



# Making sense of energy code compliance in MA

DOE BTO Technical Meeting

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# What do we want?

Improved energy performance of buildings

...Without sacrificing durability

...At a reasonable cost

...In the context of 80% GHG reductions by 2050

# Which home is zero net energy?



# What is possible?

- Residential - ZNEB with solar exposure or
  - Passivehaus
- Commercial – Near Zero not Net Zero
  - Passivehaus?
- Location matters too

# Exceeding 90% code compliance

While moving codes towards zero energy

- Requires broad stakeholder buy-in
  - expectation of improving performance
- Requires clear performance metrics
  - that change frequently!

# Exceeding 90% code compliance

Implies:

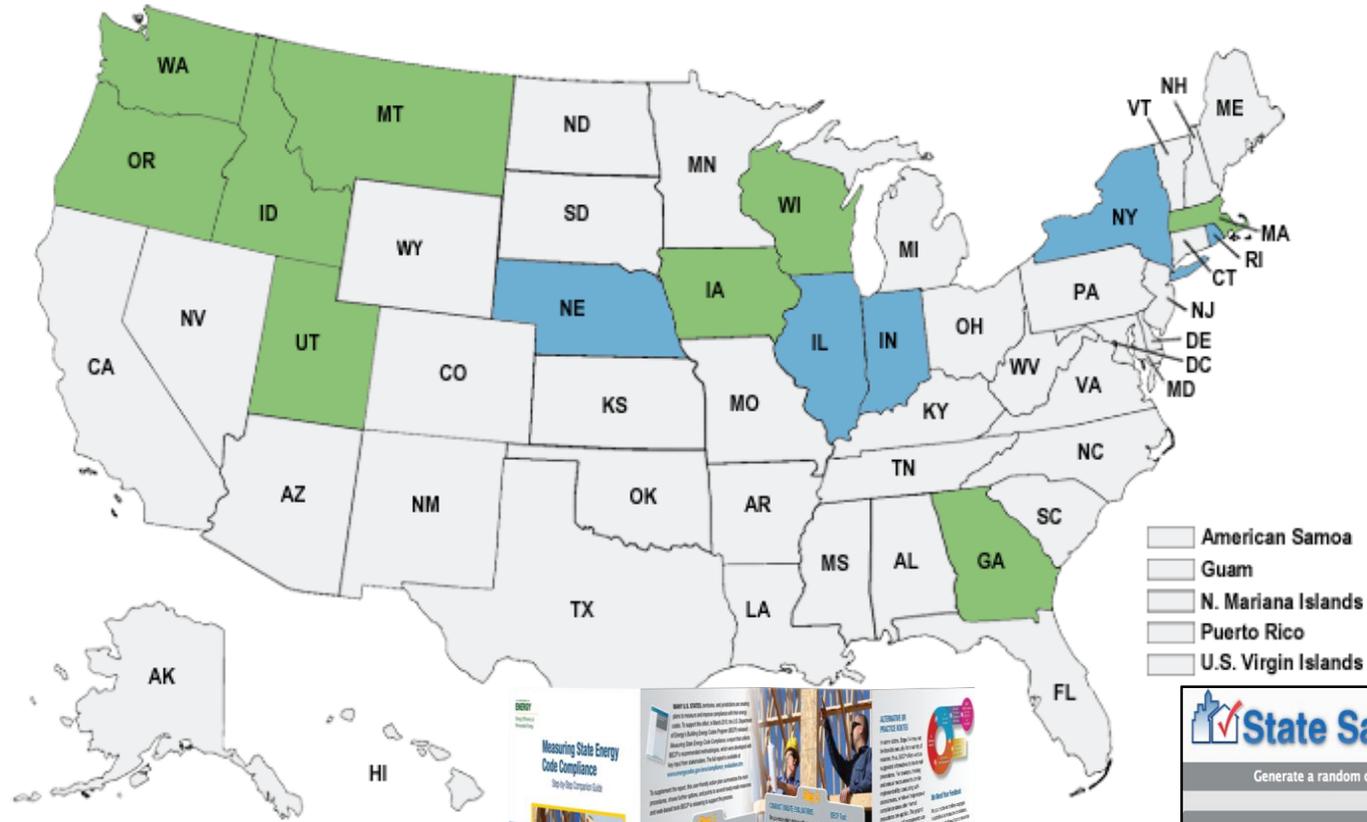
1. moving away from prescriptive energy codes
2. towards energy modeling validated by diagnostic testing
3. additional support/expertise for municipal code officials



# Question

- How does this relate to 90% code compliance?

# BECP/PNNL 8 Pilot Studies 2011



Creating A Cleaner Energy Future For the Commonwealth

State Sample Generator

Generate a random code compliance sample. Learn more...

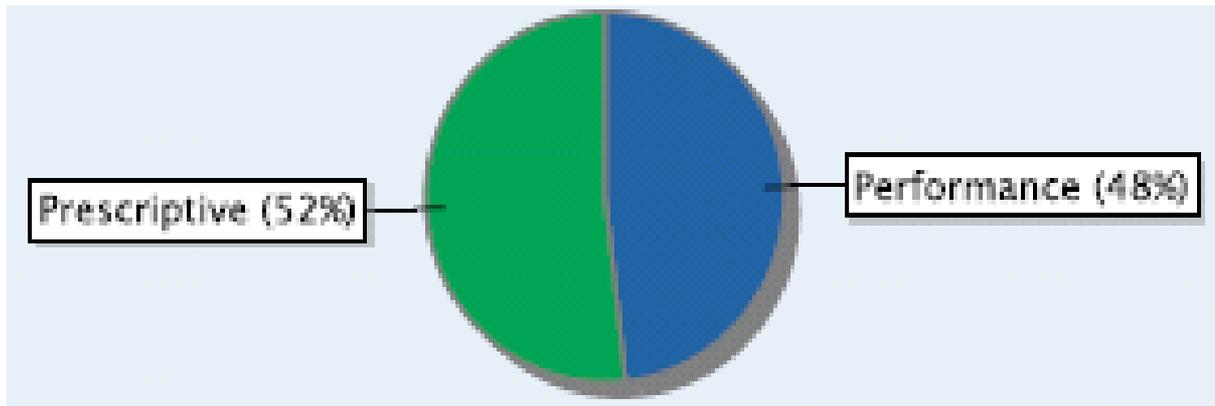
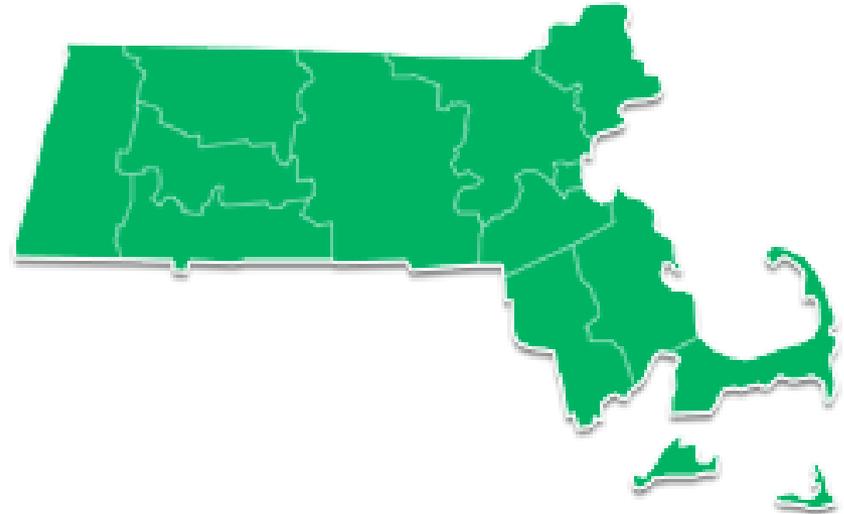
SELECT A STATE

Click a state to generate construction samples.

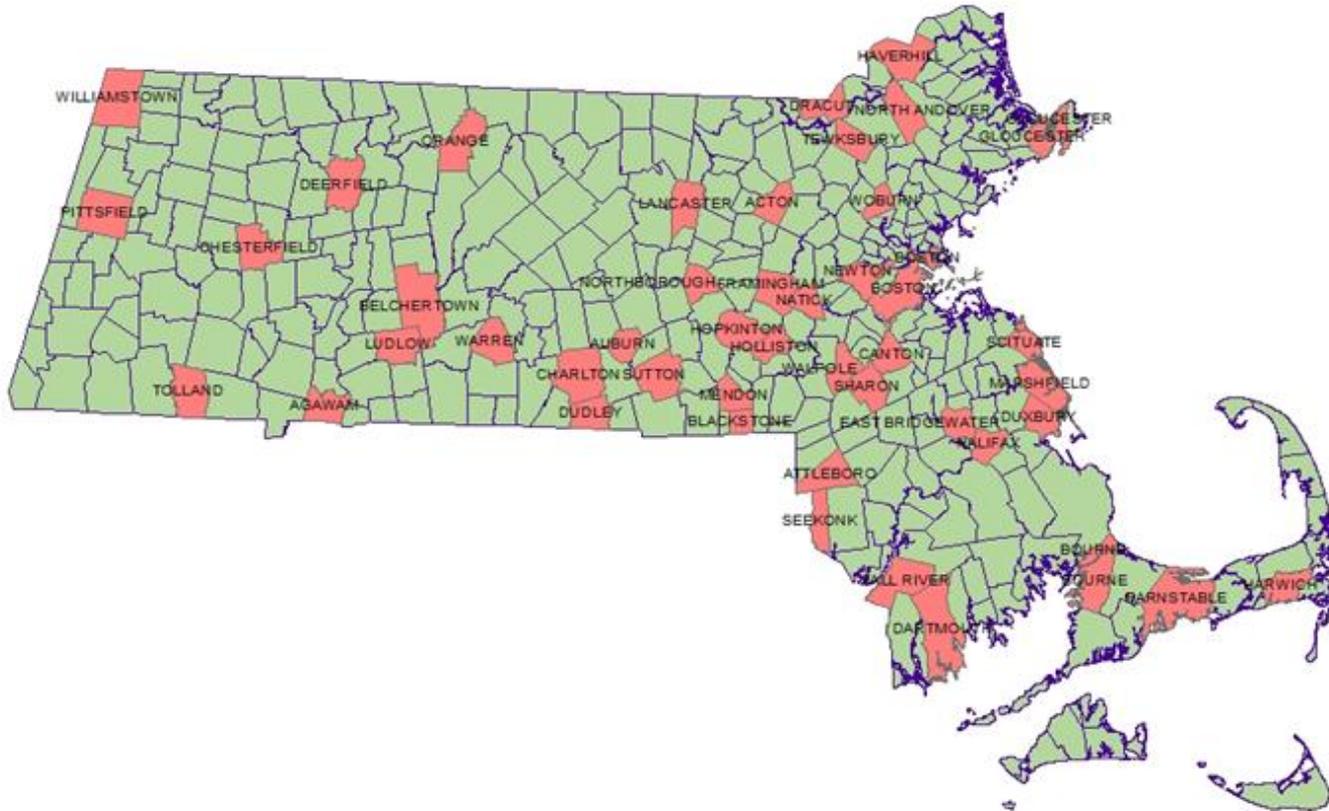
State:

# Massachusetts (2006 IECC)

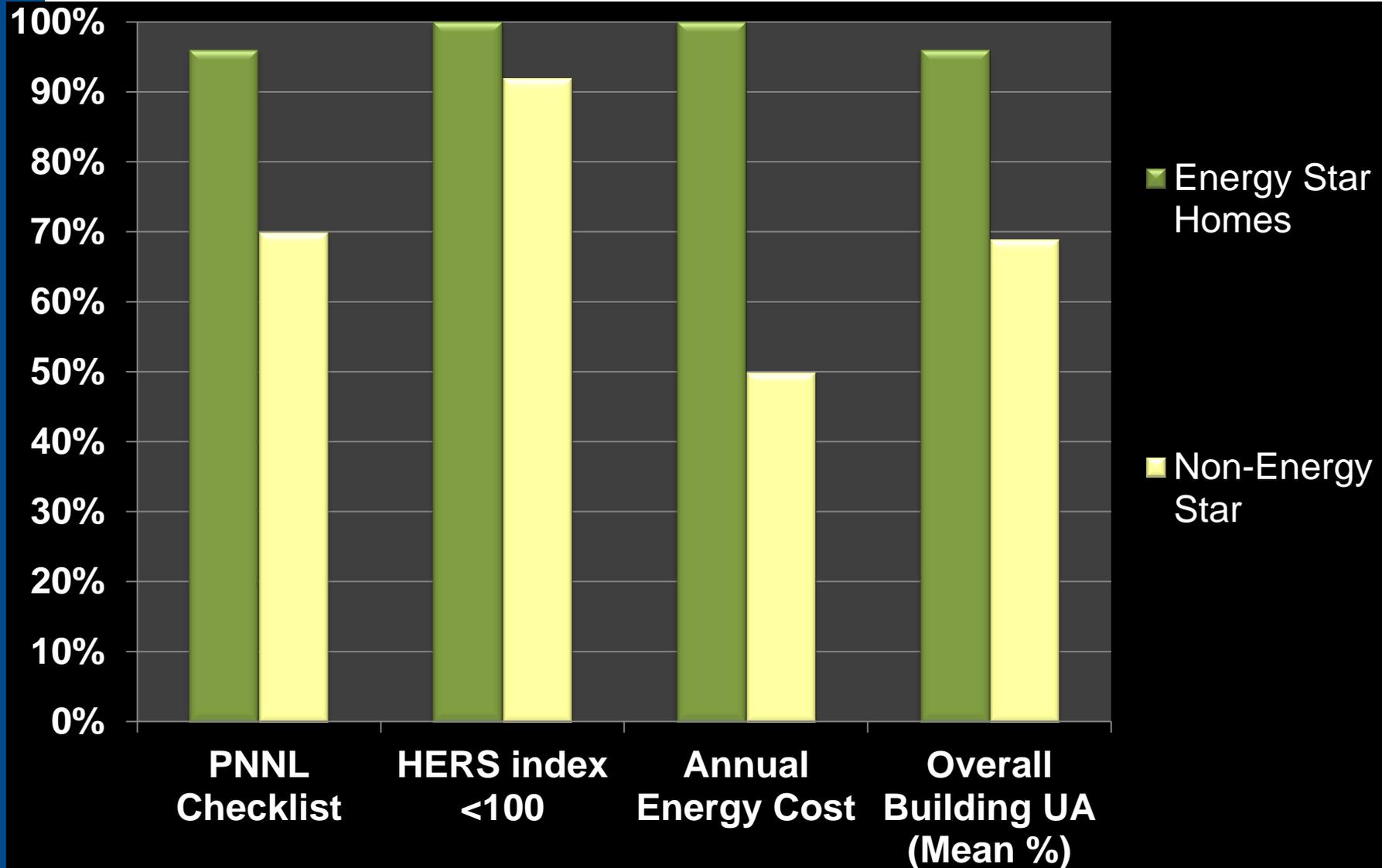
- 50 new code-built residential homes
- 50 new ENERGY STAR qualified homes



# Good sampling

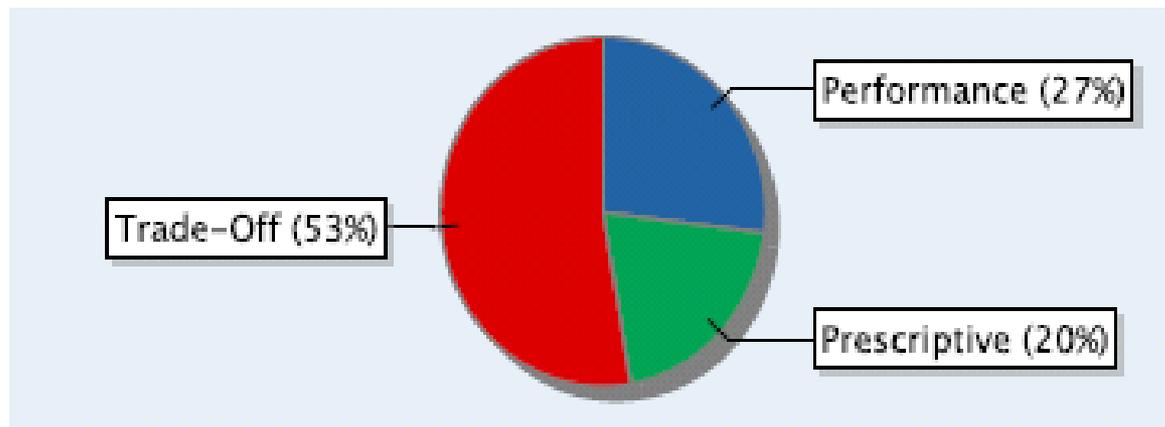
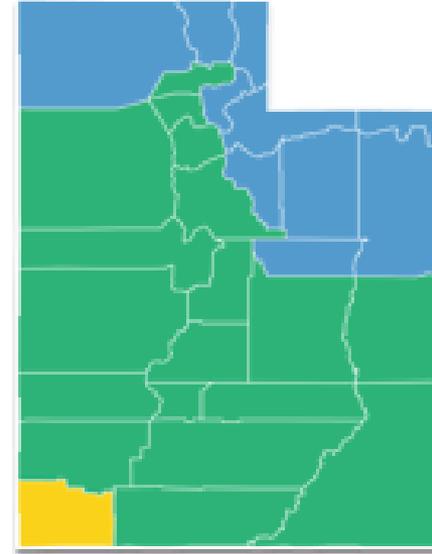


# Initially difficult results

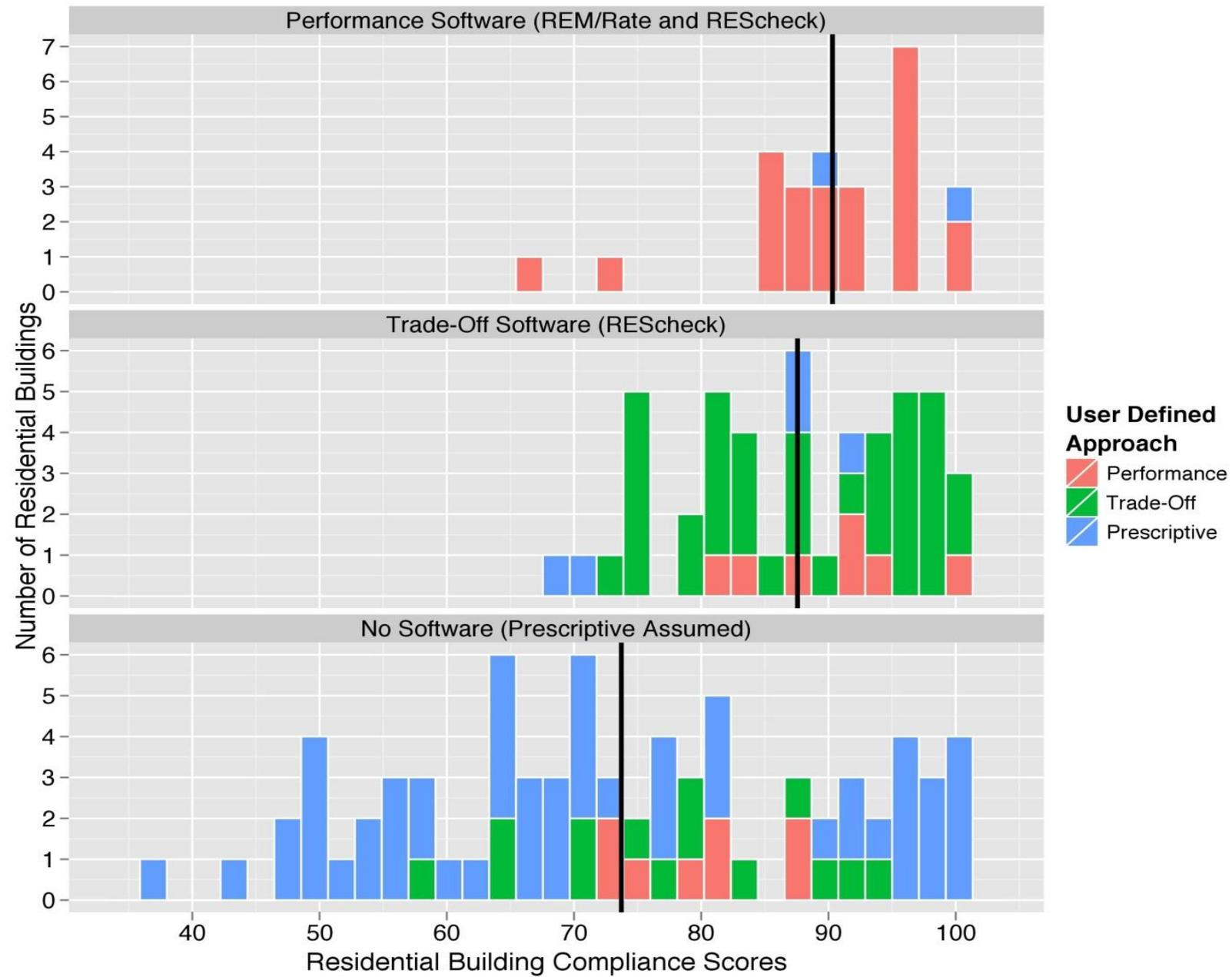


# Utah (2006 IECC)

- The study evaluated 53 new residential buildings against the 2006 IECC



# Residential compliance - by software



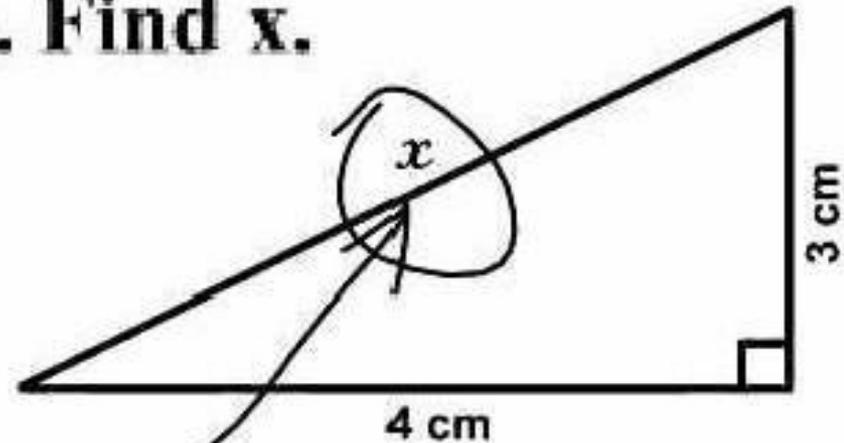
# PNNL Study: Lessons Learned

- The top barriers to compliance are
  - Training
  - Lack of resources
  - Lack of compliance information on plan submissions
- Software tools associated with trade-off and performance-based compliance approaches, demonstrated a strong correlation with higher compliance rates

# Want Compliance? Make it simpler

- Use modeling software to make code more concise and performance-oriented
- Use real-world diagnostic test data
- Make compliance simpler to calculate
- Make building performance as intuitive as car MPG

**3. Find  $x$ .**



*Here it is*

# Embedding Performance

- Stretch Energy Code – 123 Communities
- Large Commercial Bldgs. – MEPA GHG review
- State Bldgs. – MA LEED+ standard
- Green Schools – Mass CHPS
- Municipal Bldgs. – Mass Energy Insight
- Home & Office MPG labeling pilots