

Harmonizing HERS and HEScore

Richard Faesy, Energy Futures Group

Anthony Roy, Earth Advantage

Andy Popp, Missouri Division of Energy

Roger Kainu, Oregon Energy Office

RESNET Conference 3/1/17

Overview

- **Audience Poll**
- **EMPRESS Overview**
- **The Need for Harmonization**
 - Arkansas, Alabama
 - Missouri
 - Massachusetts, Vermont
 - Oregon
- **Options for Harmonization**
- **Discussion and Feedback**

Audience

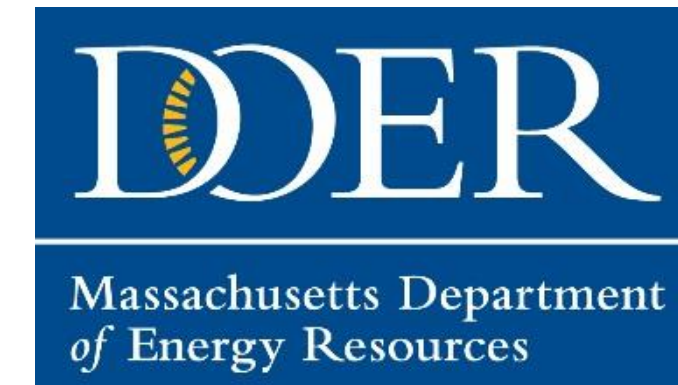
- **Who is here?**
- **What do you want to get out of this session?**

EMPRESS

- **“Energy Metrics to Promote Residential Energy Scorecards in States”**
- **DOE 2-year SEP Project**
- **Harmonizing HERS and U.S. DOE’s Home Energy Score**

The EMPRESS Team

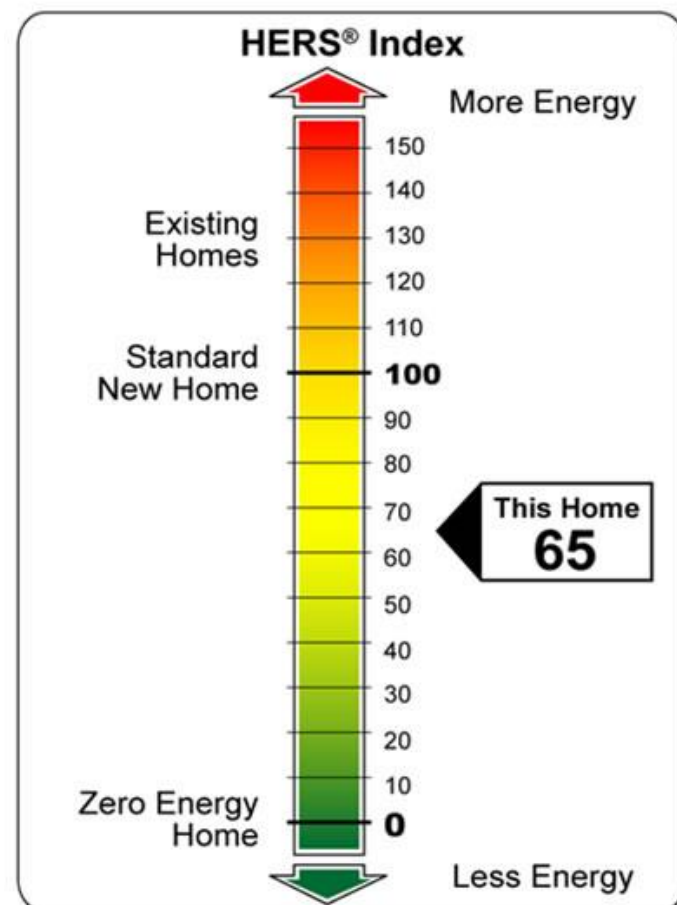
- Rhode Island Office of Energy Resources (OER)
- National Association of State Energy Officials (NASEO)
- Arkansas Energy Office (AEO)
- Massachusetts Department of Energy Resources (DOER)
- Missouri Division of Energy (DE)
- Oregon Department of Energy (ODOE)
- Earth Advantage (EA)
- Energy Futures Group (EFG)
- Vermont Energy Investment Corporation (VEIC)



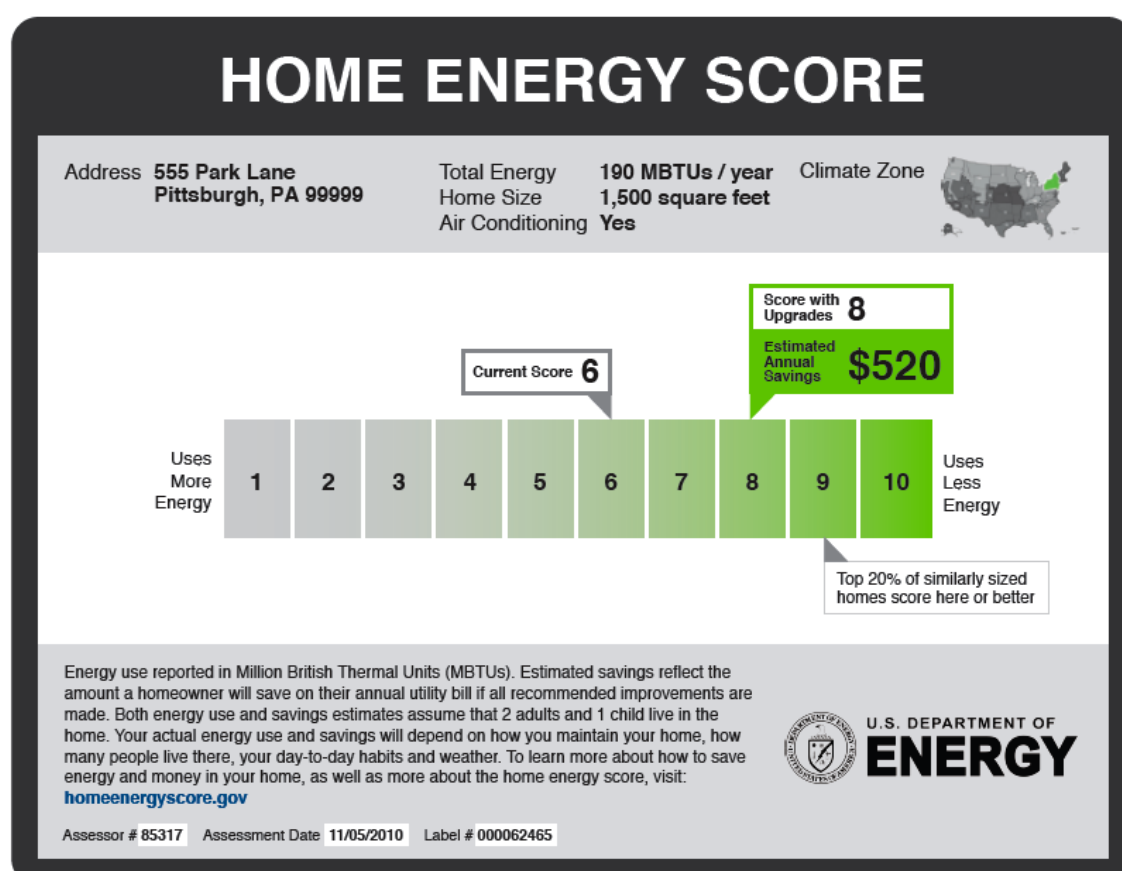
Partners & Collaborators

- **RESNET**
- **U.S. DOE**
- **Software providers**
- **National Labs**
- **Regional Energy Organizations**
- **Others**

Consumer Confusion



- Home Energy Labels have the potential to transform the residential building market by making energy efficiency visible
- 2 primary systems provide info on home energy performance in the US:
 - Home Energy Rating System (HERS) from the Residential Energy Services Network (RESNET)
 - Home Energy Score (HEScore) from the US Department of Energy (DOE)
- These 2 systems calculate and represent energy performance quite differently – leading to market confusion



More Confusion

- **Scores vs Certifications:**

- LEED
- Energy Star
- HERS
- HES
- National Green Building Standard
- Living Building Challenge
- Etc.



Goals of the DOE SEP Grant

Goal 1: More closely align HERS and HEScore, so ratings and performance data are comparable and translatable

Goal 2: Develop and promote model policies and programs that encourage the voluntary use of residential energy data

Goal 3: Educate State Energy Offices, the real estate market, and other stakeholders on the policies, programs, processes, and market-facing information associated with a harmonized approach to home energy labeling

Tentative Conferences

2017 NASEO Annual Meeting

2017 RESNET Conference

2017 Home Performance Conference

2017 ACEEE Market Transformation Symposium

2017 ACEEE Finance Forum

2017 DOE Better Buildings Summit

2017 USGBC GreenBuild

2018 NASEO Winter Meeting

2018 RESNET Conference

2018 Home Performance Conference

How to Be Involved

1. Let us know if you're interested in participating in our stakeholder roundtables
2. Fill out our handout!
3. Help us share our project deliverables



The Need for Harmonization

- **States making the case:**
 - Arkansas & Alabama – Anthony Roy
 - Missouri – Andy Popp
 - Massachusetts & Vermont – Richard Faesy
 - Oregon – Roger Kainu

Arkansas, Alabama

- **Anthony Roy**



The Energy Rating and Scoring Landscape in Alabama and Arkansas

RESNET Conference

March 1, 2017



Welcome

Anthony Roy

Director, Policy & Partnerships
Earth Advantage



Earth Advantage Mission

TO ACCELERATE THE CREATION OF BETTER BUILDINGS

Building Certifications

We provide a suite of building certifications for new homes, remodels, multifamily and small commercial projects.

□ Green Certifications

- Earth Advantage homes ~600 homes in 2016
- LEED for Homes provider ~3000 units in 2016

□ HERS raters on staff (5 HERS raters and 2 RFIs)

□ 100-200 HERS ratings / yr for Federal tax credits and EEMs

Professional Training

We provide training to builders, appraisers, architects, real estate brokers, and remodelers on green building and energy efficiency.

- 5,300 professionals trained
- 2,500 professionals accredited



Research & Policy

Several initiatives focused on making the value of high performance homes visible to the real estate market.

- 3 regional HPH valuation studies completed
- Software solution to autopopulate HPH information into the MLS
- Involved with existing homes energy scoring programs in multiple states.....

Which led us to.....

Alabama and Arkansas

Different States: Common Characteristics



- State agency interest and involvement
- Track record of some HERS activity and Rater infrastructure
- Recent existing homes scoring activity
- Secured DOE funding to support scoring activity for existing homes
- Concerned about future market confusion and barriers to effective implementation



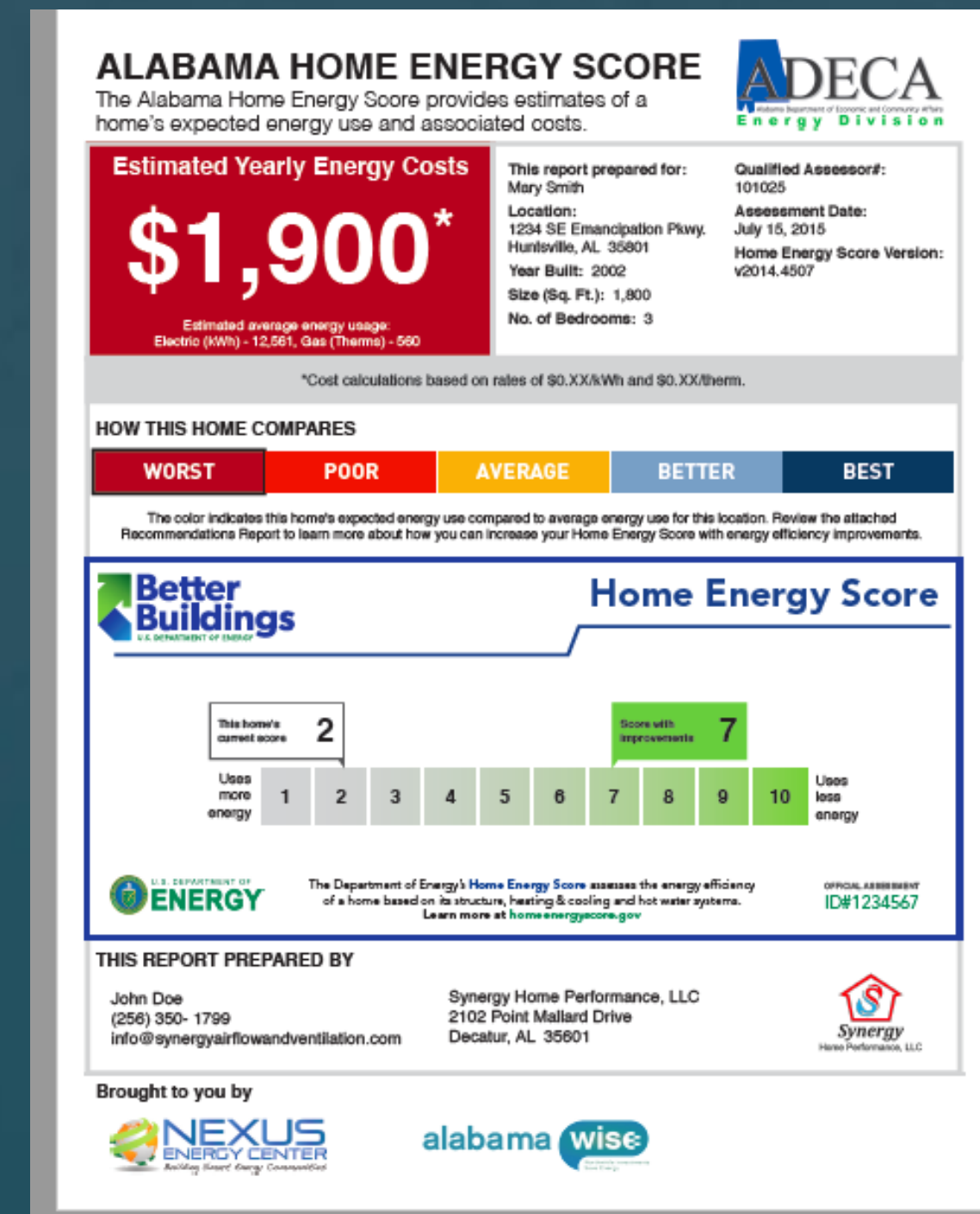
➤ **New Homes**

- New homes EE program: Alabama Power
- HERS can be used for code compliance
- ADECA supported HERS training 2010-12
- Some HPH activity –
 - 187 ENERGY STAR certified homes built in 2016



➤ Existing Homes

- AlabamaWise - first major residential home performance program in the state
- Energy Performance Score (2011-2014)
 - 720 EPS issued
 - MMBTu score
- DOE Home Energy Score (2015-present)
 - 1-10 scale with customized score sheet
 - 3 assessors completed training
- A few localized rebate programs by TVA distributors
 - Escore 1-10 scale



ADECA's position on harmonization of HERS and HES:

- Supports greater market use of HERS for new homes and HES for existing homes
- Supports efforts to display home performance information consistently for all homes in the state
- Open to supporting efforts that move toward similar calculation methodology for HERS and HES



Arkansas

➤ New Homes

- City of Fayetteville requires HERS rating disclosed on all new homes (2012)
- AEO proposed statewide mandatory HERS rating disclosure on all new homes (2015)
- Limited above code construction activity
 - 43 ENERGY STAR certified homes built in

2016



Arkansas

➤ Existing homes

- Arkansas Home Energy Score (2015-present)
- Coordinated with local municipal utility to integrate scores into their home assessment services
- Coordinating with Organic Think and EEtility to produce scores via existing program serving rural co-op utilities
- Training assessors on HES



Arkansas

AEO's position on harmonization of HERS and HES:

- Supports greater market use of existing energy scoring infrastructure and greater collaboration between providers
- Supports efforts to display home performance information consistently for all homes in the state
- Open to supporting efforts that move toward similar calculation methodology for HERS and HES



Missouri

- **Andy Popp**



Missouri Division of Energy Missouri Home Energy Certification (MHEC)

RESNET Building Performance Conference
February 27- March 1, 2017



Department of Economic Development
Division of Energy

About Missouri Division of Energy

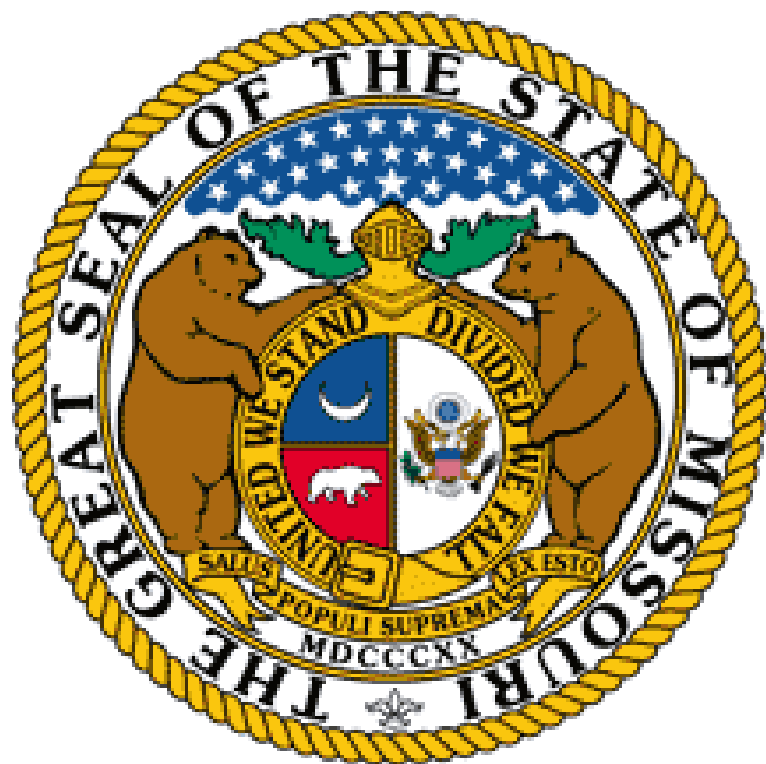
As the state's energy office –

The Missouri Division of Energy assists, educates, and encourages Missourians to advance the efficient use of diverse energy resources to drive economic development, provide for a healthier environment and to achieve greater energy security for future generations.

Missouri Landscape

- Relatively low utility rates.
- Home rule state.
- No statewide energy codes.
- No Public Benefit Funds for EE/RE

Why Missouri Home Energy Certification (MHEC)?



- Decrease marketplace confusion.
- Increase the level of awareness.
- Provide meaningful recognition.
- Make it voluntary.
- Recognize both new and existing homes.

MHEC Highlights



- Involved stakeholders.
- Incorporates existing national and local residential EE programs to create a level of consistency with a single platform.
- Recognizes both new homes and existing homes.

MHEC Program Overview



The Missouri Division of Energy's Home Energy Certification Program

This home has achieved a superior level of energy performance and includes the following home energy components:

- Energy Star heat pump with SEER of 14.5
- R-49 insulation installed on attic floor
- R-15 insulation installed in conditioned basement band joist wall cavity
- Thermal envelope testing of 3ACH50

Certified GOLD

Home address:
1234 Main Street
Anywhere, MO 12345

Home Energy Auditor:
John Doe

Program Provider:
Program Name

System and score:
HES = 8 (or HERS = 65)

Certificate Issued:
June 3, 2014

Certificate Number:
0603141236

Lewis Mills
Director, Division of Energy

The Missouri Home Energy Certification (MHEC) Program is designed to provide for a voluntary approach to promote energy efficient homes through a clear and meaningful recognition program. For more information regarding the program go to <http://energy.mo.gov/energy/mhec>.

- Both new and existing single-family homes are eligible.
- Two certification levels: Gold and Silver.

MHEC Paths for Gold Certification

An eligible home must achieve one of the following:

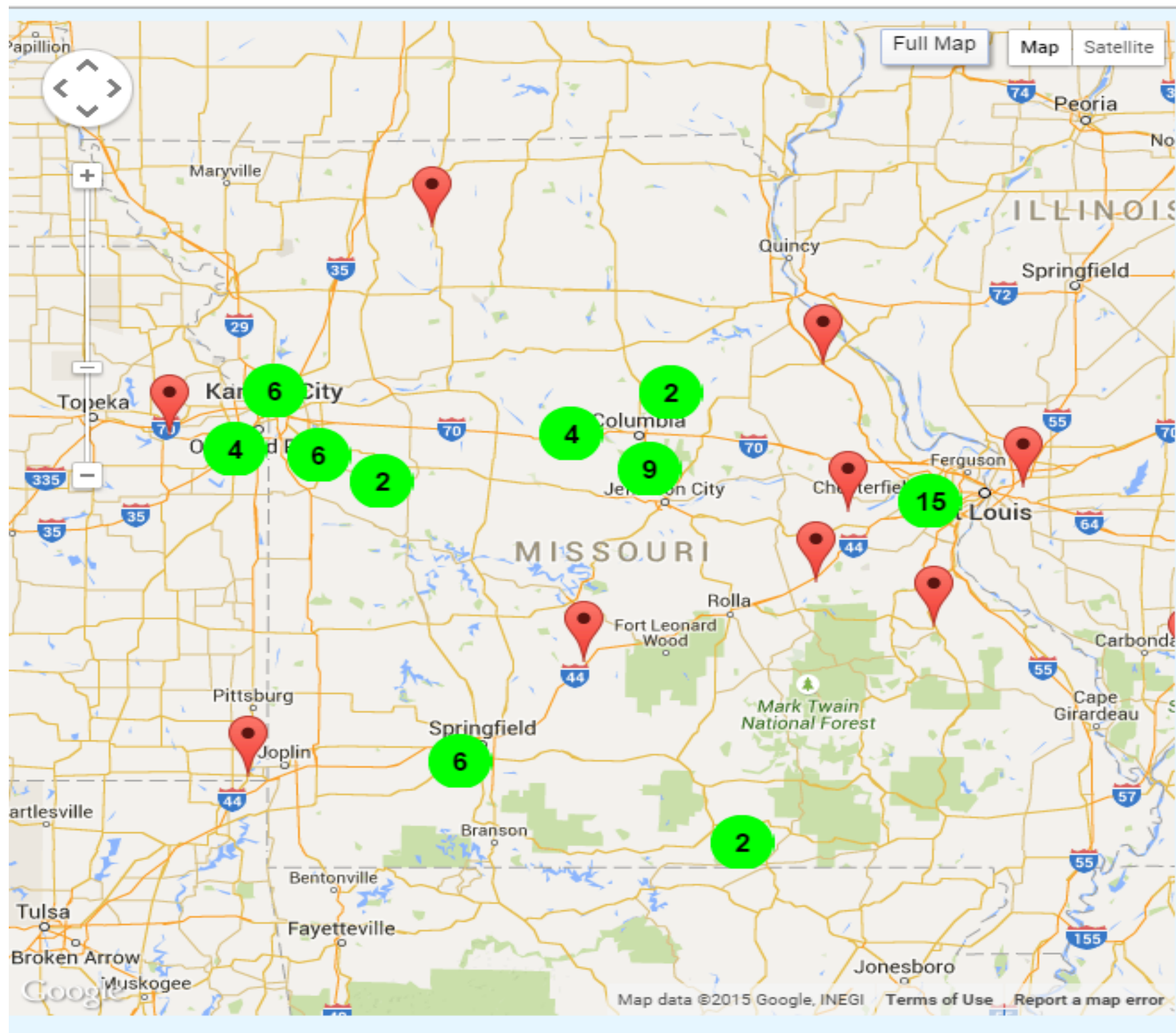
- Score of 65 or less on the HERS Index.
- Score of 8 or greater on the HEScore.
- Achieve the equivalence of the 2012 IECC for climate zone 4.
- Receive a Columbia Water & Light Efficiency Score backed by a HES of 8 or greater.
- ENERGY STAR Certified homes.

MHEC Paths for Silver Certification

An eligible home must achieve one of the following:

- All cost effective improvements in HES have been implemented.
- 20 point decrease on the HERS Index.
- 90% efficiency rating on the CWL Efficiency Score.
- 20% energy savings as modeled by an approved program or approved modeling software.

Missouri Certified Home Energy Auditors



Application Form
& Instructions

<http://energy.mo.gov/energy/hea>

MHEC Next Steps

- Work with Investor-Owned and Municipal Utilities to align energy efficiency programs.
- Reach out to realtors, inspectors, appraisers and homebuilder organizations.
- Survey modeling software used by home energy auditors.
- Work with residential energy stakeholders to overcome technical and market barriers.

For More MHEC Information

- **Visit our program webpage:**

<http://energy.mo.gov/energy/mhec> or

email mhec@ded.mo.gov

- **Contact:**

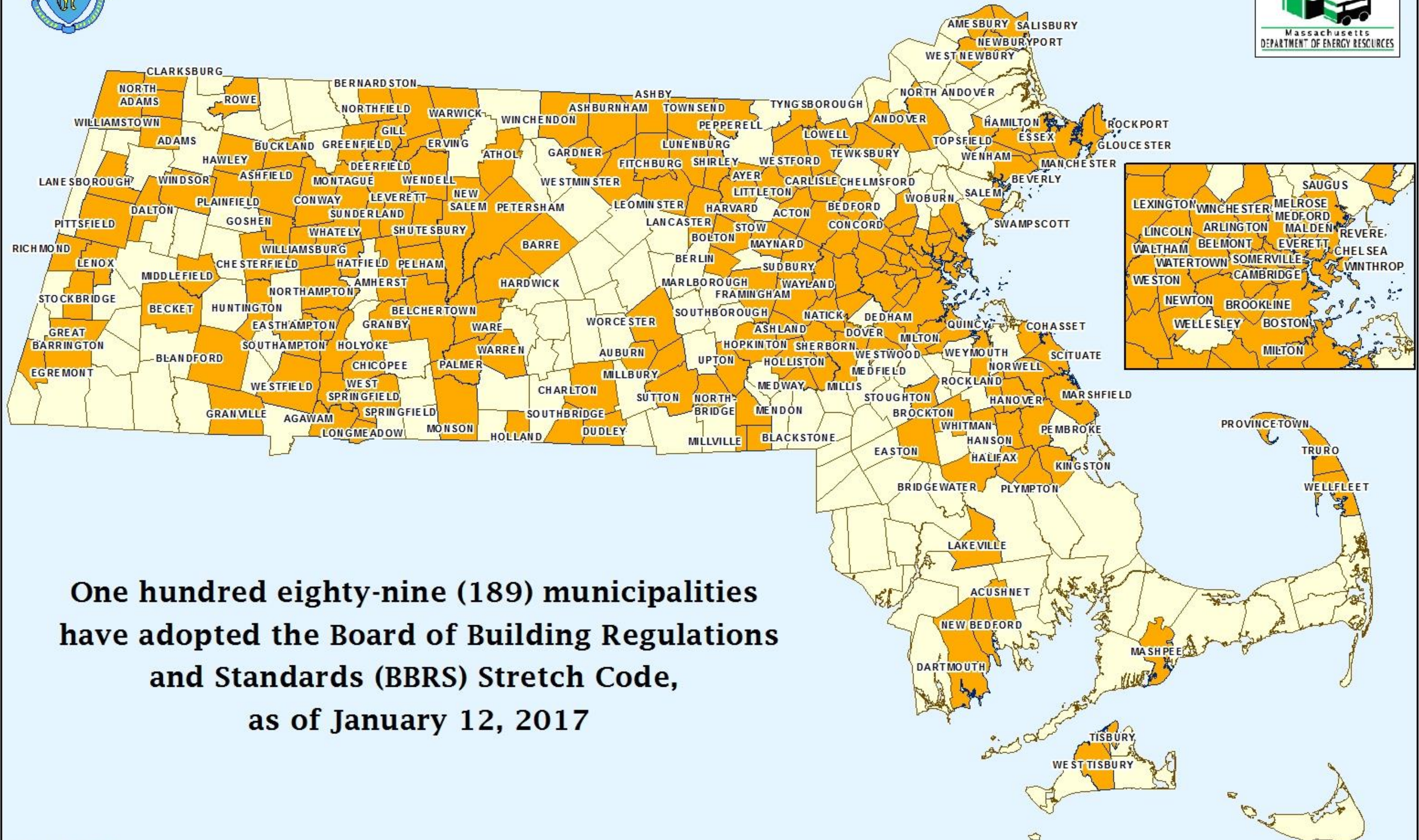
➤ Andy Popp

(855) 522-2796

andy.popp@ded.mo.gov

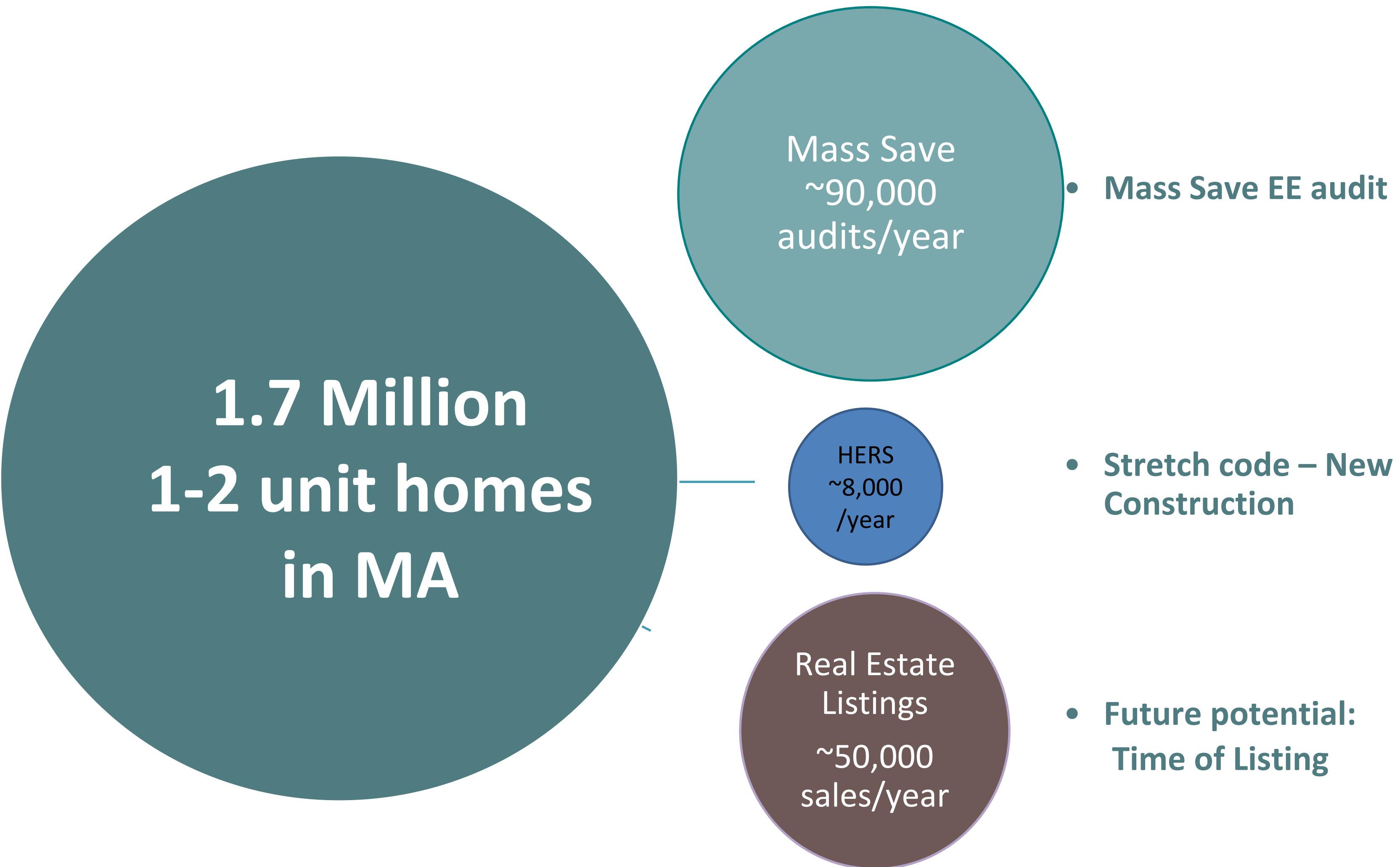
Massachusetts

- **Richard Faesy**



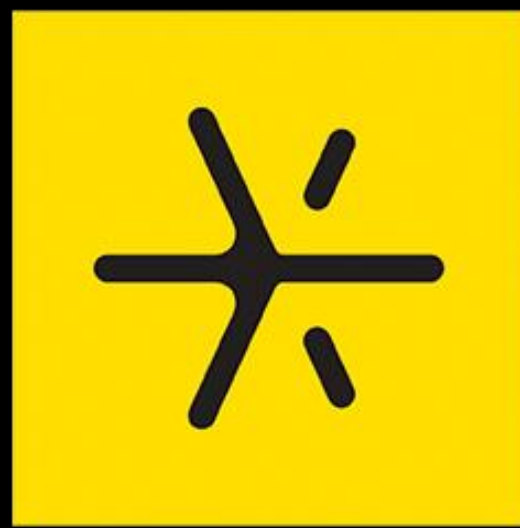
DOER, 1-13-17, jpfister

Delivery Mechanisms for a Home Score



Vermont

- **Richard Faesy**



Vermont
Energy Investment
Corporation

Market Confusion Goes Beyond HERS/HES

Home Performance with ENERGY STAR® Summary of Energy Improvements Performed

Home Performance Improvements:

- Your home was air sealed
- Attic insulation was improved from R-13 to R-38
- Windows were sealed
- Insulation was installed
- Uninsulated basement walls were sealed
- Water heater replaced with an Energy Star model
- Water heater venting checked for combustion safety
- Homeowner/contractor tested for combustion safety

Home Performance Results Achieved:

Compliance and condition of your home, the energy performance, and the efficiency of the improvements you have made.

Environmental Impact of Improvements:

Energy, greenhouse gas, and water savings.

Home Address:
Susan Hall
1001 West End Ct
Charlottesville, VA 22902

Work Performed by:
HomeSmart

Work Verified by:
Energy Alliance Program

leap
Home Energy Assessment Program

UtilityCo Home Energy Report

Account number: 1234567890
Report period: 02/01/09 – 03/01/10

We are pleased to provide this person, to help you save energy.

The purpose of the report is to:

- Provide information
- Help you track your progress
- Share energy efficiency tips

This information and more is available at UtilityCo.com/reports

BOB SMITH
1515 N COURTHOUSE RD
ARLINGTON, VA 22042

Last Month Neighbor Comparison

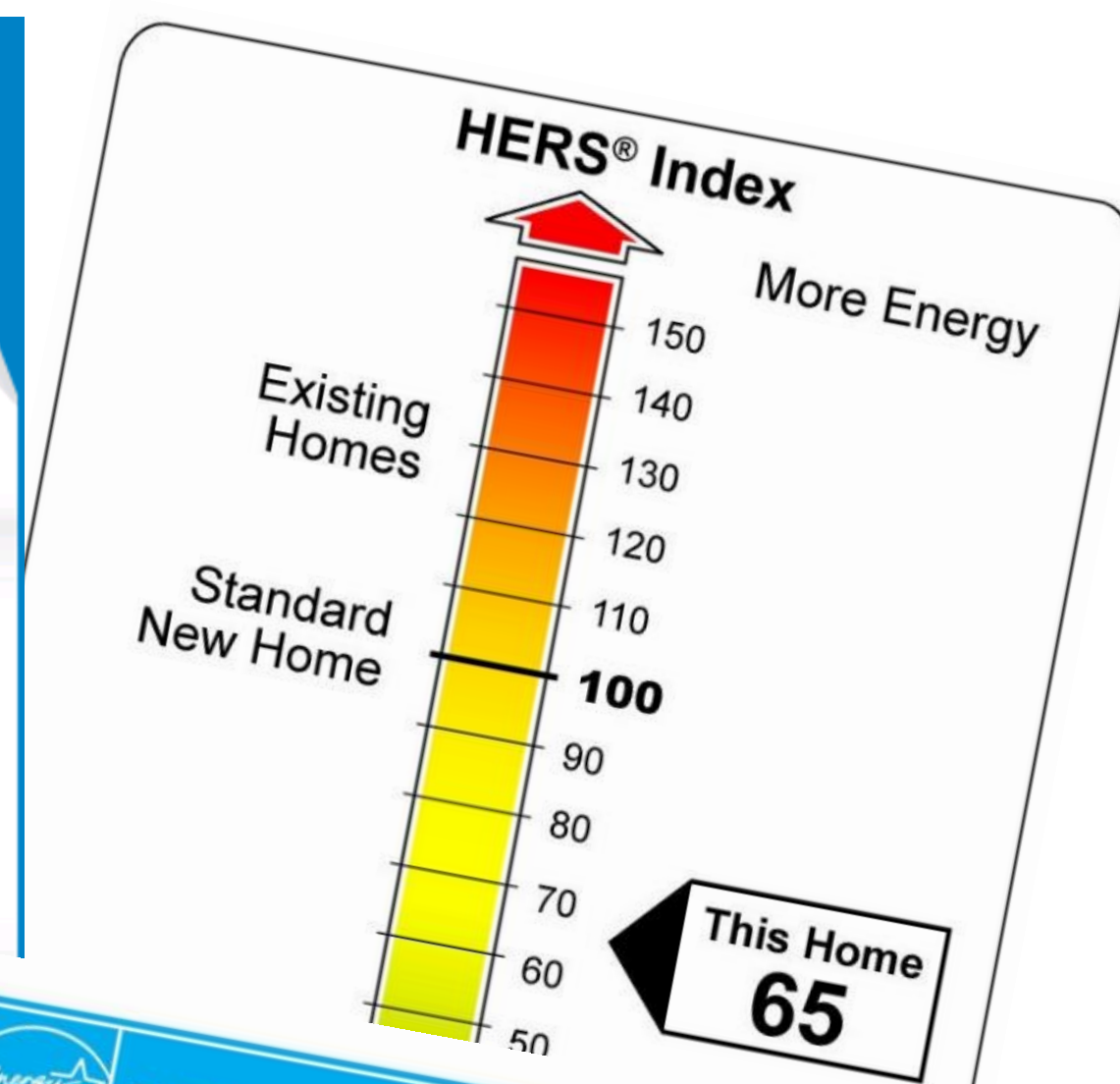
You used **22% MORE** energy than your efficient neighbors.

Category	Energy Index
Efficient Neighbors	1,266*
YOU	1,544
All Neighbors	1,704

* This energy index combines electricity (kWh) and natural gas (therms) into a single measurement.

Who are your Neighbors?

- All Neighbors:** Approximately 100 occupied, nearby homes that are similar in size.
- Efficient Neighbors:** The most efficient 20 percent from the All Neighbors.



VT HOME ENERGY PROFILE

THIS HOME'S EXPECTED ENERGY USE
93 MMBtu ANNUALLY

THIS HOME'S EXPECTED ENERGY COST
\$3,137 ANNUALLY

HOME ENERGY SCORE
9/10

Expected Annual Energy Usage

This scale represents how much energy this home is expected to use over the course of a year, placed on a scale of 0 to 300+, where zero energy usage is most efficient.

This home's usage: 93

MMBtu/yr

LOWEST ENERGY USE

HIGHEST ENERGY USE

0 40 90 300

40 High Performance Home (RSES 2015)

Expected Annual Energy Costs

\$3,137

The breakdown of fuel usage is an estimate based on the fuels used in this home and average fuel costs as of January 2016.

Fuel Type	Cost
Propane	\$1,578 (631 gal @ \$2.50 / gal)
Electric	\$1,559 (10,296 kWh @ \$0.15 / kWh)

HOME INFORMATION
LOCATION: 123 Main Street, Anytown, VT 05000
YEAR BUILT: 2005
CONDITIONED FLOOR AREA: 3,029 sq. ft.
Includes all spaces that are intentionally heated or cooled. This value may differ from a home's appraised square footage.

REPORT INFORMATION
PROFILE ISSUE DATE: 6/10/15
ASSESSOR: John Doe
ORGANIZATION: Sample A. Sample Contracting
PHONE: 555-1111

Home Energy Score
9/10

Better Buildings
U.S. Green Building Council

Efficiency Vermont

Rebates Services Products & Technologies Tips & Tools Find a Contractor or Retailer

Home Energy Assessments

The first step in saving energy is understanding how much you use and which products or systems use the most.

An energy assessment helps you understand where your home is losing heat or wasting electricity, and how you can address it. You can do a basic assessment on your own with some help from us, or you can have a professional contractor do an assessment for you. We manage a network of qualified contractors who have knowledge of building science, and experience with a range of building types.

HIGHLIGHTS

- Do an assessment on your own and technical support from us
- Get clear advice on the most effective ways to lower your heating and electricity bills
- Access a trusted network of Performance with ENERGY STAR® contractors

Contact Us

ENERGY STAR® CERTIFIED NEW HOME

Builder Name:
Permit Date/Number:
Home Address:

Rating Company:
Rating Identification Number:
Version: 3.0

Standard Features of an ENERGY STAR Certified New Home

Your ENERGY STAR certified new home has been designed, constructed, and independently verified to meet rigorous requirements for energy efficiency set by the U.S. Environmental Protection Agency (EPA), including:

- Thermal Enclosure System**
A complete thermal enclosure system that includes comprehensive air sealing, quality-installed insulation and high-performing windows to deliver improved comfort and lower utility bills.
Air Infiltration Test: Htg: 964 Cfg: 964 CFM50
Primary Insulation Levels:
Ceiling: R-43.0
AGWall: R-23.0
Primary Window Efficiency:
U-Value: 0.320, SHGC: 0.220
- Water Management System**
A comprehensive water management system to protect roofs, walls, and foundations.
Flashing, a drainage plane, and site grading to move water from the roof to the ground and then away from the home.
Water-resistant materials on below-grade walls and underneath slabs to reduce the potential for water entering into the home.
Management of moisture levels in building materials during construction.
- Heating, Cooling, and Ventilation System**
A high-efficiency heating, cooling system, and ventilation system that is designed and installed for optimal performance.
Total Duct Leakage: 107.50 CFM @ 25 Pascals
Duct Leakage to Outdoors: 1.00 CFM @ 25 Pascals
Primary Heating (System Type • Fuel Type • Efficiency):
Fuel-fired air distribution, Natural gas, 92.1 AFUE
Primary Cooling (System Type • Fuel Type • Efficiency):
Air conditioner, Electric, 13.0 SEER.
- Energy Efficient Lighting and Appliances**
Energy efficient products to help reduce utility bills, while providing high-quality performance.
ENERGY STAR Qualified Lighting: 75%
Refrigerators: 1
Ceiling Fans: 2
Dishwashers: 1
Exhaust Fans: 5
Primary Water Heater (System Type • Fuel Type • Efficiency):
Instant water heater, Natural gas, 0.82 EF, 0.6 Gal.

LESS EFFICIENT



And more!



Confusions:

- Is a high score or a low score good?
- Entering a “0” HERS score for no score
- Entering a “5” HERS score for 5 Stars
 - which after the switch to the Index Stars became meaningless in Vermont (all our homes are 5 Stars Plus)
- We had a lot of Index Scores of 6 as well
 - Realtors® entered 5 Stars Plus (as 5.5)

But, Realtors are excited about labeling:

- Home buyers are starting to ask about the different aspects of home energy consumption. Labeling helps standardize and share information
- Attracted by increased sale prices and shorter sell times
- Will be most valuable if appraisers can evaluate efficiency as well
- Need clearer call to action in confused market
- Vermont Realtors are supporting mandatory time-of-sale disclosure handout on home energy programs, including Home Energy Score (“Profile”)

Oregon

- **Roger Kainu**

Home Energy Performance Scoring

Leading the integration of energy use information for homes



→ Solution that serves the market

→ Consumer Protection from Energy Expertise

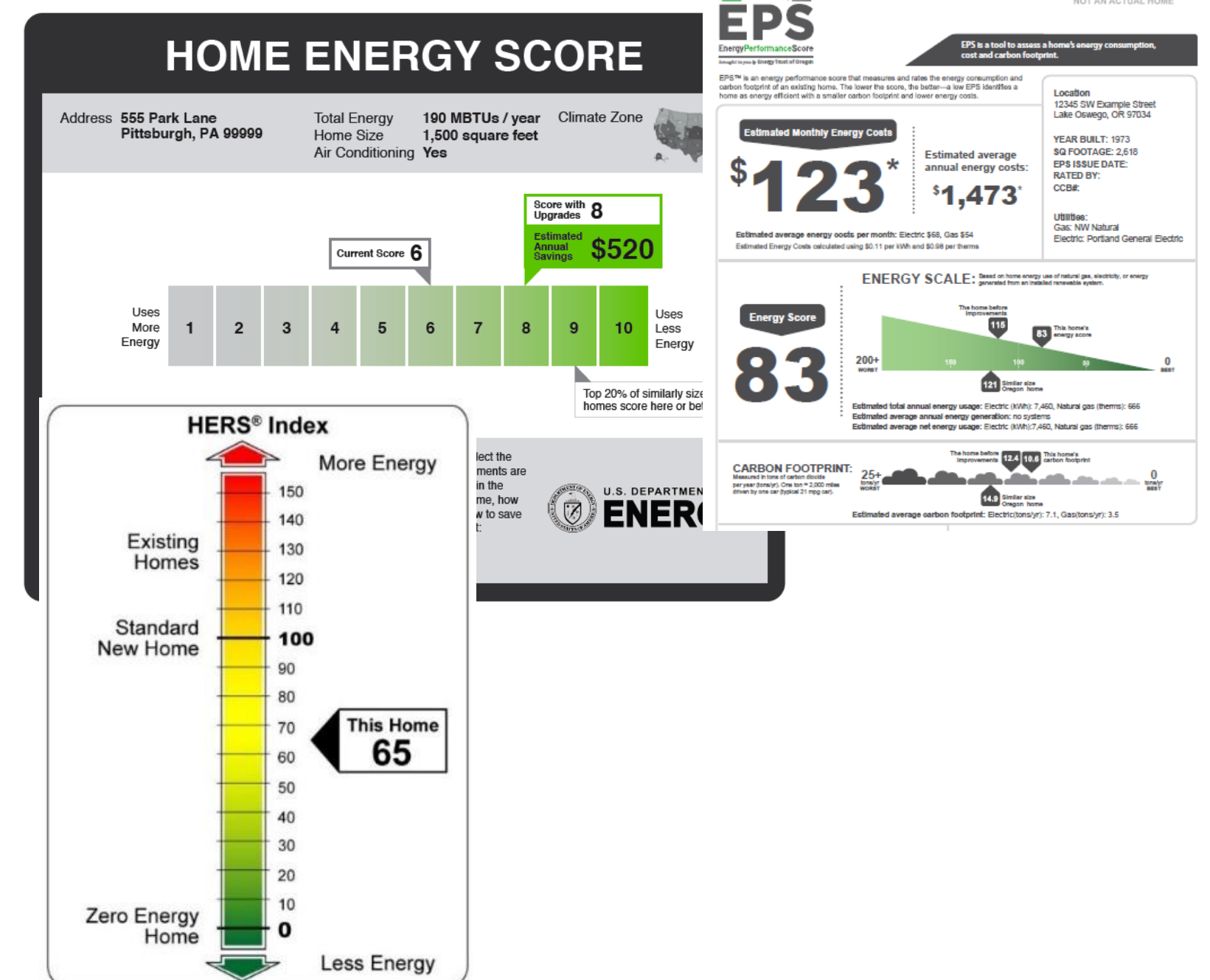
- **Contractors:** Presenting meaningful, consistent information
- **Homeowners:** When considering energy efficiency upgrades
- **Homebuyers:** Principal. Interest, Tax, Insurance + Energy
- **Real estate professionals:** Credible additional information on the listing
- **Energy Efficiency programs:**
Consistent language of energy use



Home Energy Performance Scoring

Leveling the field

- Stakeholder Panel
- Training Requirements
- Select a system or standard
- Market based delivery
- Data gathering
- National participation



Portland Oregon – Mandatory Energy Scoring - effective 1/1/2018

Why a home energy score policy?

Scores, labels and ratings are a regular part of how we communicate information. We consult miles-per-gallon ratings on cars, nutrition labels on food, and Energy Guide labels on appliances to make informed consumer decisions. However, **consumer labeling for homes is inconsistent and unavailable** in most real estate markets.

Of Portland's 160,000 single-family homes, **less than two percent** have an energy score.

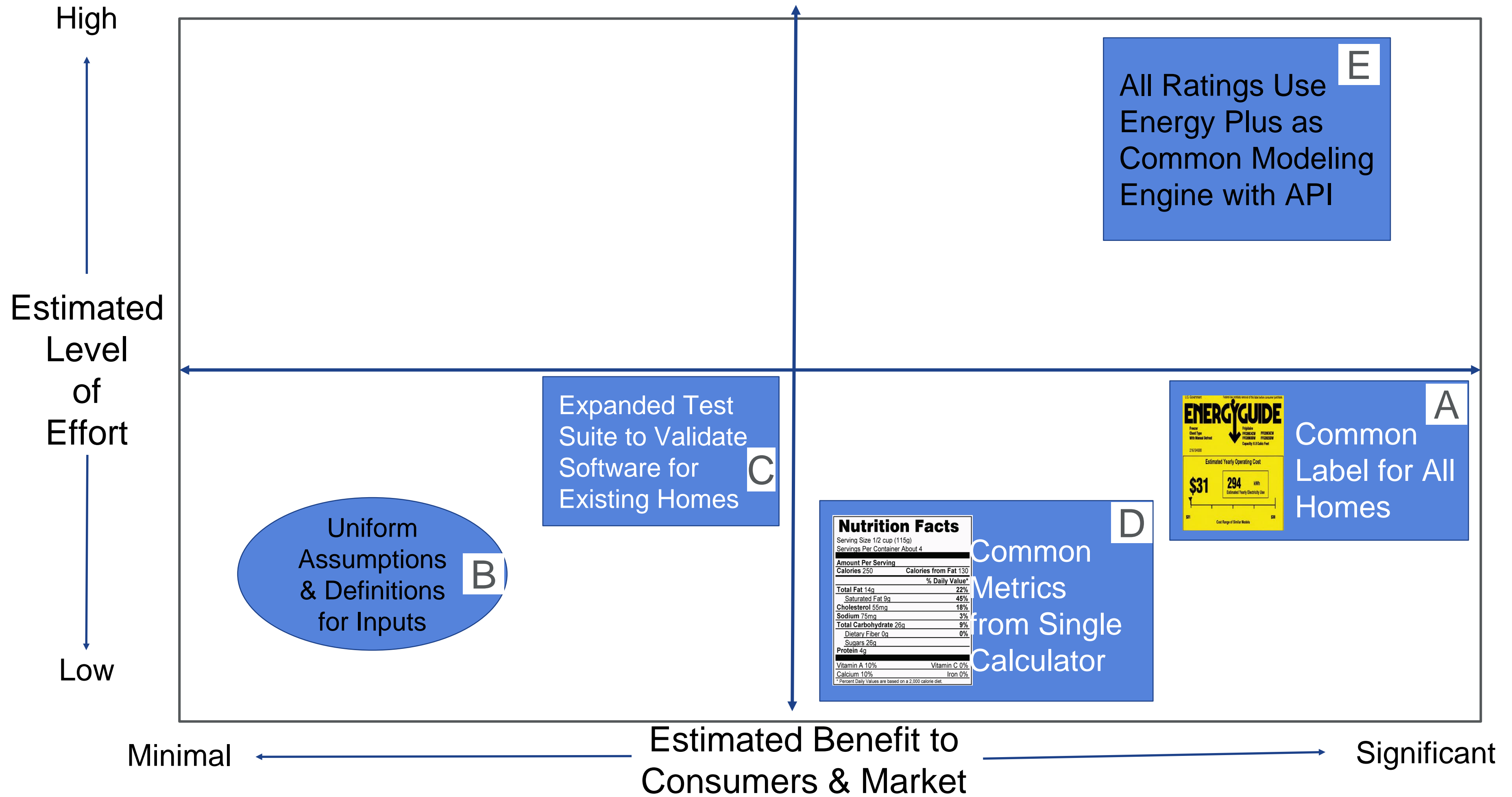


Options for Harmonization

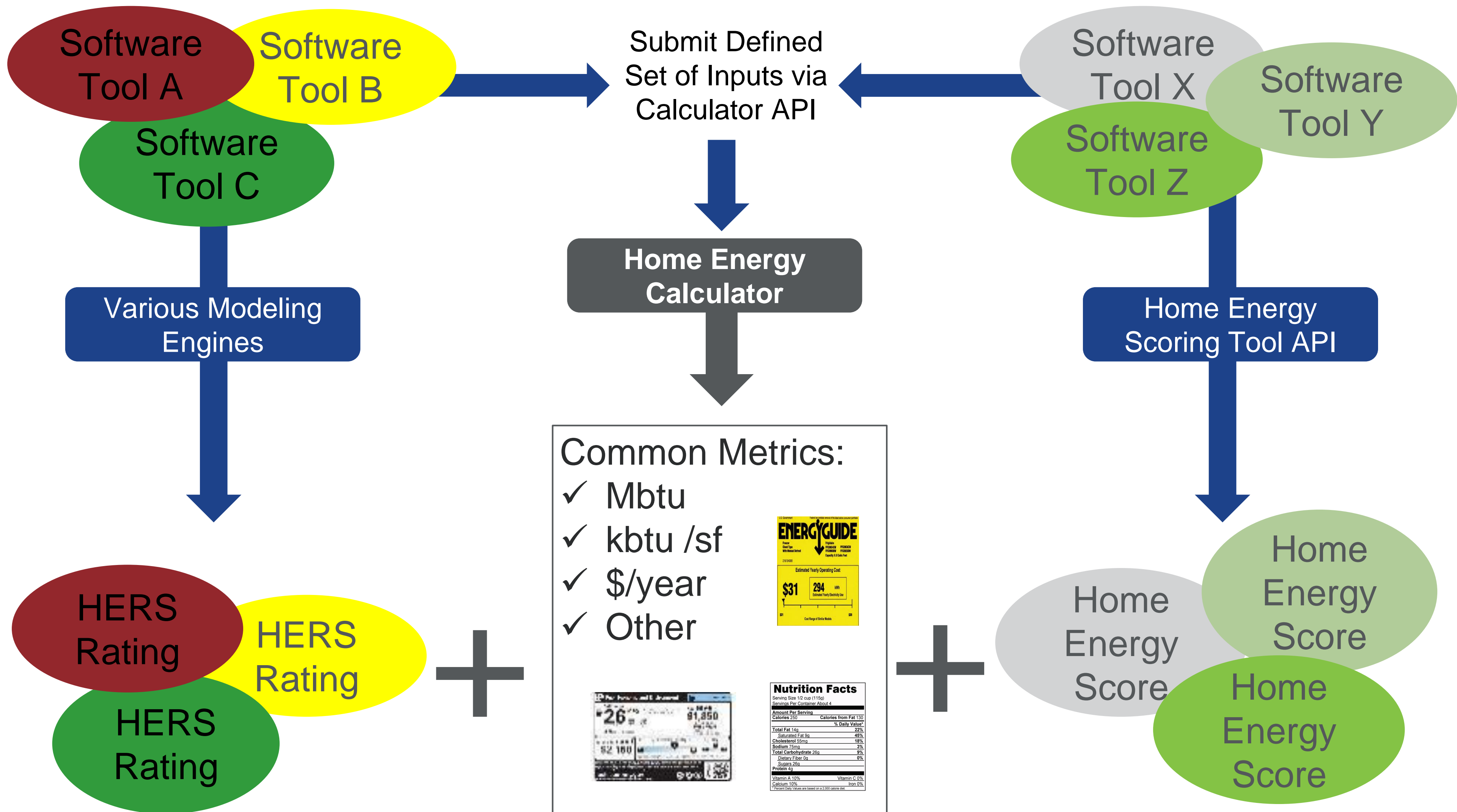
Some Potential Harmonization Options

- A. Common Reporting (e.g., “Yellow EnergyGuide Label”)
- B. Align Inputs and Assumptions
 - Thermostat set points
 - Weather data
 - Number of occupants
 - Other
- C. Expanded Test Suite to Validate Software for Existing Homes
- D. Common Metrics form Single Calculator
- E. EnergyPlus as Common Modeling Engine

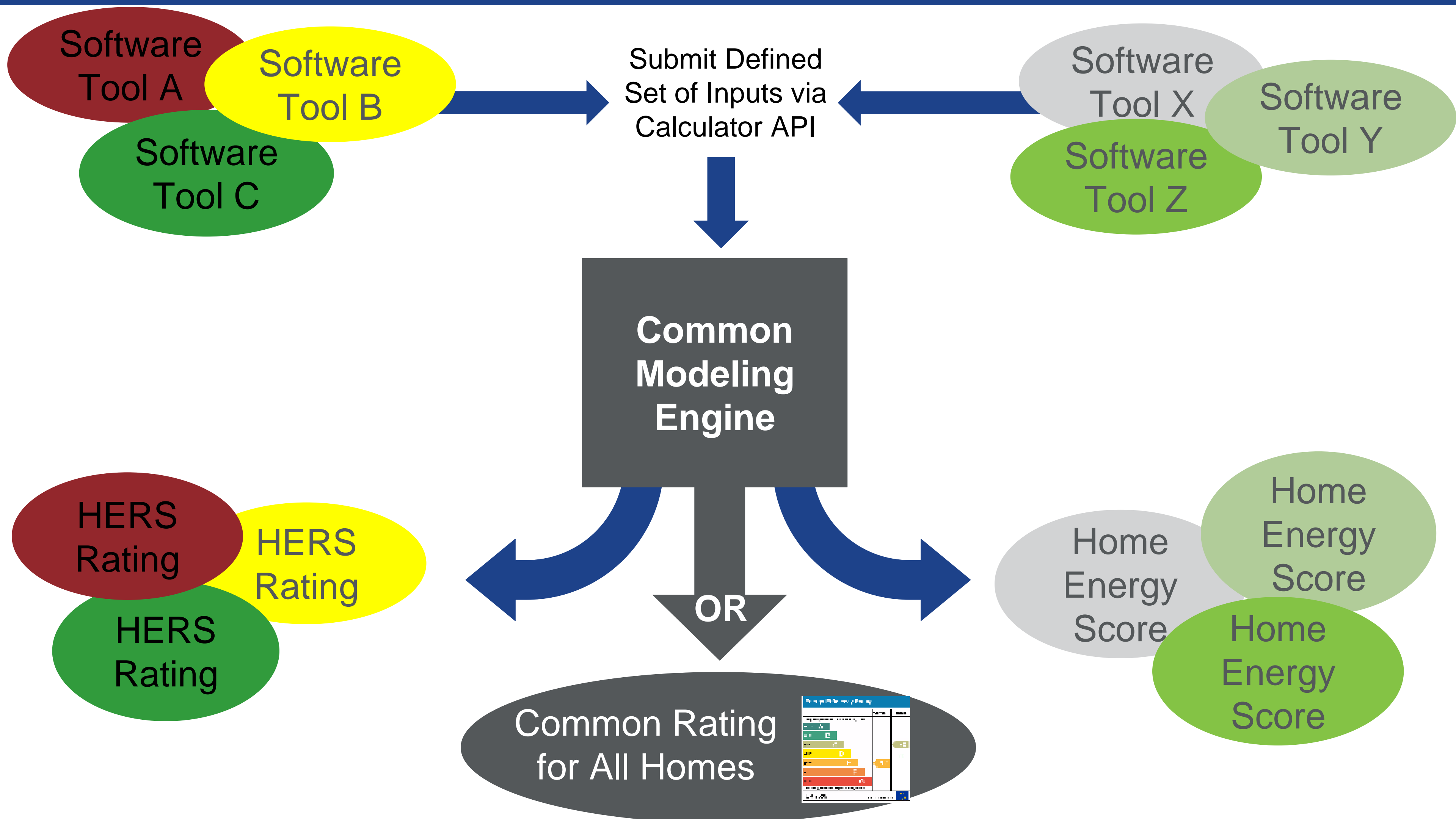
Options Range from Complex to Relatively Simple



D. Common Metrics from a Single Calculator



E. IT Configuration for a Common Modeling Engine



What do you think?

- Do any of these options resonate?
- Are any of these options worth pursuing?
- What other ideas do you have that might work?
- Pros/cons?
- What should we be considering as we move forward?
- Cautions, booby-traps, pit-falls?
- Suggested next steps?

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