

Introducing NH to the 2015 International Energy Conservation Code

Energy Efficiency and Sustainable Energy Board

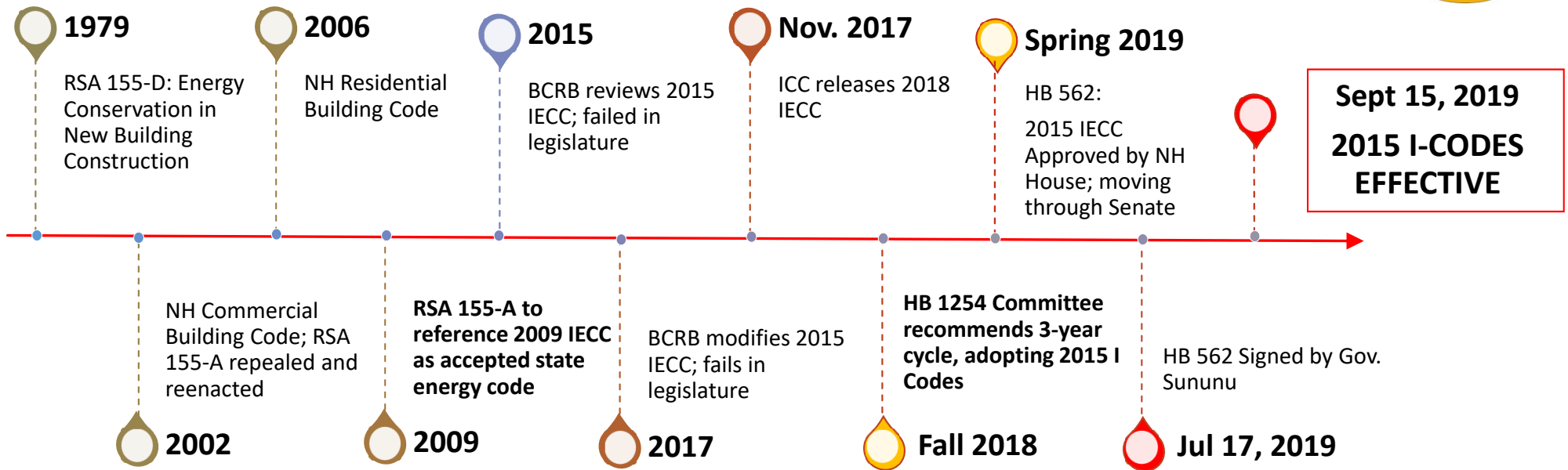
November 8, 2019

presented by **GDS ASSOCIATES, INC.**

| AGENDA

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- CODE ADOPTION HISTORY AND PROCESS
 - IMPACTFUL CHANGES IN THE 2015 IECC
 - NH'S AMENDMENTS
 - EARLY INDUSTRY REACTION
 - PATHWAY FORWARD

NH Energy Code Timeline



HB 562

- Signed by Gov. Sununu 7/17/2019
- Effective 9/15/2019
- Updates NH to 2015 I-Codes, adds refer pools and spa code
- Adds Int'l Pool and Spa Code to Building Code def.
- Ratifies NH BCRB Amendments

HB 710-FN

- Signed by Gov. Sununu 7/12/2019
- Effective 8/11/2019
- State Building Code Review Board may recommend adoption of a newer version of a code that has been published for at least 2 years

The Family of I-Codes

- International Code Council (ICC) established in 1994
- Dedicated to developing a single set of comprehensive and coordinated national model construction codes

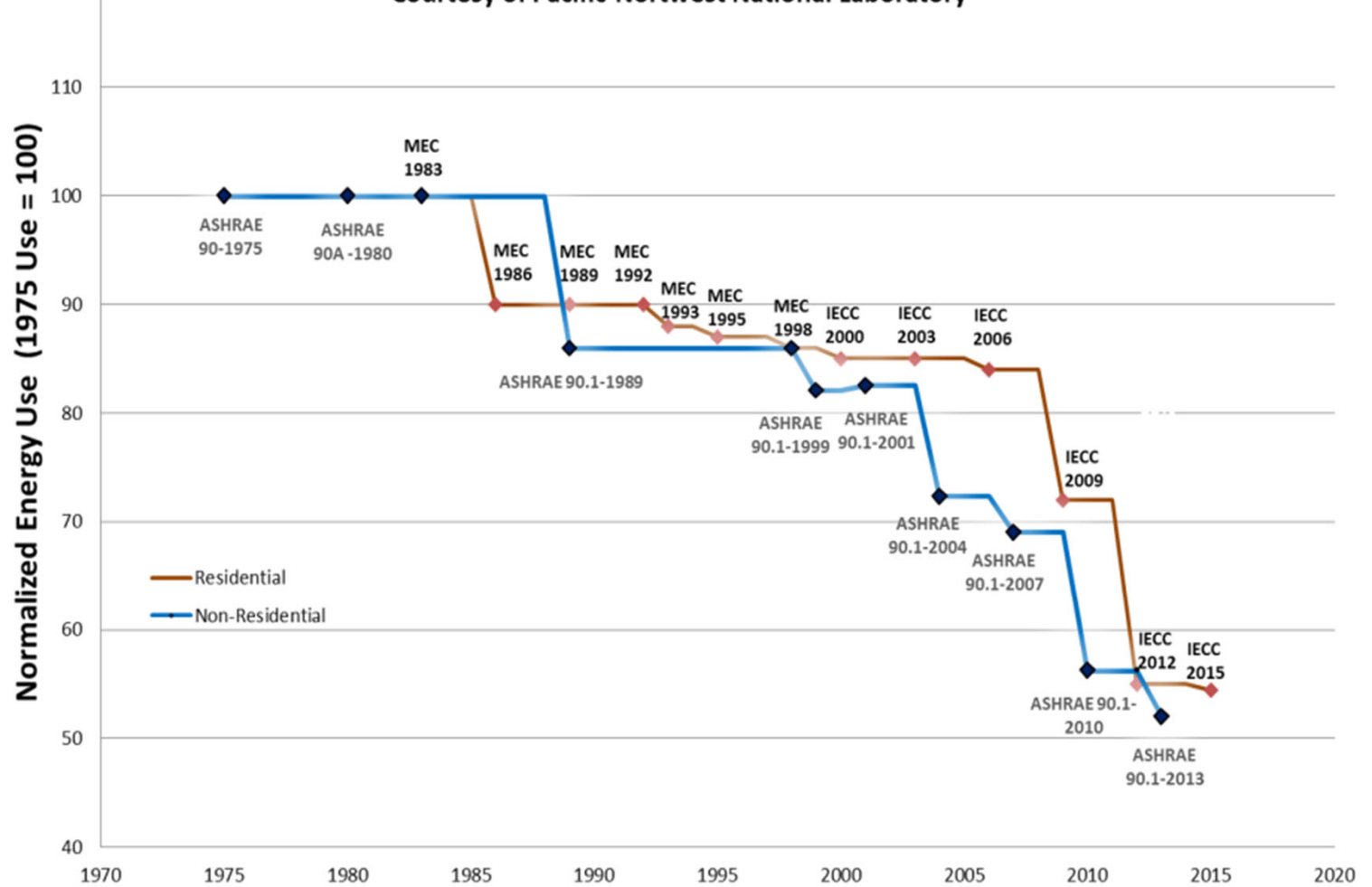
First International Energy Conservation Code (IECC)
published in 2000 (based on MEC)

*The IECC provides design guidelines for the
effective use and conservation of energy in
commercial and residential buildings*



Improvement in Residential and Non-Residential Model Energy Codes (Year 1975-2015)

Courtesy of Pacific Northwest National Laboratory



Average Commercial Building is nearly 25% more efficient under 2015 IECC versus 2009 IECC

Residential vs. Commercial Provisions

- **International Residential Code (IRC)** – applies to detached one-and-two family dwellings only

**** Any building other than a 1 or 2 family dwelling is subject to the provisions of the 2015 IECC ****

- **Residential Building defined (2015 IECC):** For this code, includes detached one-and-two family dwellings and multiple single family dwellings (townhouses) as well as Group R-2, R-3, and R-4 buildings three stories or less in height above grade plane
 - R-1 (Hotel, Motel) must comply with commercial provisions
 - All residential buildings > 3 stories must comply with commercial provisions

**R-2, R-3 and R-4 buildings three stories or less
comply with IECC residential provisions**

**BCRB Residential
Amendments only
relate to IRC (one and
two family dwellings)**

Impactful Energy Code Changes 2009 to 2015

- ❑ Information required on construction documents, scope of inspections
- ❑ Increased stringency for opaque building elements and fenestration
- ❑ Focus on air sealing, continuous air barrier and building tightness
- ❑ Expanded requirements for HVAC controls
- ❑ New provisions related to refrigeration and kitchen hood systems
- ❑ Improved treatment of existing and historic buildings
- ❑ Enhanced requirements for energy recovery with high volume OA systems

Key NH Amendments to 2015 Energy Provisions

Reference	Sector	Summary of Amendment
RE-15-40-18	Res	Reduces ACH ₅₀ limit from three (3) to seven (7) as it was in the 2009 codes
RE-15-41-18	Res	Reduces allowable duct leakage rate from 4 CFM/100sf conditioned area to 8 CFM/100sf
RE-15-42-18	Res	Eliminates requirement for mandatory mechanical ventilation and HRV/ERV
RE-15-37-18	Res	Reduces requirement for information on construction documents
EN-15-03-17	C&I	Eliminates requirement for system commissioning
EN-15-04-17	C&I	Deletes C406 – Additional Efficiency Package Options

Section C103 Construction Documents (2015)

(C103.2) Construction documents shall be of sufficient clarity to indicate the location, nature and extent of the work proposed, and show in sufficient detail pertinent data and features of the building, systems and equipment as herein governed. Details shall include, but are not limited to:

1. Insulation materials and their R -values.
2. Fenestration U -factors and solar heat gain coefficients (SHGCs).
3. Area-weighted U -factor and solar heat gain coefficient (SHGC) calculations
4. Mechanical system design criteria.
5. Mechanical and service water heating system and equipment types, sizes and efficiencies.
6. Economizer description.
7. Equipment and system controls.
8. Fan motor horsepower (hp) and controls.
9. Duct sealing, duct and pipe insulation and location.
10. Lighting fixture schedule with wattage and control narrative.
11. Location of *daylight* zones on floor plans.
12. Air sealing details.

Commercial Building Envelope

Commercial Code Comparison				
CLIMATE ZONE	2009 IECC Code		2015 IECC Code	
	5 AND MARINE 4		5 AND MARINE 4	
	All other	Group R	All other	Group R
Roofs				
Insulation entirely above deck	R-20ci	R-20ci	R-30ci	R-30ci
Attic and other	R-38	R-38	R-38	R-49
Walls, Above Grade				
Metal framed	R-13 + R-7.5ci	R-13 + R-7.5ci	R-13 + R-7.5ci	R-13 + R-7.5ci
Wood framed and other	R-13 + R-3.8ci	R-13 + 3.8	R-13 + R-3.8ci or R-20	R-13 + R-7.5ci or R-20 + R-3.8ci
Walls, Below Grade				
Below grade wall	R-7.5ci	R-7.5ci	R-7.5ci	R-7.5ci
Floors				
Joist/framing Steel(wood)	R-30	R-30	R-30	R-30
Slab-on-Grade Floors				
Unheated slabs	NR	R-10 for 24 in. below	R-10 for 24" below	R-10 for 24" below
Heated slabs	R-15 for 24 in. below	R-15 for 24 in. below	R-15 for 36" below	R-15 for 36" below

Commercial Code Comparison - U Factor		
	2009 IECC	2015 IECC
Climate Zone	5 AND MARINE 4	5 AND MARINE 4
Fixed Vert. Fenest.	0.45	0.38
Operable Vert. Fen.	0.80	0.45
Skylights	0.60	0.50

International Code Council. "2015 International Energy Conservation Code."
https://codes.iccsafe.org/content/IECC2015?site_type=public

Residential Building Envelope

Residential Code Comparison		
	2009 IECC Code	2015 IECC Code
CLIMATE ZONE	5 AND MARINE 4	5 AND MARINE 4
Ceiling R-Value	38	49
Wood frame Wall R-Value	20 or 13+5 ^h	20 or 13+5 ^h
Floor R-Value	30 ^g	30 ^g
Basement Wall R-Value	10/13	15/19
Slab ^d R-Value & Depth	10, 2ft	10, 2ft
Crawl Space ^c Wall R-Value	10/13	15/19

Residential Code Comparison - U Factor		
	2009 IECC	2015 IECC
Climate Zone	5 AND MARINE 4	5 AND MARINE 4
Verticle Fenestration	0.35	0.32
Skylights	0.60	0.55

c. "15/19" means R-15 continuous insulation on the interior and exterior of the home or R-19 cavity insulation at the interior of the basement wall. "15/19" shall be permitted to be met with R-13 cavity insulation on the interior of the basement wall plus R-5 continuous insulation on the interior or exterior of the home. "10/13" means R-10 continuous insulation on the the inerior or exterior of the home or R-13 cavity insulation at the interior of the basement wall

d. R-5 shall be added to the required slab edge R-values for heated slabs. Insulation depth shall be the depth of the footing or 2 feet, whichever is less in Climate Zones 1 through 3 for heated slabs.

g. Or insulation sufficient to fill the framing cavity, R-19 minimum.

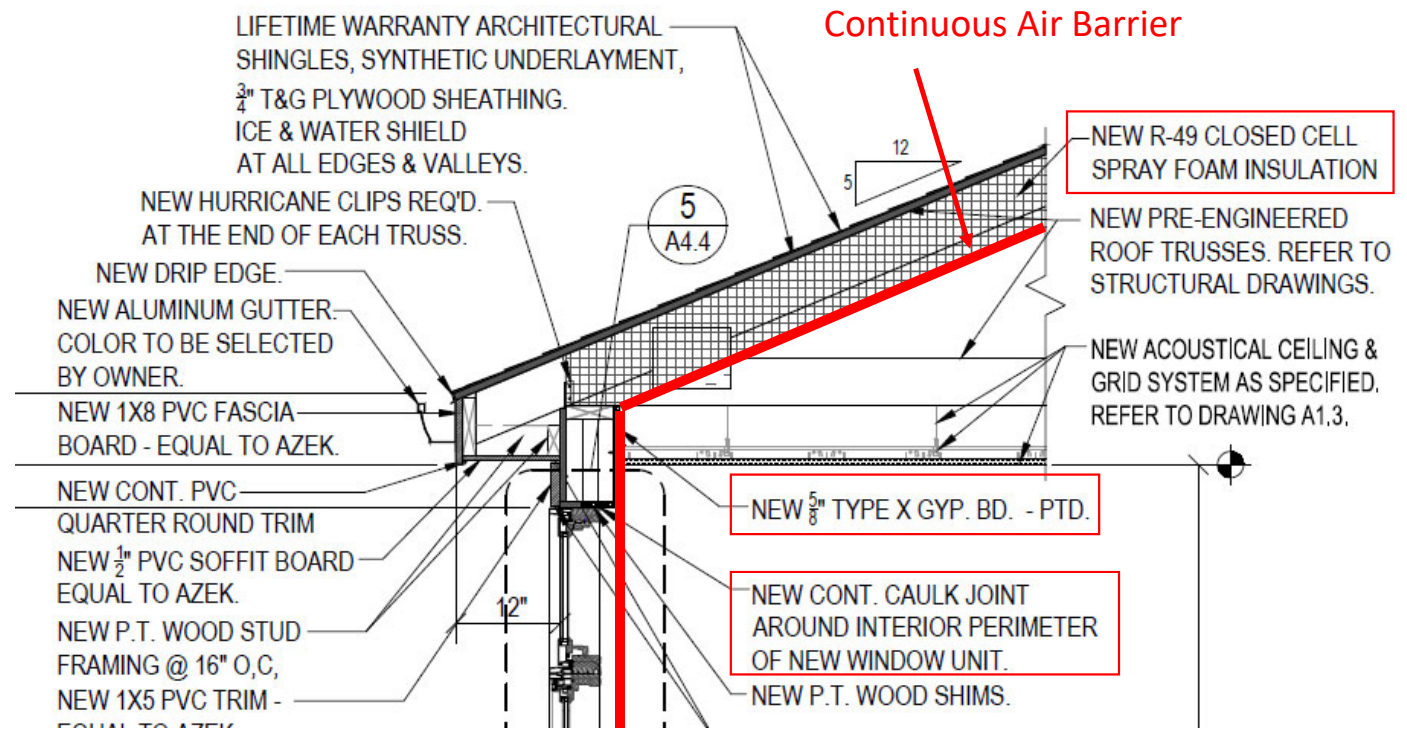
h. The first value is cavity insulation, the second value is continuous insulation, so "14+5" merans R14 cavity insulation plus R-5 conitnuous insulation.

Residential Provisions of the 2015 International Energy Conservation Code
www.energycodes.gov

New Air Barrier Provisions in 2015 IECC

☐ Continuous Air Barrier Requirements (C402.5.1) - MANDATORY

- ☐ Allowable Prescriptive Materials (e.g. 1/2" cement board, 3/8" plywood)
- ☐ Treatment of joints, penetrations and material intersections
- ☐ New Provisions for OA Openings, Loading docks, Vestibules



Compliance with Air Barrier Provisions

- ❑ Use of Prescribed Materials
- ❑ Building Performance Testing (< 0.40 CFM/ft² leakage at -75 Pa)
- ❑ Approved, tested assemblies



<https://www.swinter.com/party-walls/2016-nyc-energy-codes-commercial/>



Building Mechanical Systems: Major Changes in 2015

- More stringent minimum equipment efficiencies and pipe insulation requirements
- *New Provisions* related to Kitchen Hood Controls, Walk-in coolers, freezers, refrigerated warehouse coolers and freezers, and display cases
- Expanded requirements for energy recovery in high outside air systems
- Expanded requirements for controls and 'Complex' HVAC systems

Economizers
OA Reset Control
Staged Cooling
Boiler Turndown

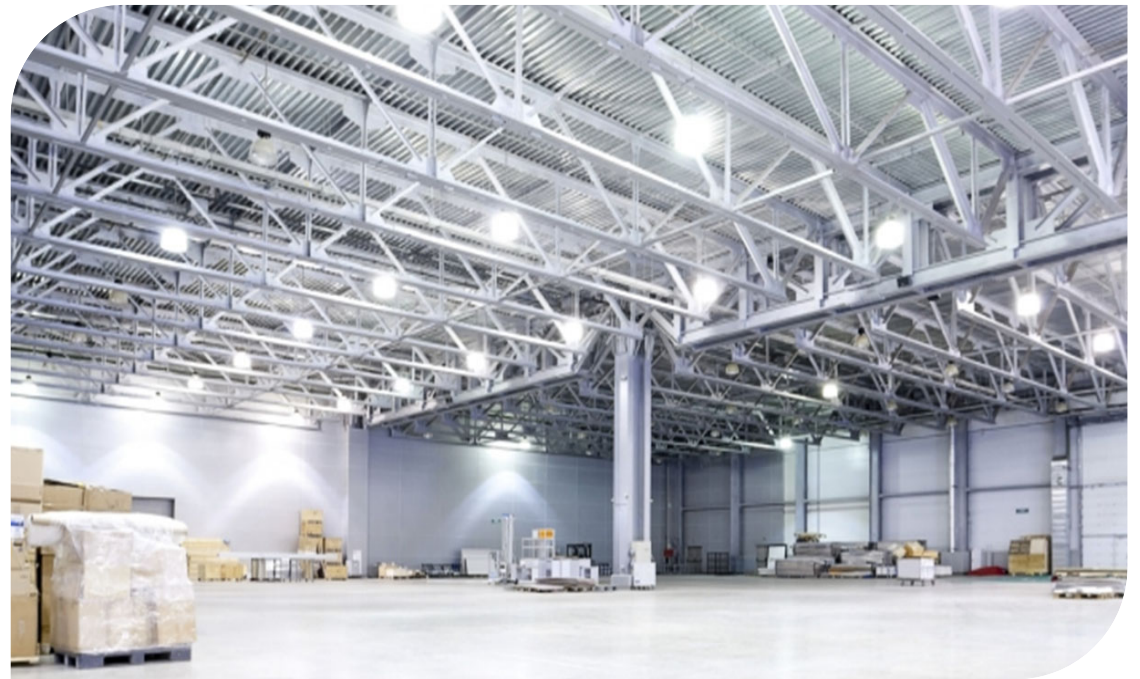
Part load hydronic controls
VAV Reheat Control
OA Ventilation Optimization
and more...



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Electrical Power Systems: Changes in 2015

- Reduced but still generous LPD allowances
- Enhanced control provisions
- Credit for daylighting controls





Commercial



Residential

NH Saves Workshops have been well attended!

Early Industry Reaction

- Equipment efficiencies already integrated into marketplace
- Control provisions mostly best practice, cost effective
- Well received by Code Officials, though enforcement and education continue to be barriers
- Some confusion about multi-family residential provisions
- Homes permitted after 9/15 at various stages of construction – impacts unknown



GDS Perspective...



- Abundant opportunity exists to cost-effectively exceed code.
- Utility programs have a key role in engaging market actors *early in the design process*
- Code enforcement varies throughout the State, impacted by bandwidth and awareness
- Commissioning is absolutely critical to realized energy efficiency in new construction

New Hampshire Code Collaborative (NHCC)



New Hampshire Gap Analysis

February 2011



Prepared by the Building Codes Assistance Project for the United States Department of Energy



BCAP Dedicated to the adoption, implementation, and advancement of building energy codes



NEW HAMPSHIRE ENERGY CODE

Compliance Roadmap

FULL REPORT

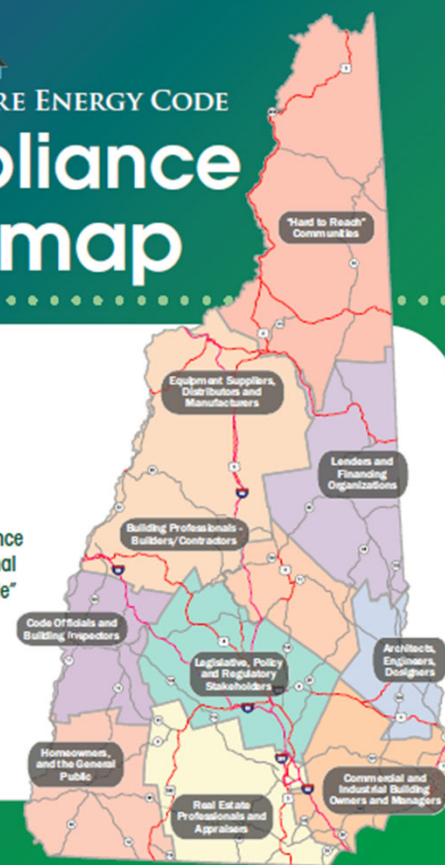
"Achieving 90% Compliance with the 2009 International Energy Conservation Code"



GDS Associates, Inc.
Engineers and Consultants



GDS Associates, Inc. • 1181 Elm Street • Suite 205 • Manchester, NH 03101 • www.gdsassociates.com
MARIETTA, GA • AUSTIN, TX • AUBURN, AL • MANCHESTER, NH • MADISON, WI • INDIANAPOLIS, IN





New Hampshire Code Collaborative: Mission and Next Steps

- “A diverse group of stakeholders working together to reduce energy usage in buildings & homes by advancing adoption of and improving compliance with building codes.”

DRAFT

New Hampshire Energy Code Collaborative Roadmap to Become State Leaders in Codes by 2025

The New Hampshire Building Code Collaborative is a diverse group of stakeholders working together to reduce energy usage in buildings & homes by advancing adoption of and improving compliance with building energy codes.

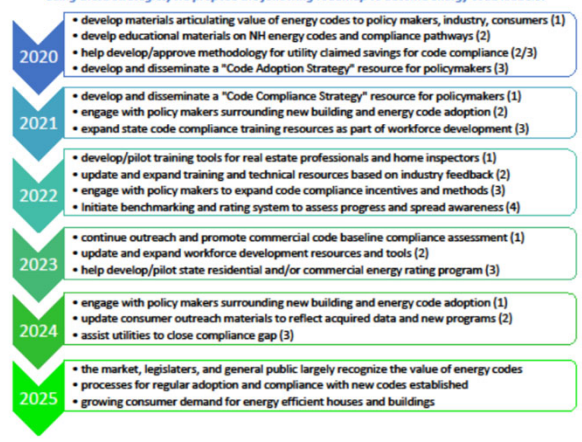
The Collaborative's goals are to:

- ★ Improve compliance rates of buildings and homes with the state energy code
- ★ Adopt new energy codes without weakening amendments
- ★ Establish a statewide energy stretch code and allow municipalities to exceed statewide base code
- ★ Discover funds for workforce development training
- ★ Establish a skilled industry workforce ready for current and future energy codes
- ★ Create incentives for builders and utilities, such as code attribution, for complying with energy codes.

To meet these goals, the Collaborative has identified the following long-term strategies:

- ✓ Expand and centralize energy code compliance resources for industry workers and state officials;
- ✓ Broaden outreach to stakeholders and the public on the benefits of the energy code;
- ✓ Provide technical input into legislative and regulatory code activities;
- ✓ Encourage localities to strive towards energy efficiency levels beyond statewide base code.

Using these strategies, we propose the following roadmap to become energy code leaders:



Do you share these goals? Help us get there. Contact Moses Riley (mriley@neep.org) to join us!

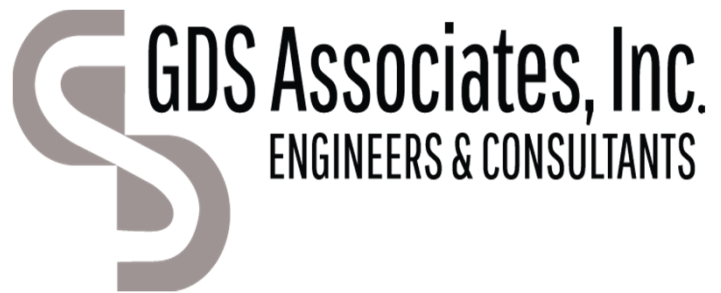


- EE and RE are increasingly part of the conversation regarding real estate transactions
- Green Symposium will be a day-long, credited event
- Basics of solar (rent vs. own), green features of MLS, to more nuanced sessions on public policy, tax credits and financing
- Focus on the bottom line!

Details and registration information
will be coming soon ...
Stay tuned!

Policy Related Questions for the EESE Board

- ❑ Given that system commissioning is not required by code, can NH Saves support commissioning on projects *and claim savings*?
- ❑ What are the most effective pathways to advance energy code enforcement in the state?
- ❑ How best should the next EERS address commercial new construction and the early engagement of stakeholders to promote high performance?
- ❑ How best can NH keep the momentum and adopt new codes on the ICC 3-year cycle?



Matthew Siska, P.E., CEM

Principal

GDS Associates, Inc.

matt.siska@gdsassociates.com

(603) 391-0035