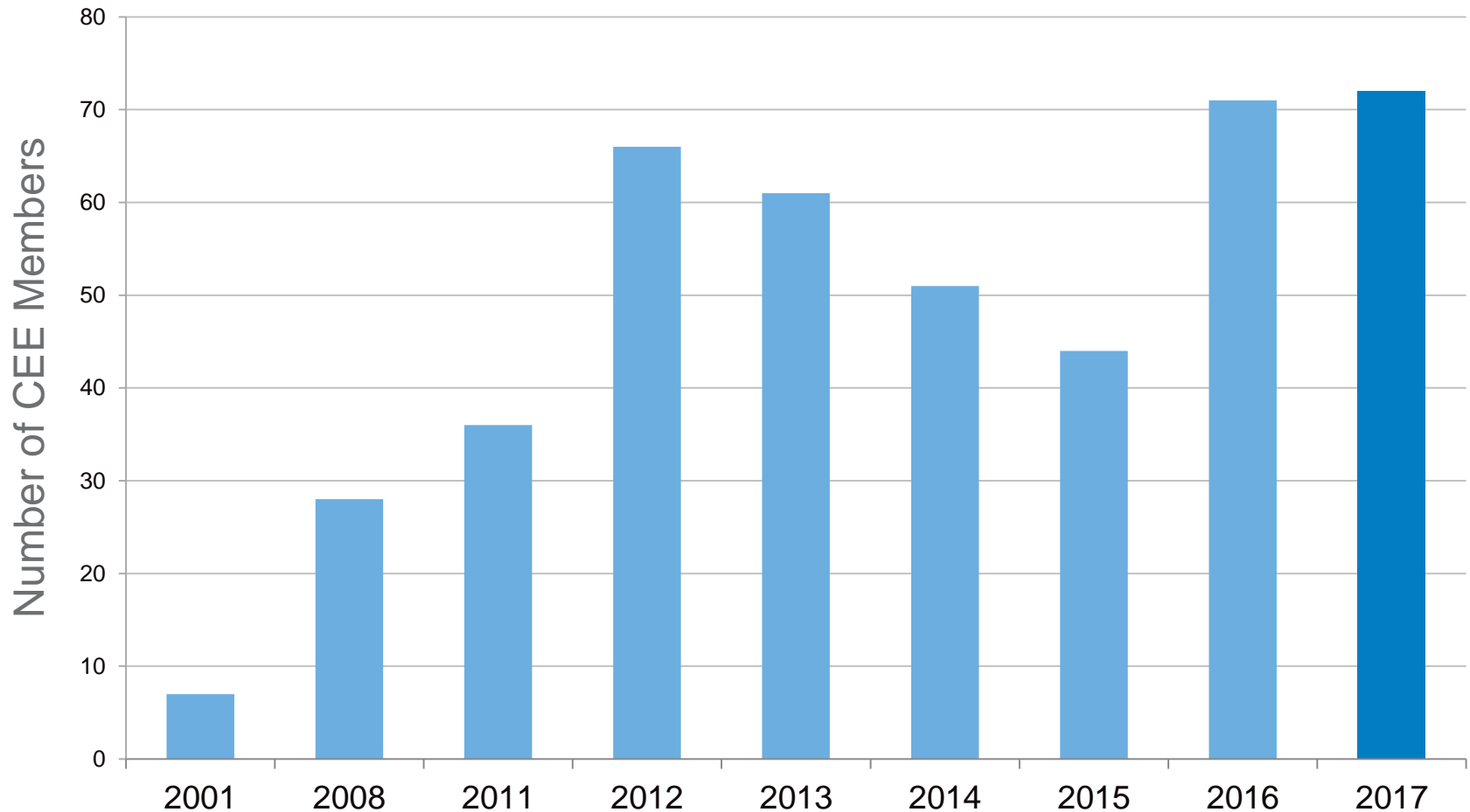


Rationale and Market Readiness

- ▶ Building codes are becoming more stringent
- ▶ Members are moving toward tiered program offerings
- ▶ There is widely-available third party scoring (HERS)
- ▶ Program baselines for new homes are increasing
- ▶ Performance-based metrics are more prevalent




Number of Member Programs (2017)

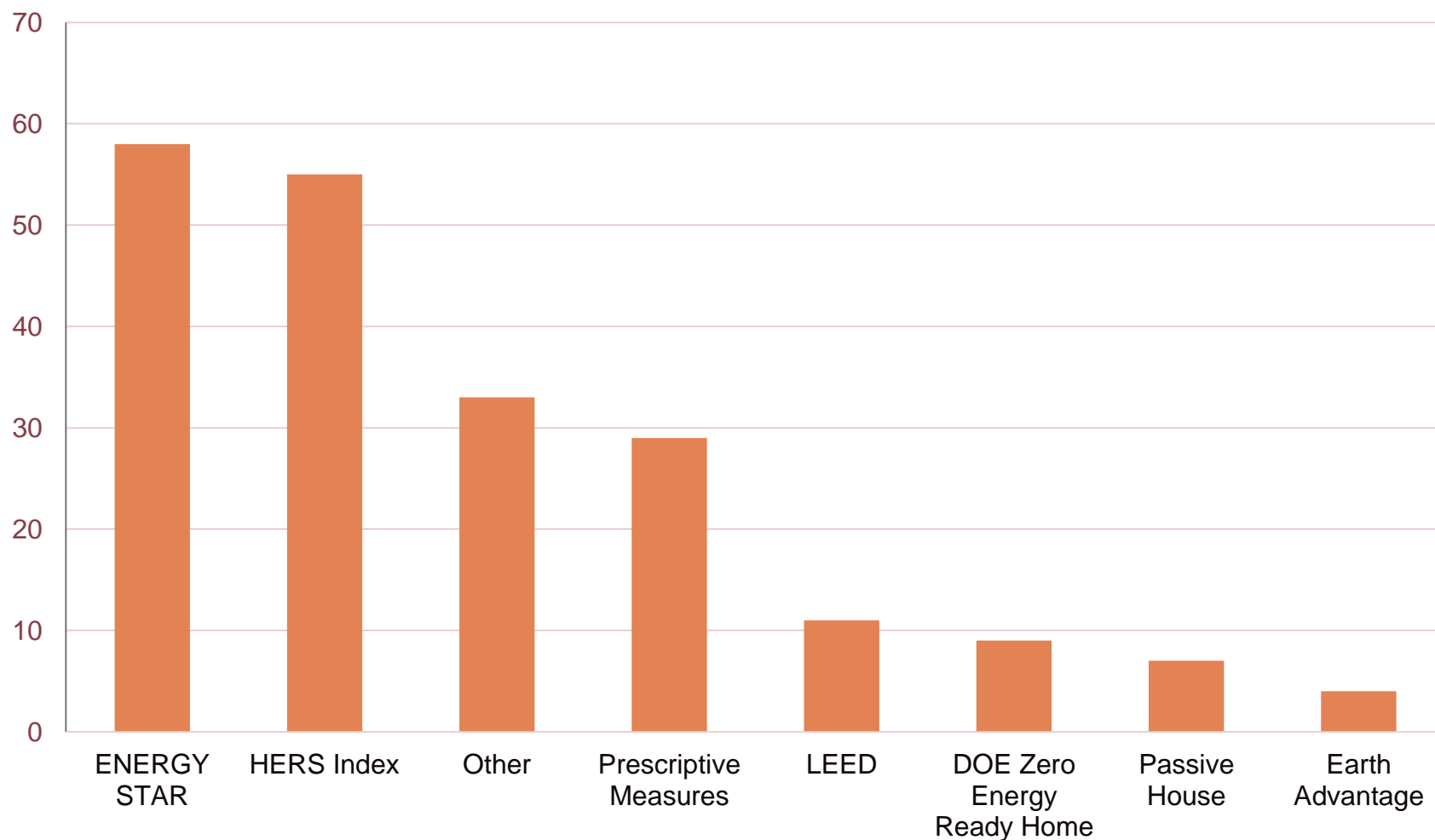


CEE New Homes Program Summary

2017 Member New Home Programs

- 
- ▶ Alabama Power
 - ▶ Alliant Energy
 - ▶ Ameren Missouri
 - ▶ Arizona Public Service
 - ▶ Avista Utilities
 - ▶ Baltimore Gas and Electric
 - ▶ BC Hydro Berkshire Gas
 - ▶ Bonneville Power Admin
 - ▶ Cape Light Compact
 - ▶ City Utilities of Springfield MO
 - ▶ Columbia Gas of MA
 - ▶ Columbia Gas of Ohio
 - ▶ Connecticut Natural Gas
 - ▶ Consumers Energy
 - ▶ Duke Energy Progress
 - ▶ Efficiency Vermont
 - ▶ Energy Trust of Oregon
 - ▶ Eugene Water & Electric Board
 - ▶ Eversource
 - ▶ Focus on Energy—Wisconsin
 - ▶ FortisBC
 - ▶ Georgia Power
 - ▶ Gulf Power
 - ▶ Hydro One
 - ▶ Hydro-Québec
 - ▶ Idaho Power
 - ▶ Liberty Utilities
 - ▶ LA Dept of Water & Power
 - ▶ MidAmerican Energy—Iowa
 - ▶ National Grid
 - ▶ New Hampshire Electric Co-Op
 - ▶ New Jersey Natural Gas
 - ▶ New Jersey's Clean Energy Program
 - ▶ NYSERDA
 - ▶ Northwest Energy Efficiency Alliance
 - ▶ Pacific Gas and Electric Company
 - ▶ PECO
 - ▶ Platte River Power Authority
 - ▶ Potomac Electric Power Company
 - ▶ Salt River Project
 - ▶ San Diego Gas & Electric Company
 - ▶ Snohomish County PUD
 - ▶ SoCalGas
 - ▶ South Jersey Gas
 - ▶ Southern California Edison
 - ▶ Southern Connecticut Gas
 - ▶ Southwest Gas
 - ▶ Tennessee Valley Authority
 - ▶ Union Gas
 - ▶ United Illuminating Company
 - ▶ Unitil—New Hampshire
 - ▶ Vectren Corporation
 - ▶ Xcel Energy

Program Specifications Used (2017)



What Can this CEE Initiative Achieve?

▼ Unify existing as well as future voluntary efforts

- Current fragmentation across new home programs
- Role for common, national objectives and metrics

▼ Save energy through performance-based tiers

- Demonstrable approach to deliver high performance
- Flexibility allows tech neutrality and design options



▼ Help inform codes through a long-term pathway

- Opportunity for enduring market transformation impact

CEE New Homes Initiative Objectives

- ▶ Establish national coordination and consistency
- ▶ Drive robust quality assurance measures
- ▶ Create a trajectory for market transformation
- ▶ Engage with key industry stakeholders
- ▶ Incorporate opportunities associated with connectivity
- ▶ Collaborate and align with federal voluntary programs



Specification Structure

- ▼ Establish performance-based tiers that reference the ANSI/RESNET/ICC 301-2014 Energy Rating Index
 - Increasingly stringent levels, towards zero net energy
- ▼ Include minimum quality assurance for all tiers
 - ENERGY STAR requirements, or similar
- ▼ Offer optional features and elements that members can elect to adopt where relevant

Specification Levels

	Base	Tier 1	Tier 2	Tier 3	Tier 4	Tier 5
Energy Rating Index Score	≤ 75	≤ 65*	≤ 55*	≤ 45*	≤ 30	≤ 10
Quality Assurance	✓	✓	✓	✓^	✓^	✓^
ENERGY STAR Certified Homes (or similar)						

* For Tiers 1, 2, and 3, CEE provides recommended ERI target scores broken down by individual climate zone.

^ For Tiers 3, 4, and 5, CEE recommends (but does not require) the inclusion of additional quality assurance measures, such as the DOE Zero Energy Ready Home, to address the increasingly complex building science considerations associated with highly efficient homes.

Recommended ERI Target Scores

Climate Zone	Tier 1	Tier 2		Tier 3
	2018 IECC (ERI Path)	2015 IECC (ERI Path) – eqCusp+10%	2015 IECC (ERI Path) Stretch – eqCusp+15%	ASHRAE SSPC 90.2 Proposed Standard
Zone 1	≤ 57	≤ 52	≤ 49	≤ 43
Zone 2	≤ 57	≤ 52	≤ 49	≤ 43
Zone 3	≤ 57	≤ 51	≤ 48	≤ 45
Zone 4	≤ 62	≤ 54	≤ 51	≤ 47
Zone 5	≤ 61	≤ 55	≤ 52	≤ 47
Zone 6	≤ 61	≤ 54	≤ 51	≤ 46
Zone 7	≤ 58	≤ 53	≤ 50	≤ 46
Zone 8	≤ 58	≤ 53	≤ 50	≤ 45

Optional Components

▶ Nonenergy Benefits/Enhanced Building Science

- e.g., water efficiency, indoor air quality, durability

▶ Renewables

- Specification for role that renewable energy can play

▶ Connectivity

- Requirements for installed products or equipment
- Minimum infrastructural components and elements

▶ Minimum Prescriptive Requirements

- Mandatory building techniques, strategies, or technologies

Looking Forward

▶ Greater harmonization and consistency

- HERS, IECC, RESNET, EPA, DOE, NAHB, LBA
- Quality assurance, size adjustment, verification, software

▶ Include further aspects of connectivity

▶ Consider expansion of scope

- e.g., multifamily, Canadian market, manufactured homes

▶ Explore relationship to existing homes

- Opportunities with the real estate and appraisal industries

Deployment of Initiative

- ▶ Track key Initiative milestones and progress
- ▶ Develop CEE program guidance resources
- ▶ Enhance relationships with key stakeholders
- ▶ Evaluate Initiative revision as needed

Industry Involvement is Critical

BUILDERS
NATIONAL LOCAL
PRODUCT SOFTWARE
MANUFACTURERS PROVIDERS
RATERS
REAL ESTATE INDUSTRY
DEVELOPERS
LENDERS/BANKS
CODE COMMITTEES
HOME BUYERS
HEALTH ORGANIZATIONS

COMMENTS TO DATE RECEIVED FROM:

- ▶ DuPont Protective Solutions
- ▶ Florida Home Builders Association
- ▶ Florida Solar Energy Center
- ▶ Green Builder Coalition
- ▶ Home Energy Technologies
- ▶ MaGrann Associates
- ▶ NAIMA
- ▶ National Association of Home Builders
- ▶ New Buildings Institute
- ▶ North Carolina Building Association
- ▶ RESNET
- ▶ Southface
- ▶ The Dillon Group
- ▶ Triconic
- ▶ US EPA – ENERGY STAR
- ▶ US DOE Zero Energy Ready Home

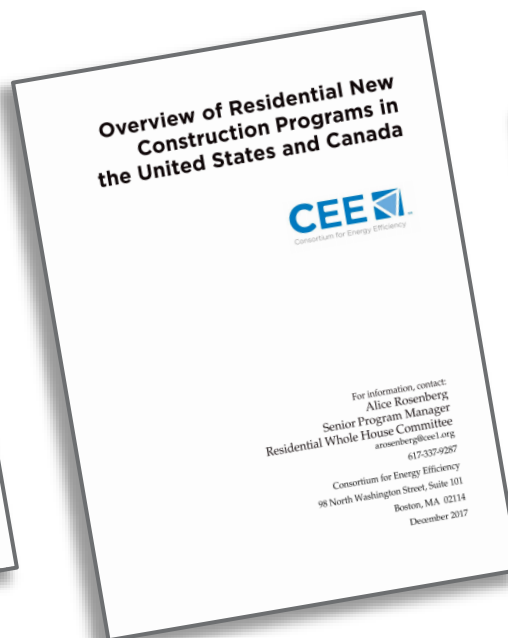
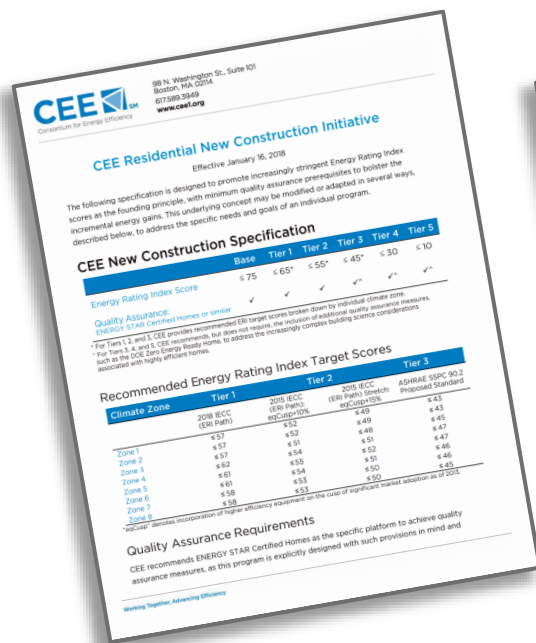
Market Transformation and Impacts

- ▶ New homes industry activity and competition
 - Builders → efficiency of homes
 - Raters → reliability of services
 - Software Providers → compatibility of offerings
 - Developers → promotion of projects
- ▶ Product, equipment, and system advancement
- ▶ Long term pathway for all stakeholders
- ▶ Reduced program administrative costs

Resources and Useful Links

▶ www.cee1.org/content/cee-program-resources

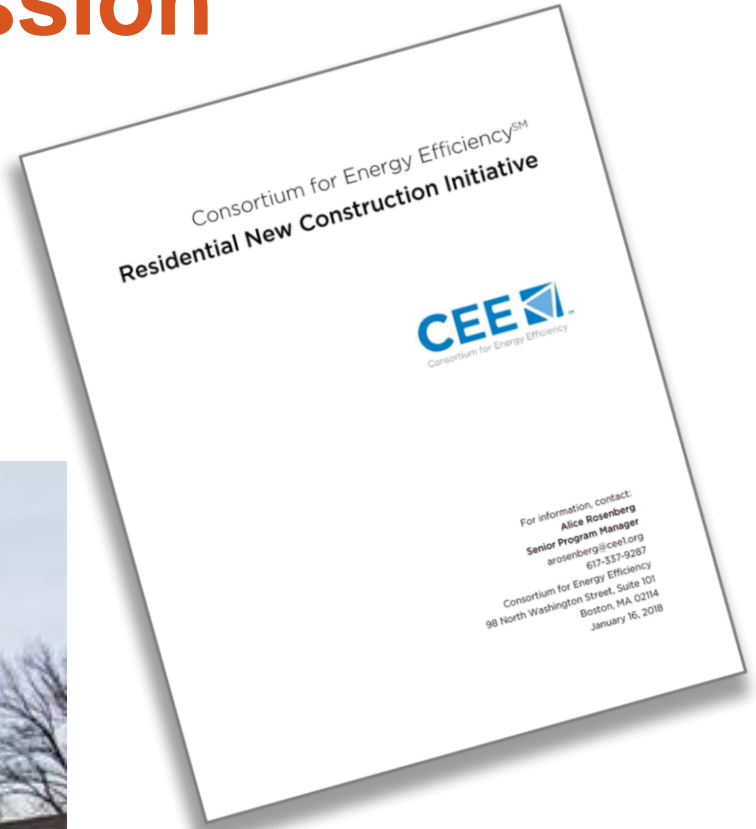
- Full CEE Res New Construction Initiative
- CEE Res New Construction Specification
- 2017 CEE New Construction Program Overview



Summary of Programs

Background Information				Program Details				Program Verification	
Program Site	State/Prov.	Fuel Type	Year Est.	ENERGY STAR	DOE ZERH	HERS Score	Prescriptive Measures	Incentive Amount	HERS Raters
Alabama Power	AL	Electric Only	2004			< 75 < 65	Prescriptive Measures	Varies	HERS Raters, Other (HVAC SAVE)
Alliant Energy - Iowa	IA	Combined Elec & Gas				< 50 < 45	Prescriptive Measures	Varies	Utility Verification (Focus on Energy - NGL)
Alliant Energy - Wisconsin	WI	Combined Elec & Gas		Yes		< 65			HERS Raters, Other (HERS, CWI, EnergyScape, US DOE)
Ameren Missouri	MO	Combined Elec & Gas							Other (ENERGY STAR)
Arizona Public Service	AZ	Electric Only	2005	Yes			Eco-Rated Homes	\$800	Third Party
Avista Utilities - Idaho	ID	Combined Elec & Gas	2005	Yes			Eco-Rated Homes	\$800	Third Party
Avista Utilities - Washington	WA	Combined Elec & Gas	2000	Version 3.0			Yes		HERS Raters
Baltimore Gas and Electric Company	MD	Combined Elec & Gas	2006	Yes			Prescriptive Measures	Up to \$7,000	ENERGY STAR (Canada), Utility Verification
BC Hydro	BC	Gas Only	2006	Yes			NEEA Next Step Home (still in pilot phase)		HERS Raters
Berkshire Gas	MA	Gas Only	2003	Version 3.0					Third Party
Bonneville Power Administration	NV	Electric Only							

Questions and Discussion



Contact

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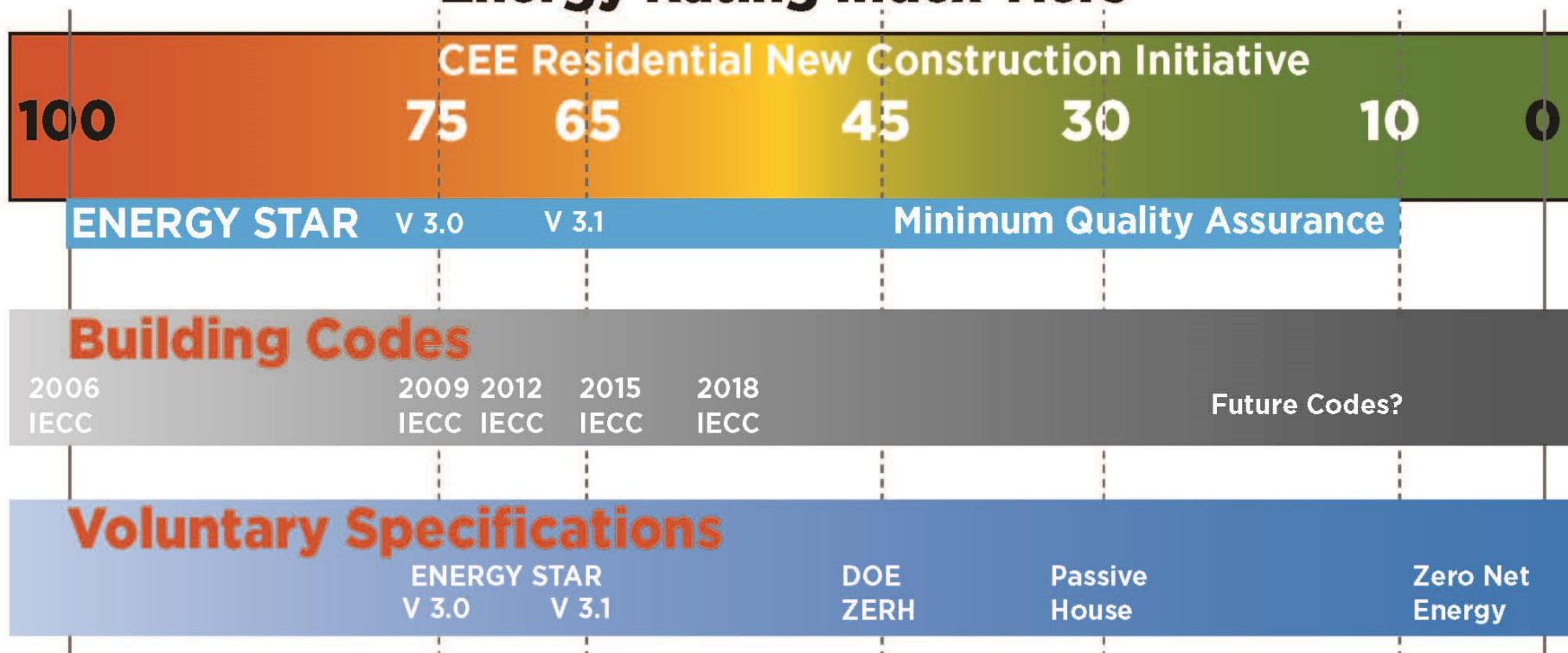
Energy Program Co-Director
Natural Resources Defense Council
dgoldstein@nrdc.org

Additional Slides

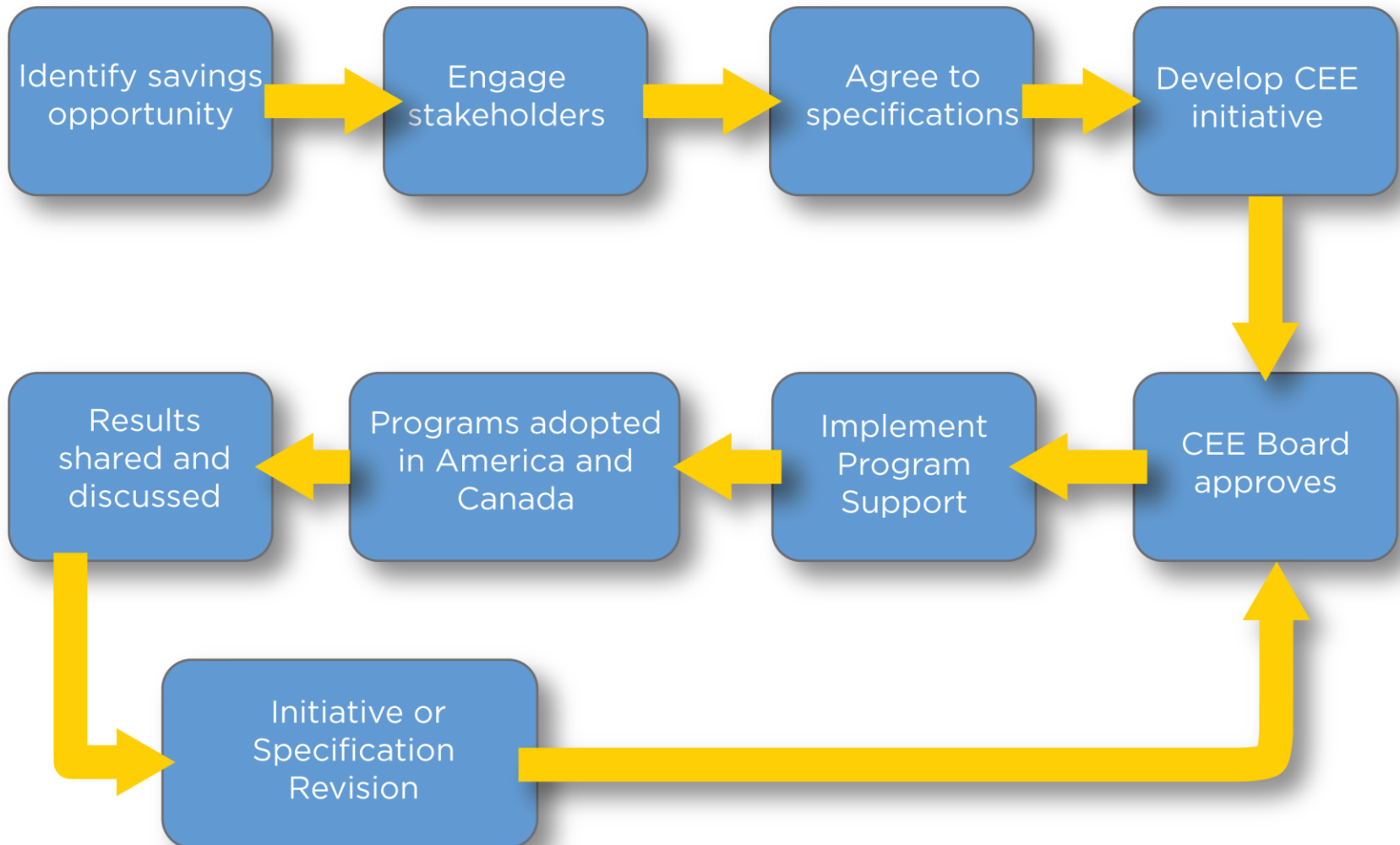
Relationship to Other Platforms

Performance-based

Energy Rating Index Tiers



CEE Initiative Development Process



Additional Optional Requirements

◀ Ancillary Benefits and Enhanced Science

- EPA Indoor airPLUS construction specification
- DOE Zero Energy Ready Home PV-Ready Checklist
- RESNET Water Efficiency Rating (WER) Index Standard
- WaterSense Labeled New Homes Partnership Program
- Institute for Business and Home Safety FORTIFIED Home
- DOE ZERH Solar Hot Water-Ready Checklist

Background: How CEE Works

By working together at CEE, administrators amplify the effect of their funding dollars to deliver ever growing, cost-effective energy savings to the public.

As CEE members voluntarily adopt initiatives, market participants are rewarded and markets begin to accelerate. It becomes easier for manufacturers to increase supply, and for services to be provided, which results in greater market penetration and energy savings.

The CEE Board of Directors judges the appropriateness and feasibility of initiatives and positions. Once the Board approves, members often choose to adopt initiatives into their programs.

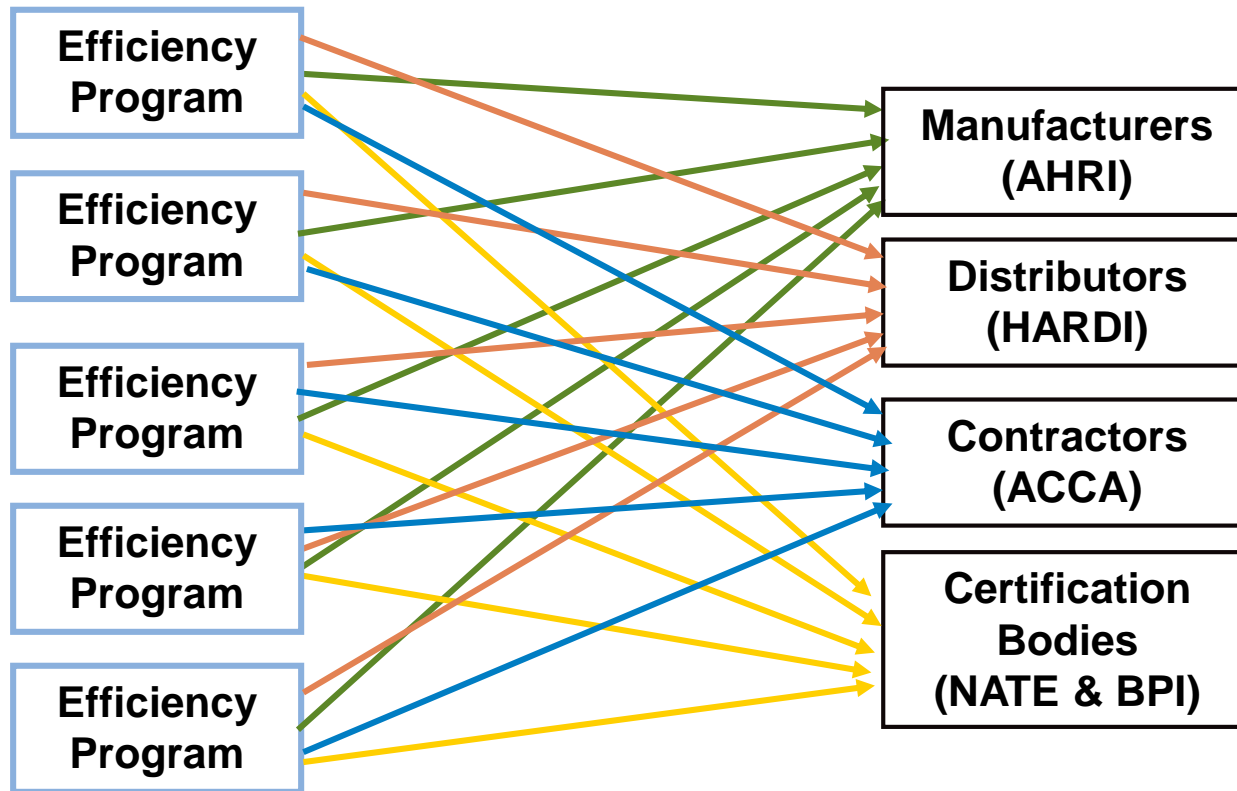


Based on a large number of factors, CEE members identify opportunities within current efforts or in new ones to leverage the collective knowledge and experience and enable members to benefit from common marketing platforms.

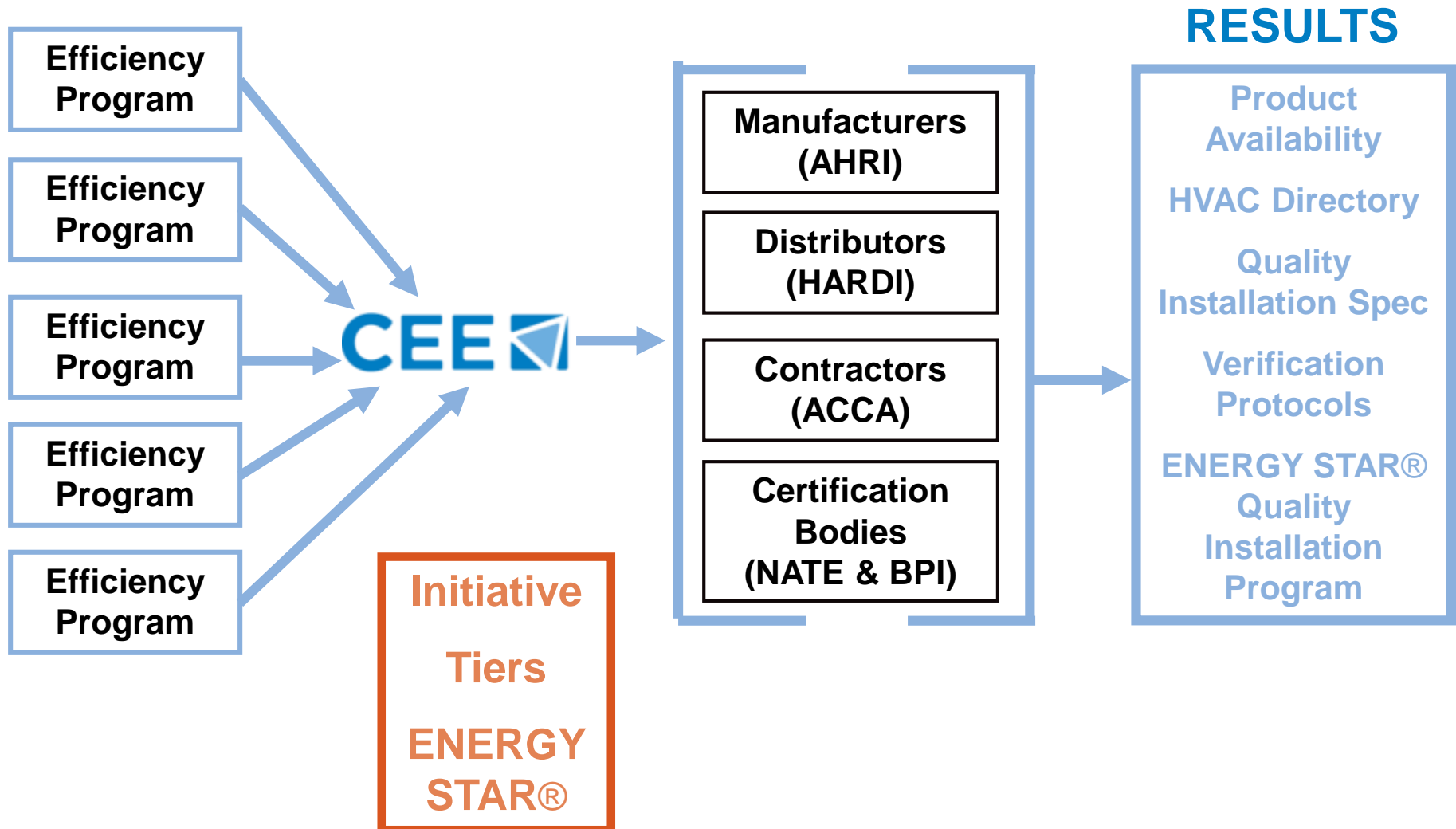
A factor in market success is whether manufacturers or providers can supply the market with compliant products or services.

Members cover the opportunity as comprehensively as possible. Initiatives may include market analysis, product specifications, opportunity scope, goals, and evaluation techniques.

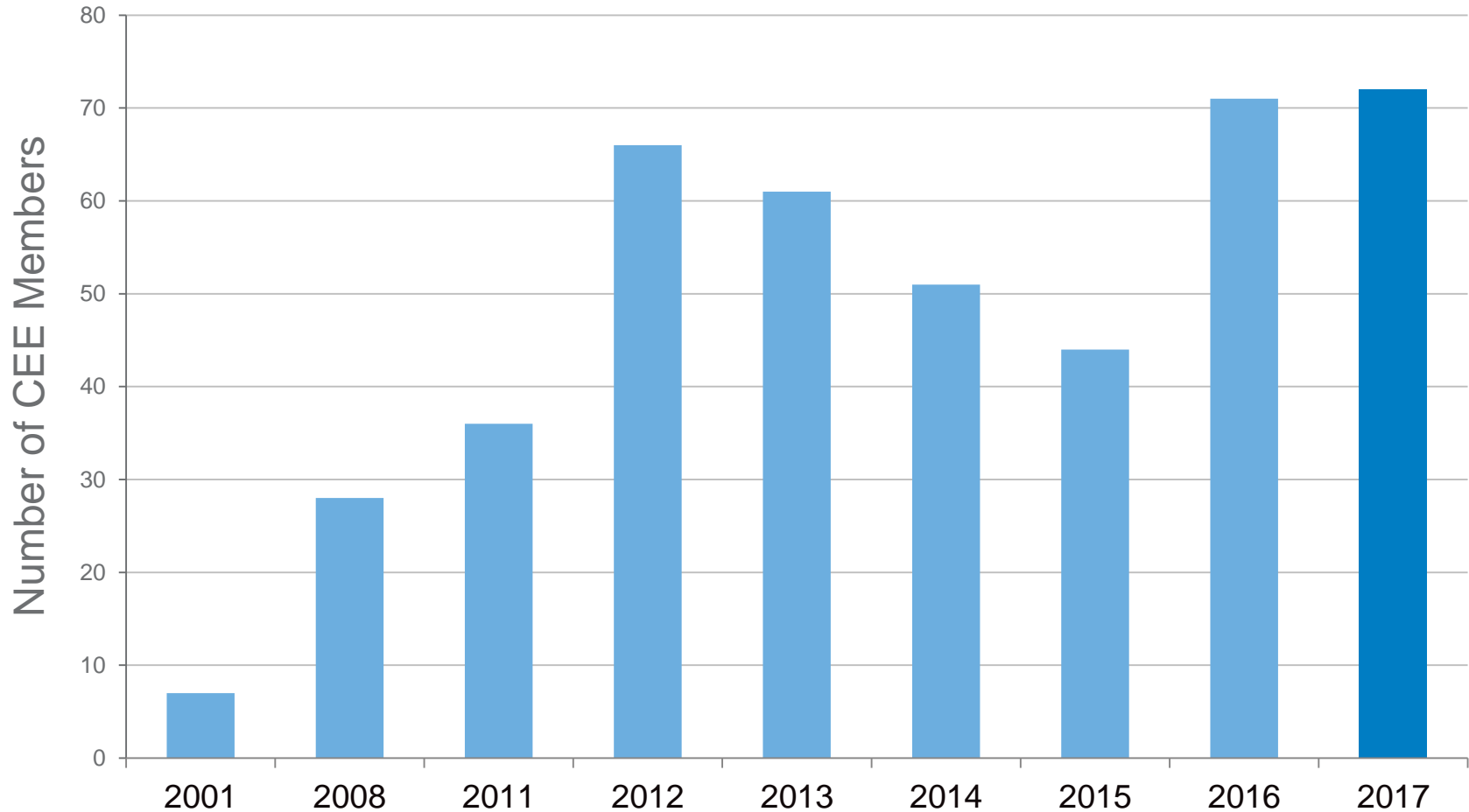
Example: Residential HVAC (Before)



Example: Residential HVAC (After)



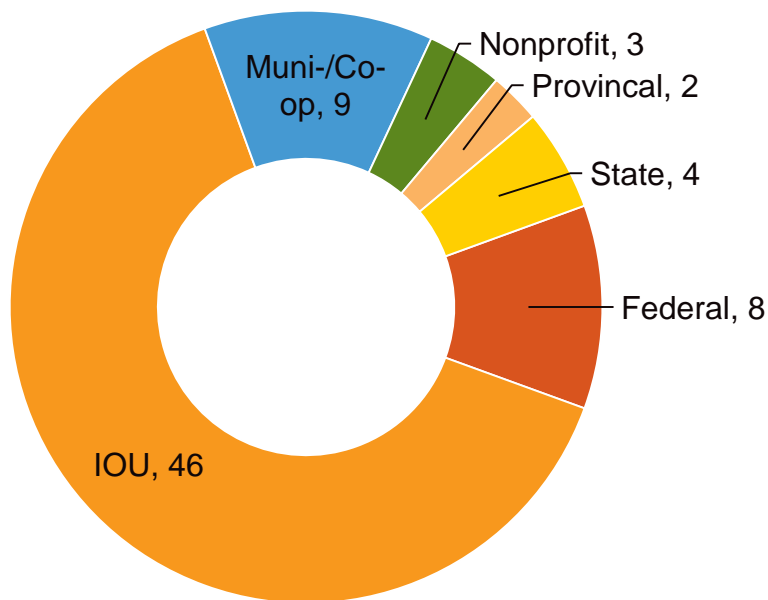
2017 Program Summary Results



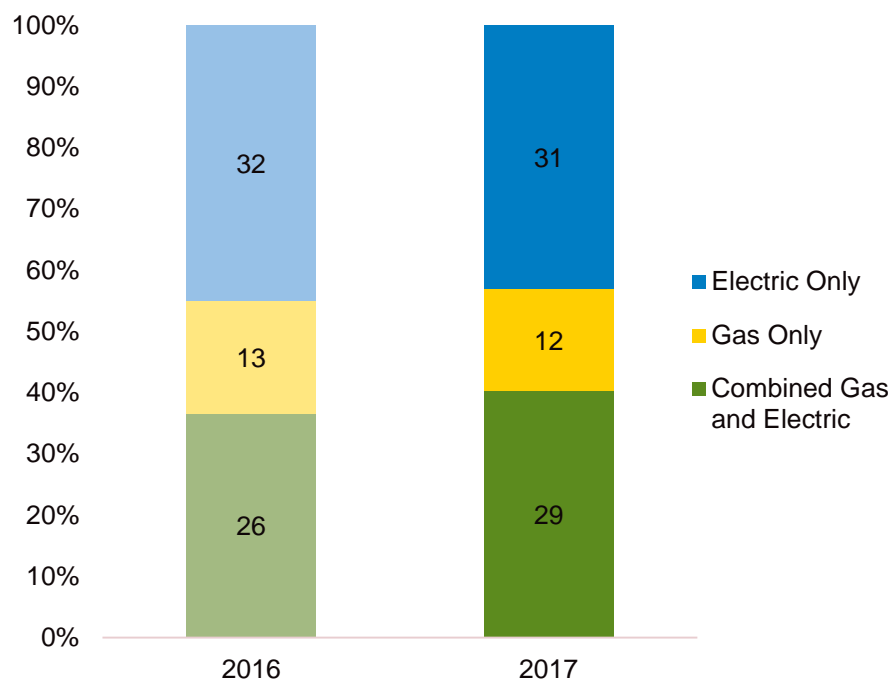
CEE New Homes Program Summary

2017 Program Summary Results

Organization Type

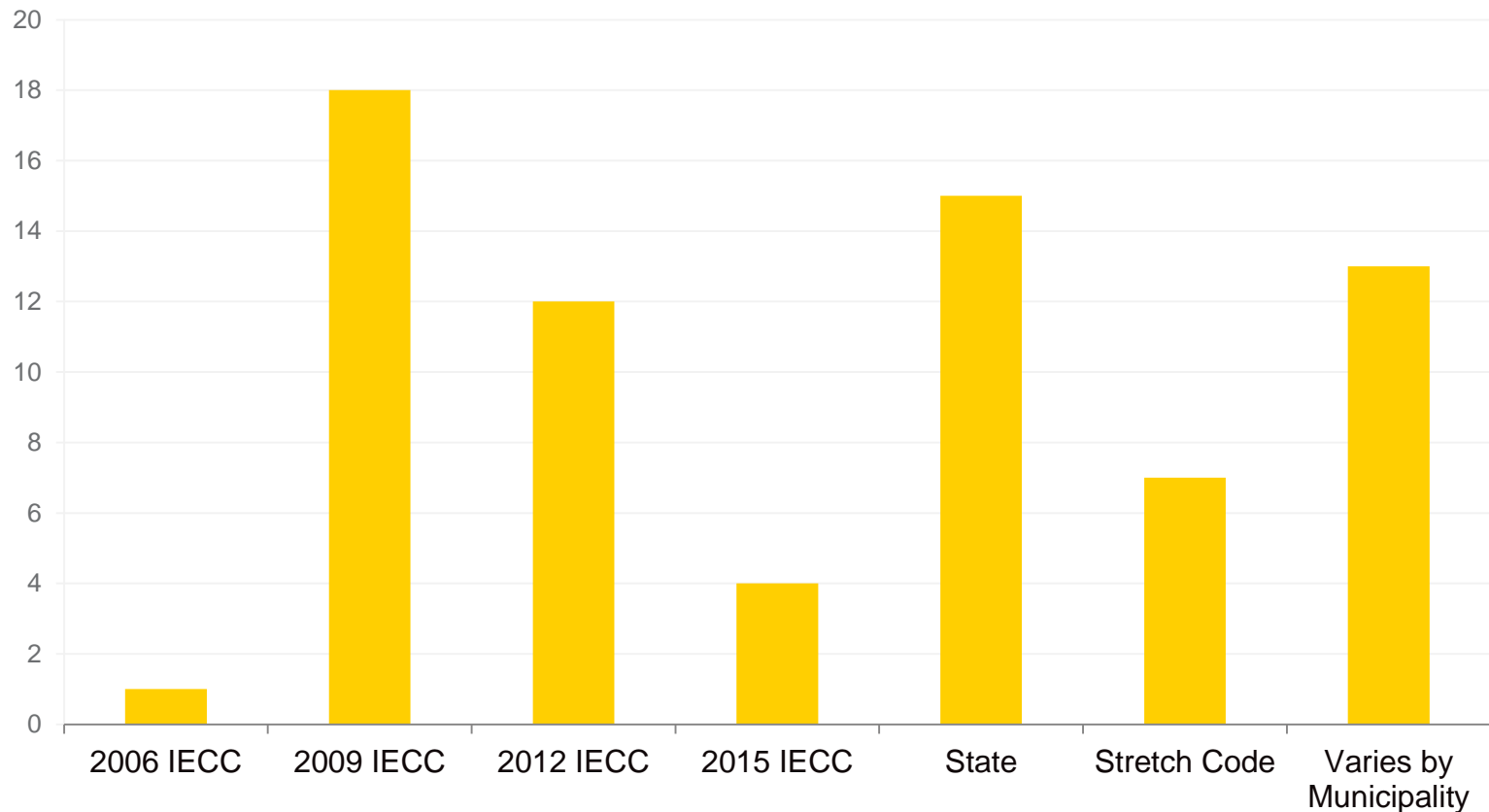


Fuel Type



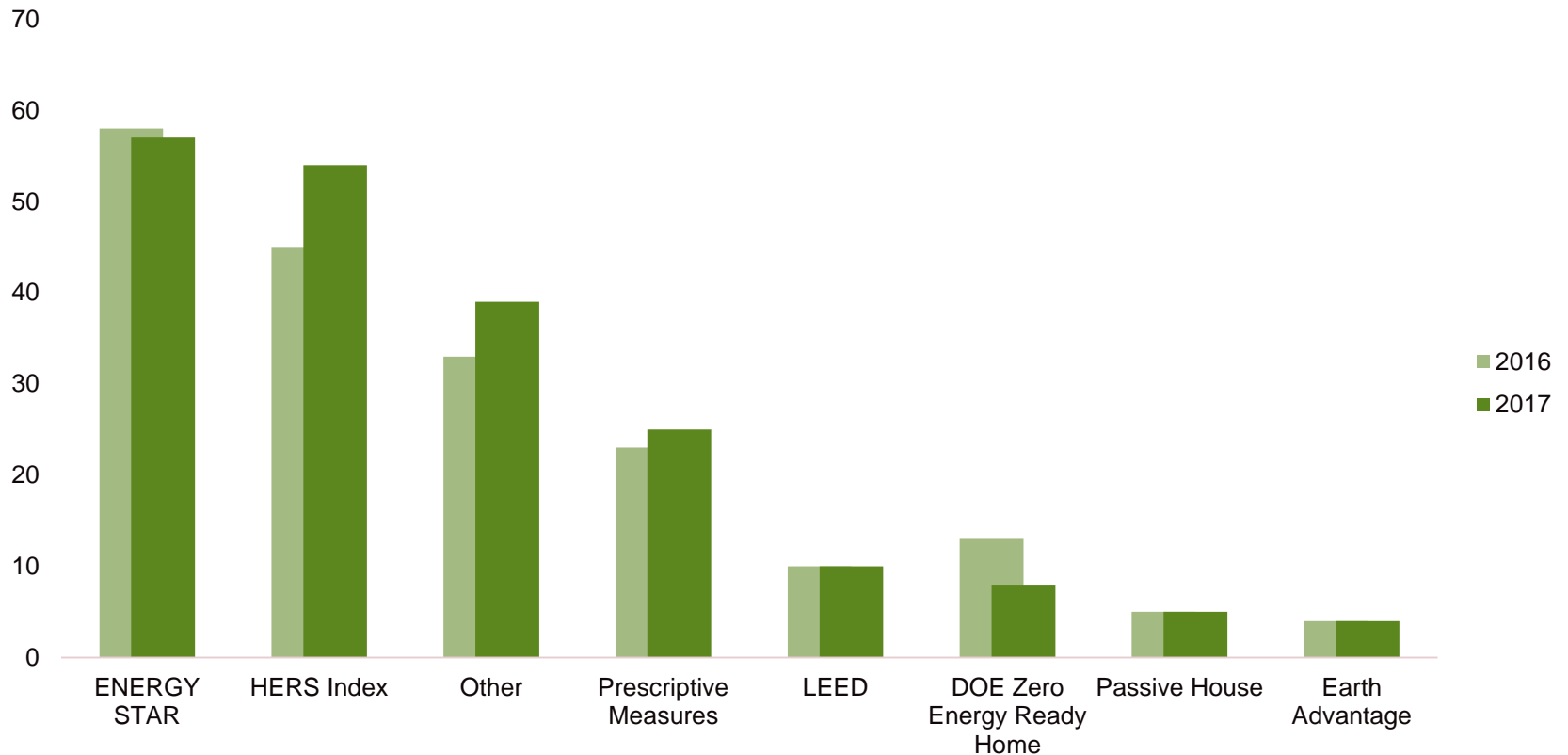
2017 Program Summary Results

◀ Building Codes



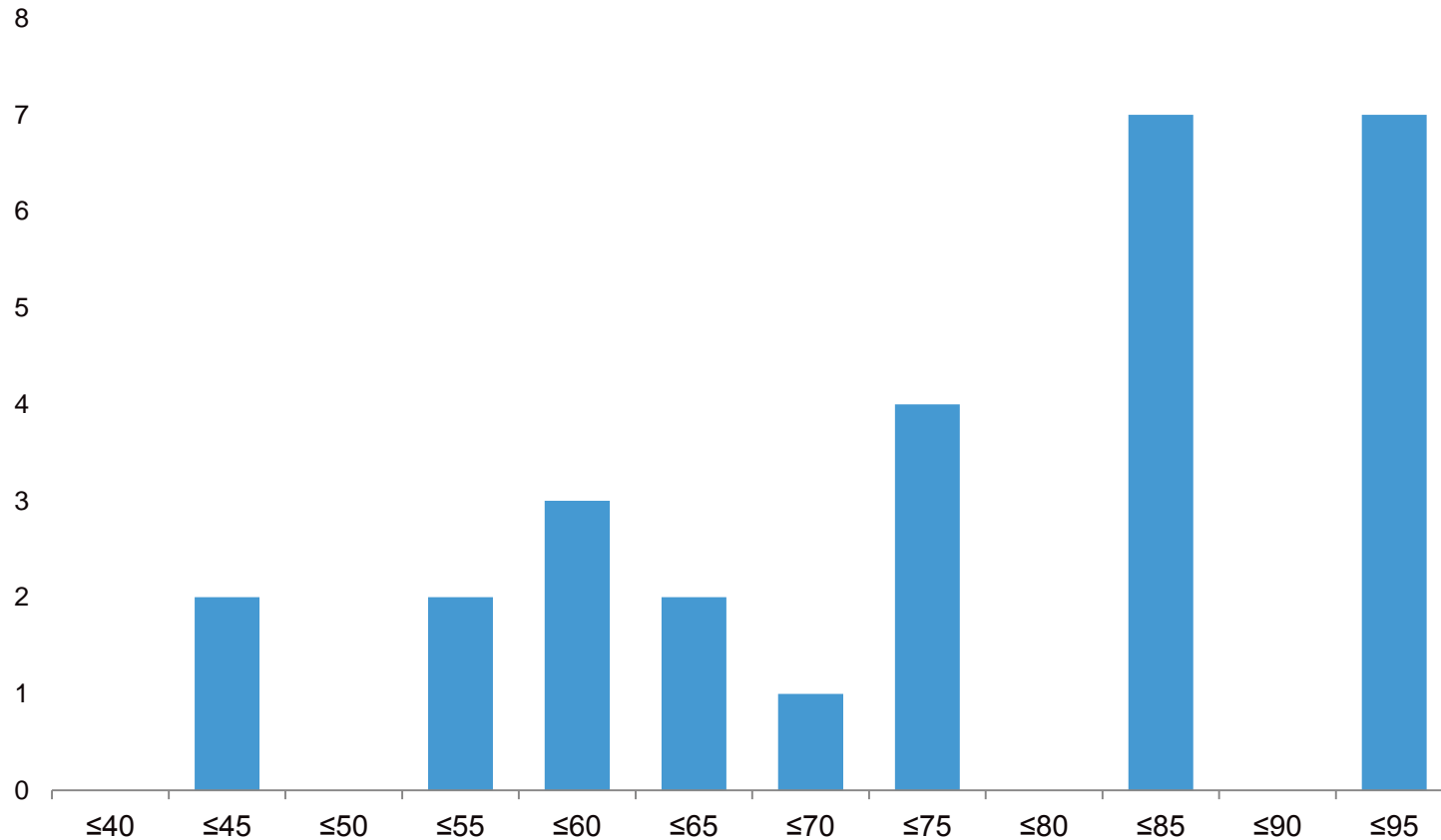
2017 Program Summary Results

Specification or Platform Used



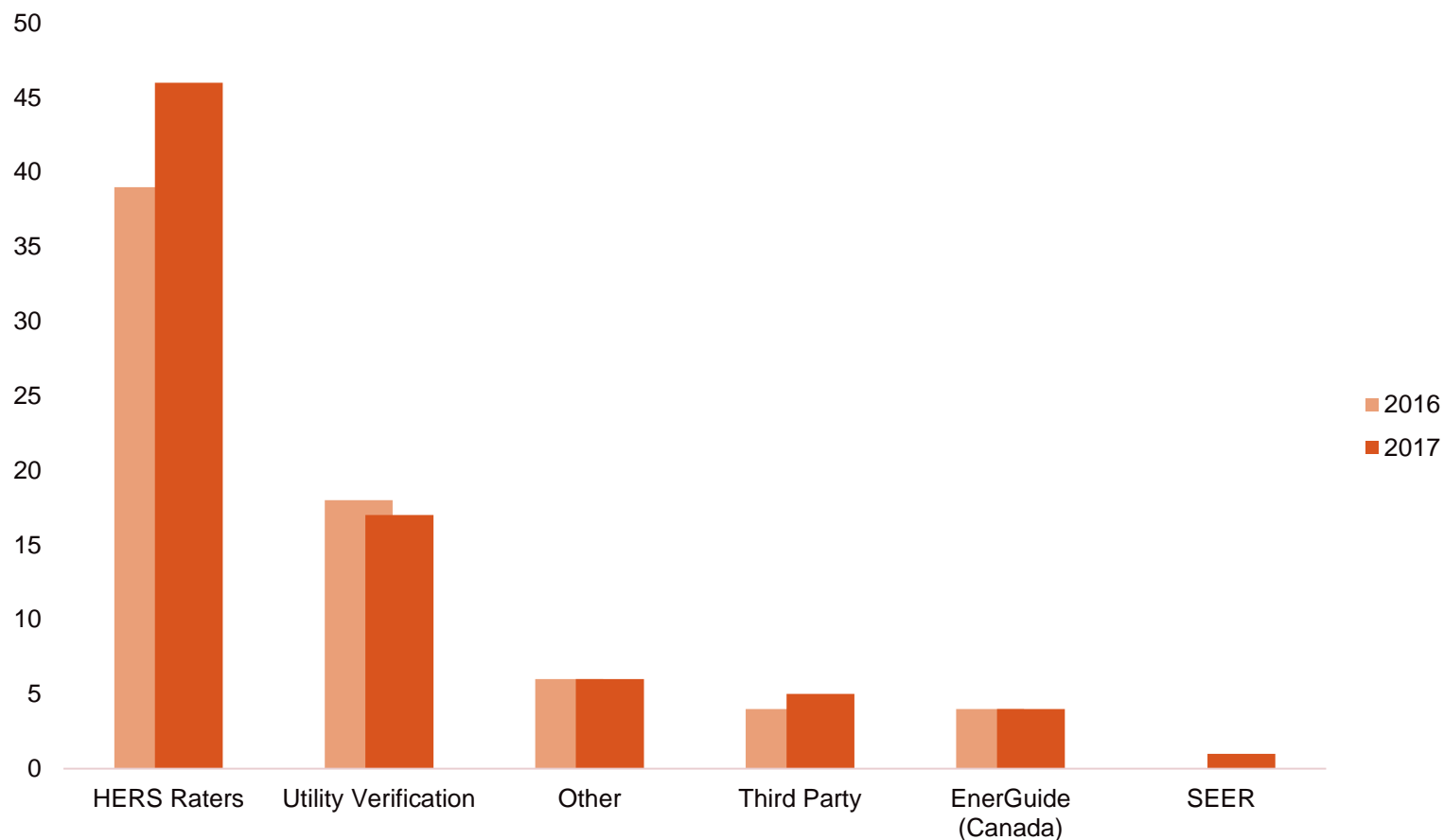
2017 Program Summary Results

▼ HERS Index Scores Promoted by Programs



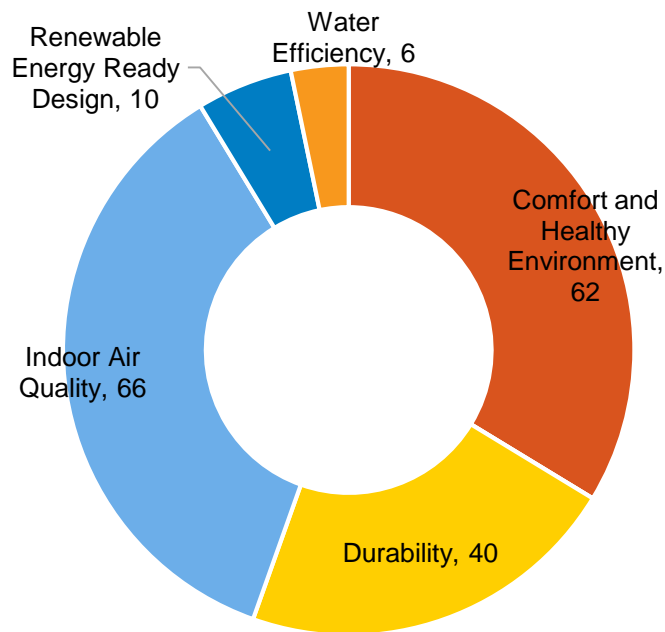
2017 Program Summary Results

Program Verification Methods

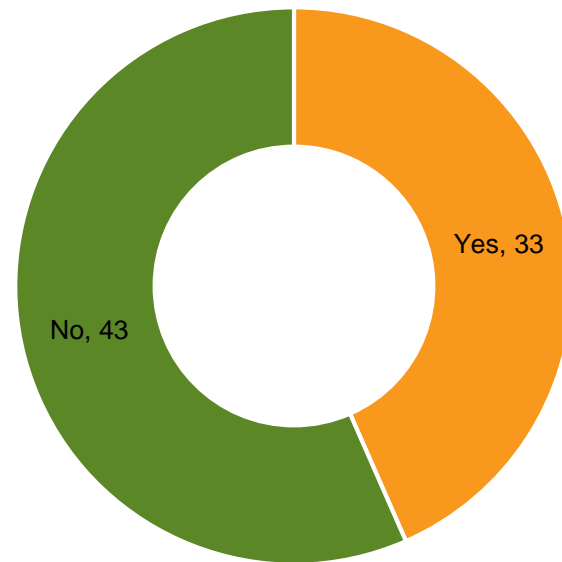


2017 Program Summary Results

◀ Nonenergy Features

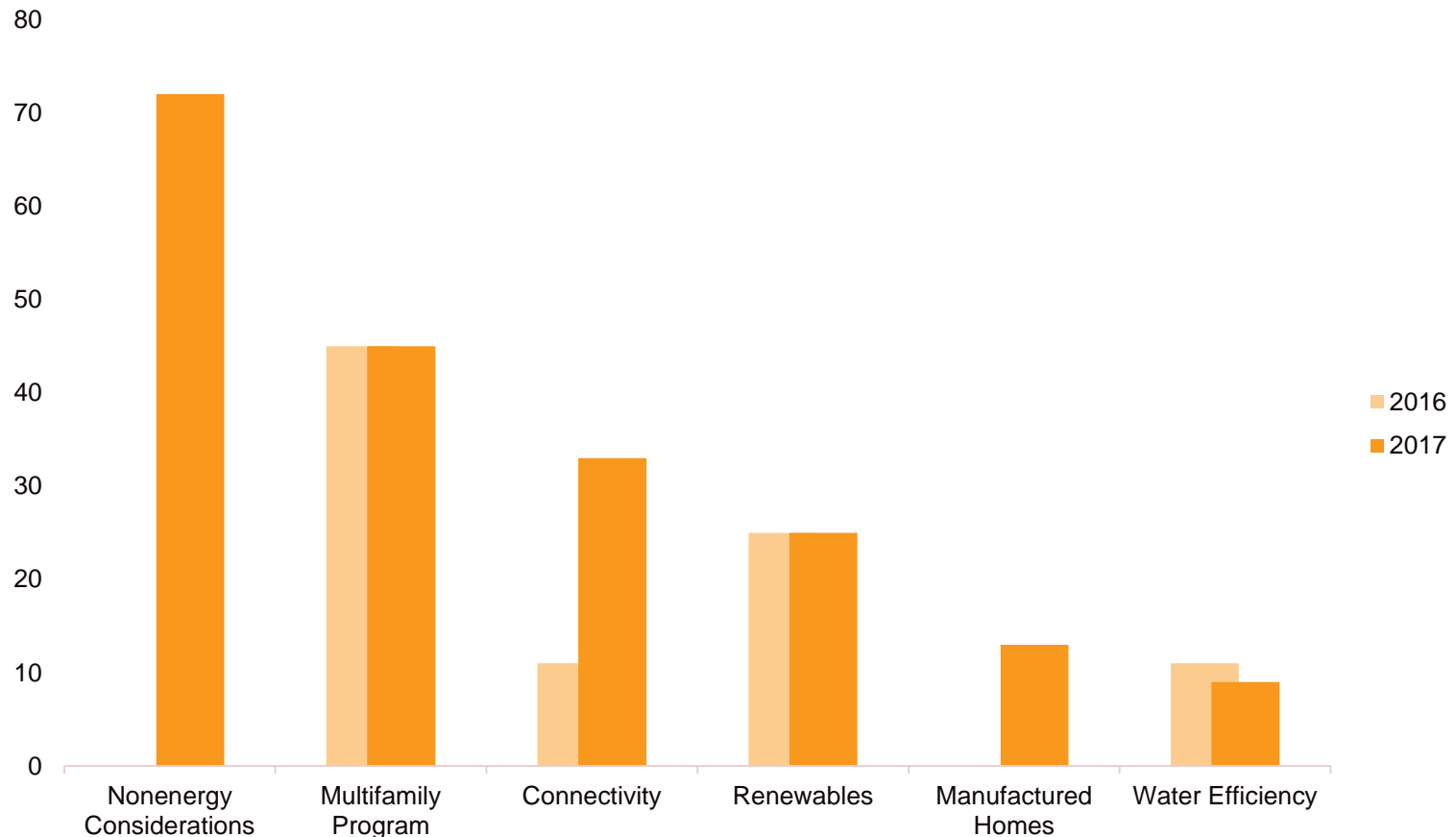


◀ Financing



2017 Program Summary Results

◀ Additional Components of Programs



Common Themes

▶ Rising Codes, Baselines, and Savings Goals

▶ Move Towards Zero Net Energy

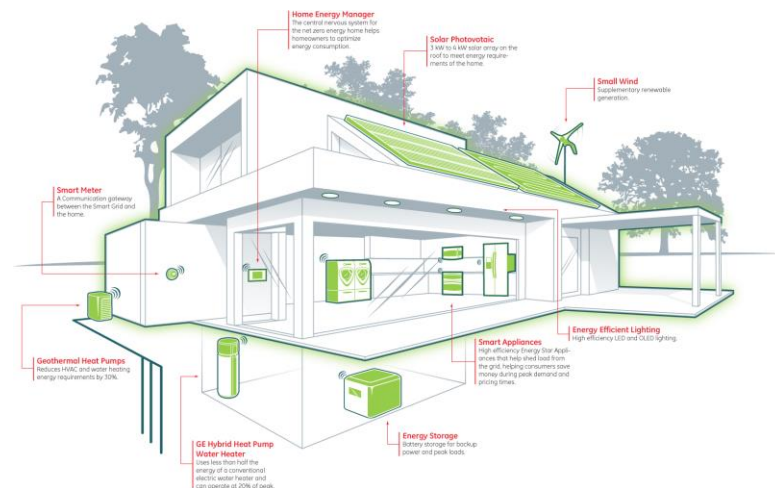
- Definitions vary, gas vs. electric
- Efficiency, then renewables

▶ Tiered Incentive Structures

- Multiple offerings and levels
- Pathways to Zero Net Energy
- Performance-based programs

▶ Statewide Coordination

- Connecticut, Massachusetts, California, New Jersey
- Gas and electric partnerships



Emerging Trends

▼ Connectivity and Smart

- Smart meters and smart thermostats
- Integrated demand side management



▼ Engagement with Real Estate Industry

- Relations with lenders, mortgagers, realtors, appraisers
- Trainings, education, tradeshow, meetings
- Green Addendum, MLS

▼ Emphasis on Nonenergy Features

- Air quality, health, durability, etc.
- Quantifiable and marketable



CEE Specification – I

CEE New Construction Specification

	Base	Tier 1	Tier 2	Tier 3	Tier 4	Tier 5
Energy Rating Index Score	≤ 75	≤ 65*	≤ 55*	≤ 45*	≤ 30	≤ 10
Quality Assurance: ENERGY STAR Certified Homes or similar	✓	✓	✓	✓^	✓^	✓^

* For Tiers 1, 2, and 3, CEE provides recommended ERI target scores broken down by individual climate zone.

^ For Tiers 3, 4, and 5, CEE recommends, but does not require, the inclusion of additional quality assurance measures, such as the DOE Zero Energy Ready Home, to address the increasingly complex building science considerations associated with highly efficient homes.

Recommended Energy Rating Index Target Scores

Climate Zone	Tier 1	Tier 2	Tier 3
	2018 IECC (ERI Path)	2015 IECC (ERI Path): eqCusp+10%	2015 IECC (ERI Path) Stretch: eqCusp+15% ASHRAE SSPC 90.2 Proposed Standard
Zone 1	≤ 57	≤ 52	≤ 49
Zone 2	≤ 57	≤ 52	≤ 49
Zone 3	≤ 57	≤ 51	≤ 48
Zone 4	≤ 62	≤ 54	≤ 51
Zone 5	≤ 61	≤ 55	≤ 52
Zone 6	≤ 61	≤ 54	≤ 51
Zone 7	≤ 58	≤ 53	≤ 50
Zone 8	≤ 58	≤ 53	≤ 50

eqCusp denotes incorporation of higher efficiency equipment on the cusp of significant market adoption as of 2013.

CEE Specification – II

Quality Assurance Requirements

CEE recommends ENERGY STAR Certified Homes as the specific platform to achieve quality assurance measures, as this program is explicitly designed with such provisions in mind and demonstrates a cost-effective approach to achieve these goals. Where adoption of this minimum prerequisite is not possible, or if a program determines that an alternative mechanism is more appropriate for their respective goals, CEE allows program administrators to implement an alternative requirement that addresses quality assurance. For those opting to employ a measure other than ENERGY STAR Certified Homes, CEE requests that detailed information about the requirement components and its associated costs be provided to CEE.

As houses become increasingly efficient, it becomes even more important to address performance and ensure that building science principles are properly employed. For this reason, CEE also recommends that programs adopt additional requirements beyond the ERI score for higher tiers. The DOE Zero Energy Ready Home is one such vetted program, with criteria specifically designed to address the considerations relevant to high performing homes.

CEE Specification – III

Additional Optional Components

1. Ancillary Benefits and Enhanced Building Science

Programs may find value in promoting features that do not fall strictly within energy performance metrics. While not comprehensive in scope, the following list offers programs or specifications that address facets outside of efficiency.

- EPA Indoor airPLUS construction specification
- DOE Zero Energy Ready Home PV-Ready Checklist
- Green Builder® Coalition's Water Efficiency Rating Score (WERS)*
- RESNET Water Efficiency Rating (WER) Index Standard (in development)
- Florida Water Star™
- WaterSense Labeled New Homes Partnership Program
- Institute for Business and Home Safety (IBHS) FORTIFIED Home
- DOE Zero Energy Ready Home Solar Hot Water-Ready Checklist

Additional analysis and comparison of impacts relative to code is necessary for all of the above ancillary services and non-energy benefits.

2. Renewables

The ERI score is generated by a method that credits on-site renewable generation such as solar PV or hot water against fuel use for both gas and electricity. If a program administrator wishes to distinguish efficiency from renewables, it can specify that the ERI score be calculated ignoring the contribution of renewables. Alternatively, an administrator might want to credit renewable energy only after a minimum threshold has been met using efficiency alone; this methodology is employed in the ERI path of the 2018 IECC, which includes prescriptive backstops for those opting to use PV.

CEE Specification – IV

Additional Optional Components

3. Connectivity

Members may determine that there is merit to promoting connected requirements for a variety of potential grid, program, and customer benefits. Connected capabilities have the potential to achieve increased efficiency gains, optimize equipment and building performance, add market value to the home, enable greater consumer engagement and amenity, and enable load management opportunities such as demand response, energy storage, and peak load shifting. For programs interested and able to include connected requirements in their offerings, CEE offers the following two strategies for consideration:

- Any products or equipment installed in the house meet the connected requirements outlined in the respective ENERGY STAR or CEE specifications, where available.
- CEE connected criteria advocate for multiple pathways to connect, including a direct, on-premise open standards connection option to ensure consumers realize benefits.

4. Minimum Prescriptive Requirements

CEE recognizes that adoption of a pure performance path leaves it entirely up to contractors to choose how they meet these levels and what measures they use to reach the respective targets. In some circumstances, programs may wish to require certain building techniques, design strategies, or technologies as fundamental components that must be included in all projects. This may be especially applicable relative to varying climate factors, unique construction types, local code structures, or cost-effectiveness considerations based on the fuels for which the program claims savings. CEE leaves it up to programs to determine whether the inclusion of minimum prescriptive requirements is appropriate.