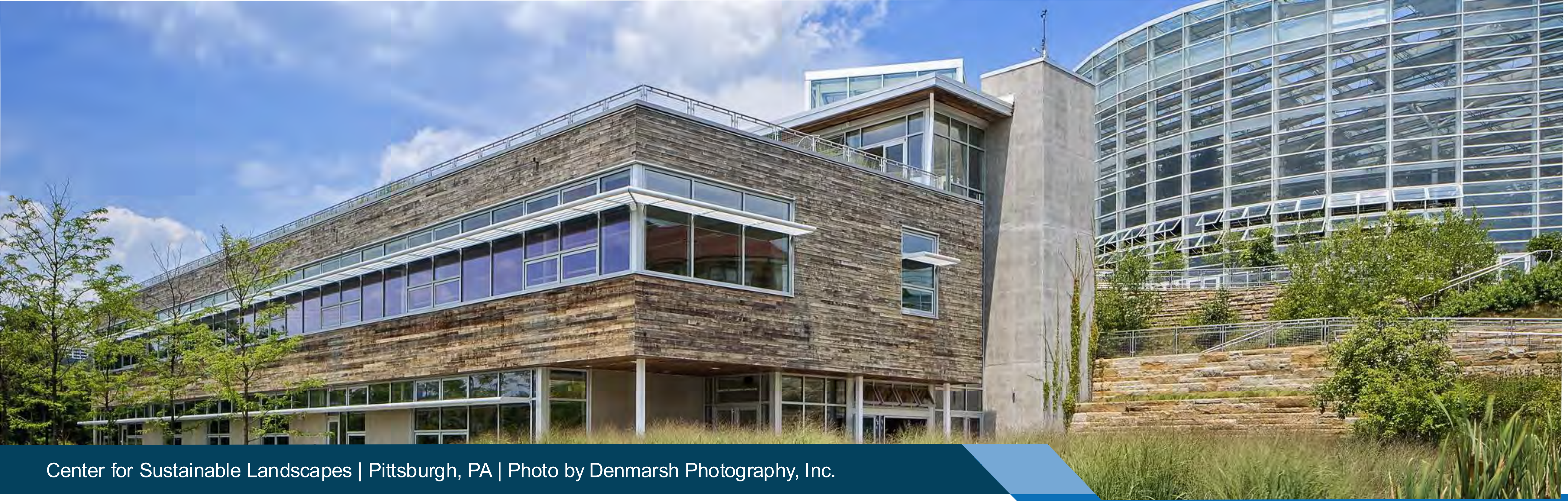


Center for Sustainable Landscapes | Pittsburgh, PA | Photo by Denmarsh Photography, Inc.

nbi new buildings institute

Building Energy Codes: The Stakes, the Trends, and the Future

Nora Esram, Ph.D.
CEO, New Buildings Institute

Redwood Energy 18th Zero Carbon Retreat / July 31, 2026

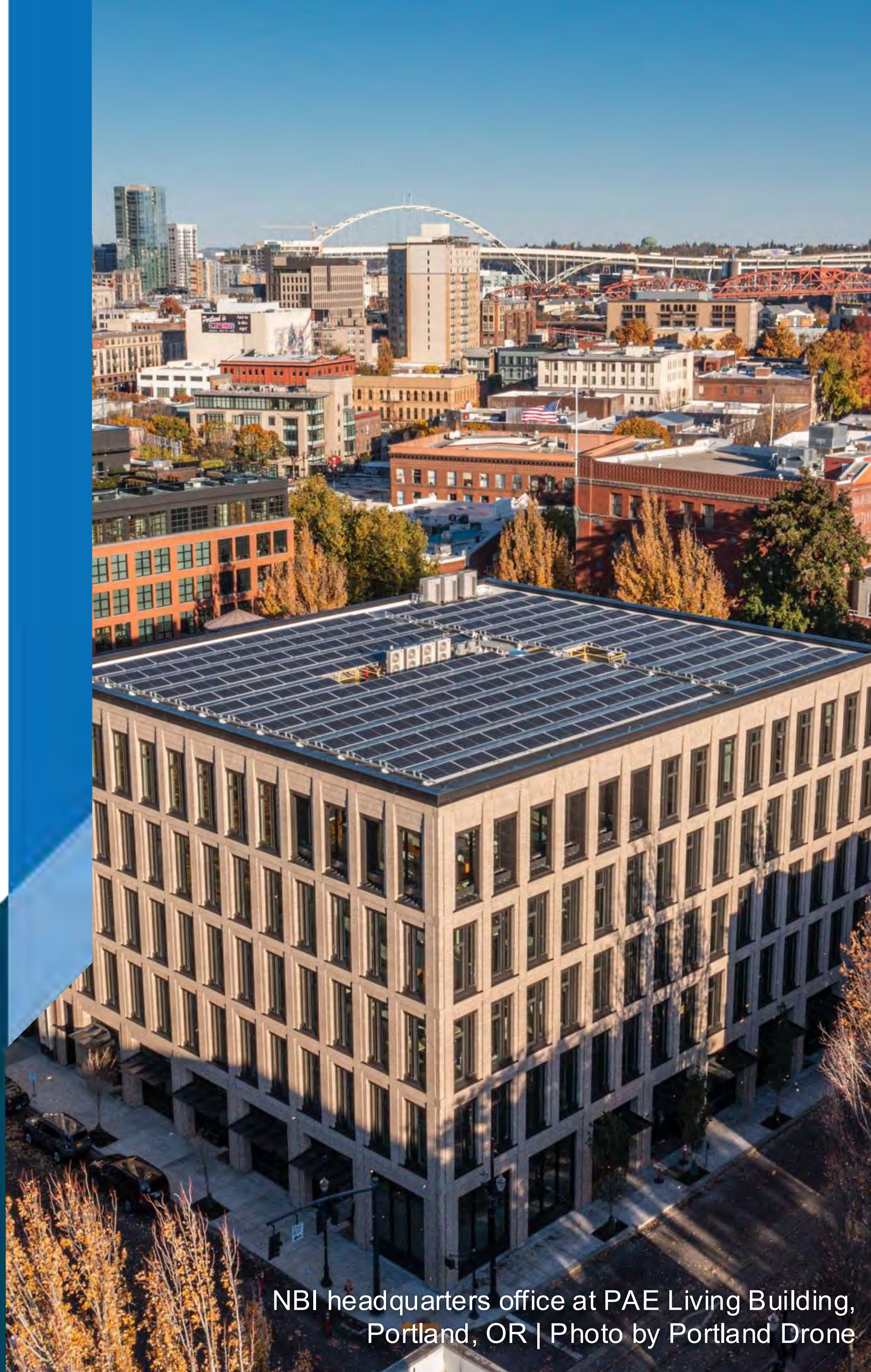
New Buildings Institute

Mission Statement

We unlock the power of buildings to transform energy systems and improve lives through evidence-based policies and solutions.

Our Vision

We envision a future where high-performance buildings supporting human and environmental health are the norm.



NBI headquarters office at PAE Living Building, Portland, OR | Photo by Portland Drone

A brief history of building energy codes…

1975

First national model codes

EPCA and ASHRAE 90-1975 set the first national model codes. Codes have saved ~$60B in energy costs since then.

1999

ASHRAE 90.1-1999 — Energy Cost Budget method.

Codes are projected to save $100B and 841M tons of CO_2 avoided (2012–2040).

2012

IECC 2012 — Renewable energy inclusion

24 states (53% of the US population) have committed to 100% clean energy.

2021

IECC 2021 & ASHRAE 90.1-2022 — Demand response & load management

An estimated $100B in savings is projected over the coming decade from grid-interactive efficient buildings (GEB).

2026

Beyond efficiency — Healthier buildings

Codes increasingly aim to improve resilience during extreme-weather events.
Obstacle: cost-effectiveness tests and methodologies still limit progress.

- Energy Efficiency
- Cost Reduction
- Carbon Reduction
- Grid Interactivity
- Health & Resilience

Challenges

Cost Effectiveness Redefined

Complexity Creep

Competing Priorities

Challenges

Cost Effectiveness Redefined

Complexity Creep

Competing Priorities

Cost Effectiveness Method (National Model Codes)

Residential

- Lifecycle cost
- Simple payback
- Annual cashflow

Commercial

- Lifecycle cost
- Simple payback
- Savings-to-Investment Ratio
- Scalar Ratio

Gap: None of these methods account for non-energy benefits to building owners, occupants, & the grid.

State Methodologies

NY

New York — State Energy Law §11-103

Includes secondary and societal effects.
Title 21, Part 510 values the social cost of carbon through avoided GHG (NYSERDA 2024).
Currently omits public-health impacts from criteria pollutants and indoor-air-quality benefits.

WA

Washington — §39.35C.020

Includes the social cost of carbon in public-building design.

CA

California — CEC 2024

Cost of emissions plus impacts on transmission and distribution costs.

DOE 2026 FRI on Cost-Effectiveness

1. Greater emphasis on first cost over life-cycle cost

*A shift toward affordability asks **"What does this add to the purchase price today?"** rather than **"What are the net costs and benefits over 30 years?"***

Example: same $2,000 measure, two lenses

Life-cycle cost approach

+$2,000 construction cost yields $8,000 in lifetime utility-bill savings → **cost-effective**

First-cost approach

+$2,000 added mortgage burden despite positive lifetime economics

This tends to disadvantage

- **Better envelopes**
- **Electrification**
- **High-performance windows**

DOE 2026 FRI on Cost-Effectiveness

2. Shorter analysis periods

- Benefits are usually evaluated over decades because building components last a long time.
- A shorter horizon makes efficiency measures look less attractive and long-lived measures (e.g., roof insulation) become harder to justify.

3. Higher discount rate

- The discount rate sets how much future savings are worth today.
- Higher rates shrink the value of future energy savings, future avoided costs, long-term resilience benefits, while placing greater weight on immediate costs.

4. Focus on simple payback

16 yrs

Simple-payback horizon
$4,000 upfront cost ÷ $250/year saved

DOE 2026 FRI on Cost-Effectiveness

5. Narrower definition of benefits

Should code analyses also value non-energy benefits?

Resilience

Health

Emission Reductions

Grid Benefits

States Pausing Codes Adoption

NY

The All-Electric Buildings Act (AEBA) Paused

The AEBA was set to go into effect on January 1, 2026. However, in November 2025, New York abruptly paused enforcement of the AEBA due to a pending lawsuit.

CA

AB 130 Blocks Reach Codes

The bill blocks revisions to the residential energy code until 2031, forcing agencies to skip a required 2028 update, and disallows any new local "reach" codes during the pause.

DE

Rejected "Zero Net Energy Capable Requirement" Enacted in 2009

In 2025 Delaware declined to approve the state-amended version of 2024 IECC, while the state law requires "that new residential building construction in Delaware shall be zero net energy capable by December 31, 2025."

VT

Residential Building Energy Standards (RBSE) Allows Compliance with Older Codes

In 2026 Vermont revised its RBSE to allow compliance with either the 2024 or 2020 code, citing the need for greater flexibility and reduce compliance costs amid housing affordability concerns.

HI

Suspended the State Building Code Council's Authority

In 2025, Governor Josh Green signed the 15th Emergency Proclamation Relating to Affordable Housing to suspend update or amendment of state building codes.

Modern Codes Do Not Appear to Drive Housing Price Increases

A study by University of Alabama analyzed home sales data from 2011-2022 and 45 adoptions of the 2009, 2012, 2015, and 2018 International Residential Code across 26 states, and the findings do not support the claim that adopting modern building codes systematically increases home prices or limits new housing supply.

- For newly constructed homes, most code adoptions were not associated with statistically significant price changes, and the overall estimated effect was statistically indistinguishable from zero.
- In the broader sample that included resales of homes up to 10 years old, price increases after code adoption were rare; price decreases were more frequent.
- no evidence that builders shifted construction activity to neighboring jurisdictions after code updates, suggesting codes did not constrain new housing supply in the border-county test.

Reference: Crawford, Shane and Awondo, Sebastain and Powell, Lawrence, Do Housing Prices Change with Building Codes? * (June 07, 2026). Available at SSRN: https://ssrn.com/abstract=6896198 or http://dx.doi.org/10.2139/ssrn.6896198

Challenges

Cost Effectiveness Redefined

Complexity Creep

Competing Priorities

2030 IECC Proposed Split

The "base" IECC narrows the scope; IECC Expanded (IECC-S) carries many advanced measures as optional pathways or appendices.

- More code books may add complexity for participation, adoption, enforcement, and compliance.
- The base path may deliver less policy value for leading jurisdictions.

A. Base IECC

minimum code

Purpose

Establish minimum energy-efficiency requirements, with greater emphasis on initial construction cost and operational energy performance.

Implication

Narrower scope: many readiness, renewables, storage, EV, carbon, demand response and load-management measures move out of the core path.

B. IECC Expanded (IECC-S)

advanced

Purpose

Provide additive requirements for energy efficiency, GHG reduction resources, and pathways that support zero-energy buildings.

Open question

Broader scope, but not necessarily a clear stretch code: measures may be optional or mandatory and may sit in credits/appendices.

ASHRAE Standard 90.1 MR-P

ASHRAE is developing a new ”Standard for Minimum Energy Requirements for Low-Rise Residential Buildings.”

- ASHRAE Standard 90.1 has traditionally applied to commercial and high-rise residential buildings and it is now expanding into a sector traditionally governed by IECC.
- The purpose of this standard is to provide **cost-justified minimum requirements** for energy efficient design and construction.
- It is intended to provide **a simple, prescriptive path** to achieve the objectives for a minimum standard which balances first cost and operational cost for **an affordable housing solution.**
- 30-day public review: July 10-Aug 09, 2026

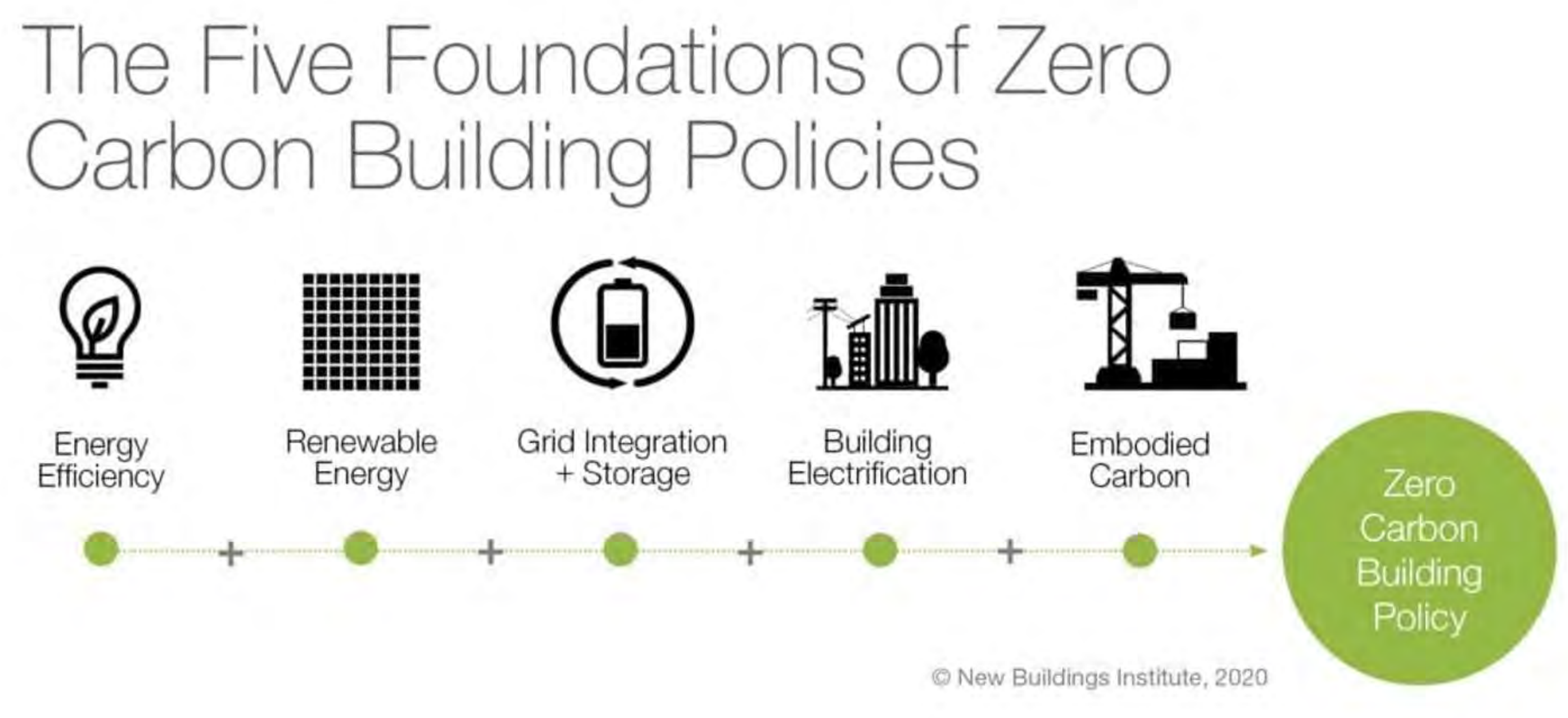
Challenges

Cost Effectiveness Redefined

Complexity Creep

Competing Priorities or…?

Competing Priorities or Fragmented Efforts?



- Between 2021 and 2026, over 30 states quietly passed state laws banning cities from adopting or enforcing **building electrification regulations.**
- Florida passed HB1217 (2026) prohibiting governmental entities from adopting certain **net-zero policies.**
- Missouri HB 939 (proposal) would prohibit cities and counties from adopting building codes that improve sustainability or energy efficiency.

A “3x5” APPROACH TO NZE BUILDINGS

3 STRATEGIC PRINCIPLES

From Energy to Emissions

Shift the focus from site energy use to GHG emissions across the building lifecycle

2050 Alignment

Align polices with 2050 climate goals and science-based pathways to net zero

Local Governments Coordination

Coordinate local governments to share resources, align policies, and coordinate with utilities

5 POLICY ELEMENTS

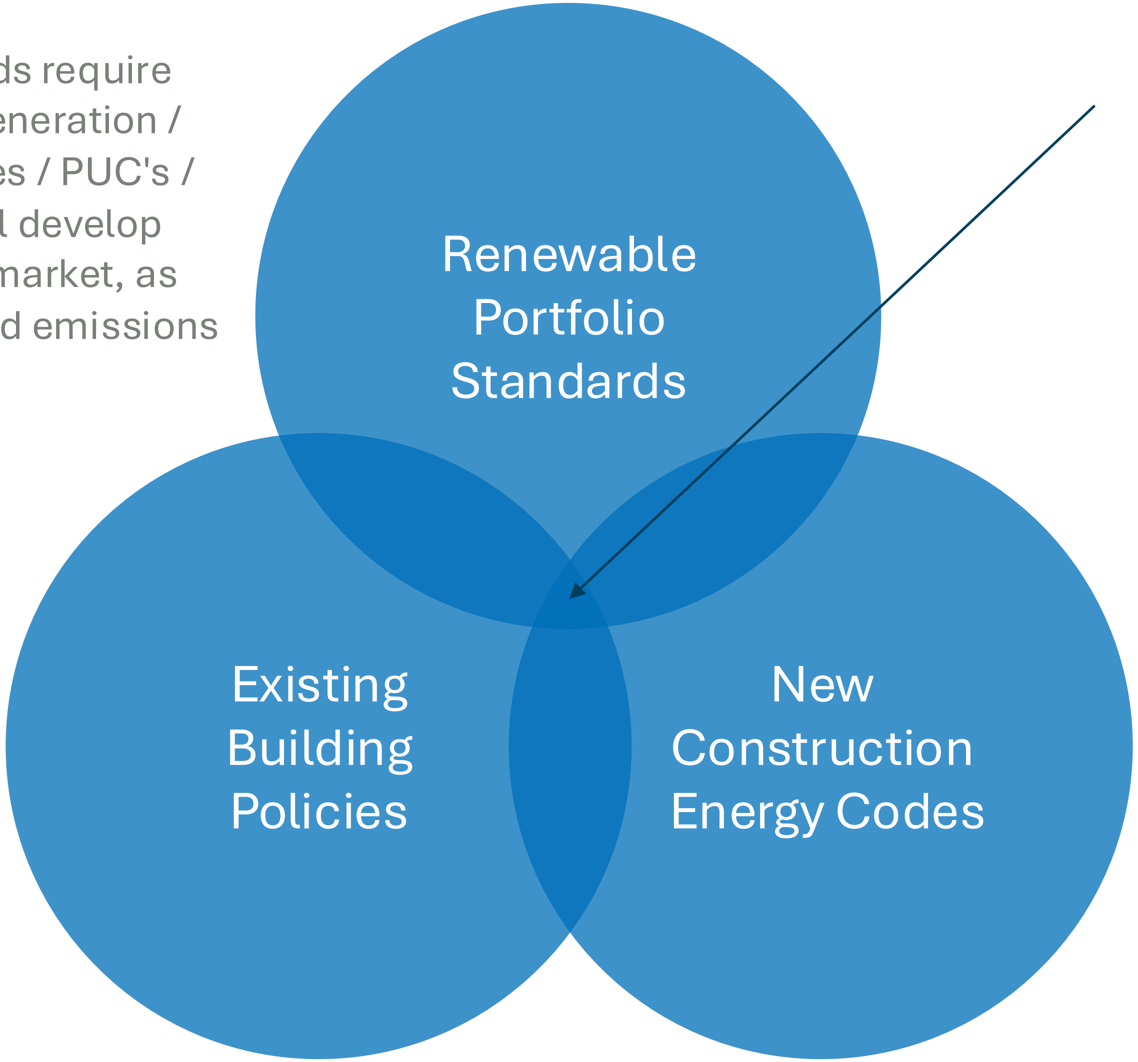
- Energy Efficiency
- Clean Energy
- Zero On-Site Emissions
- Grid Integration
- Carbon Accounting

The framework brings together fragmented components and is intended to help policymakers understand building codes as a critical tool for achieving the broader objective of a reliable, affordable, and clean energy system.

The framework allows local jurisdictions to develop workplans that fit their specific circumstances.

Alignment with Load Management & Grid-Integration

Renewable portfolio standards require utilities to meet renewable generation / low emissions targets. Utilities / PUC's / third party private entities will develop emissions based signals for market, as cost-effective pathway for grid emissions reductions



Realizing full emissions reductions through grid-integration / load management tech

Existing building policies require buildings to achieve operational emissions intensity targets, which they are capable of with the DR/load management controls (required through NC energy codes), and the utility emissions signals (from RPS)

New construction codes include minimum technology requirements related to demand flex and load management, so buildings are capable of responding to emissions-based grid signals for operational emissions reductions. This optimizes on- and off-site renewables requirements

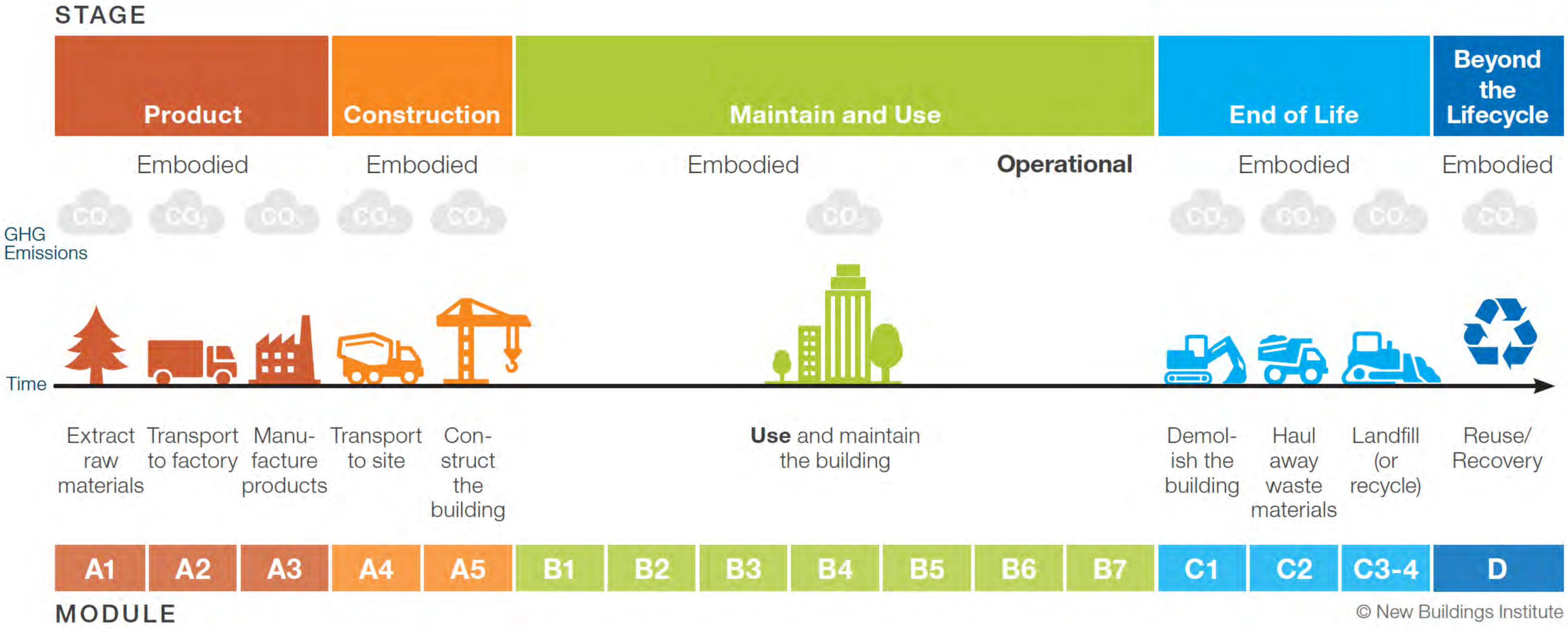
Alignment with Building Energy Resilience

> The capacity for a building to **withstand, respond to, and recover from** acute and chronic stressors that impact the maintenance of **energy-critical functions** — such as habitable thermal conditions; lighting; fresh air; pumping of potable water; and powering medical, refrigeration, and communication devices.

Three core functions

1. **Passive Survivability**
2. **GEB Technologies**
3. **Active Systems (DERs)**

Embodied Carbon in Codes

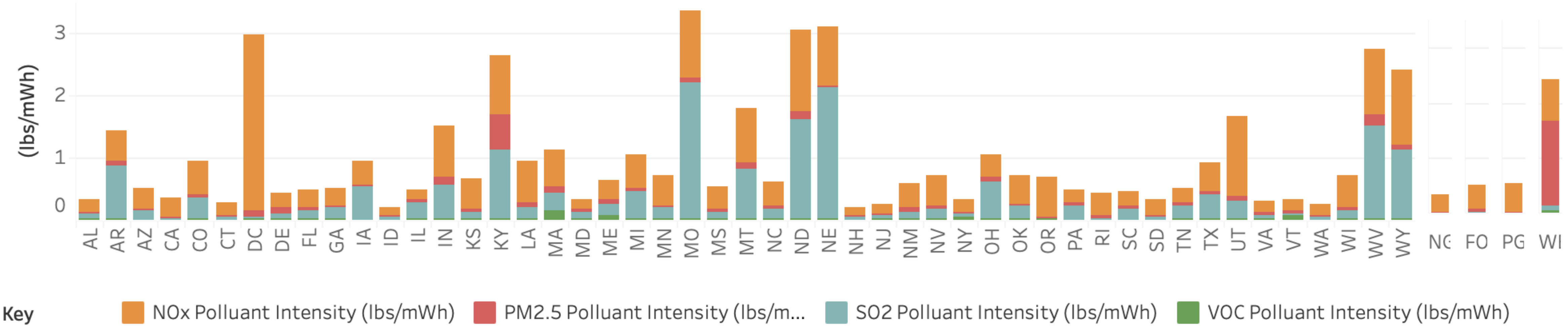


- Scoping embodied carbon into model energy codes.
- Developing balanced "trade offs" between embodied carbon, efficiency measures, renewables, and grid integration for model energy codes.
- Relating impacts in embodied carbon reduction to climate pollution and public health.

Alignment with Public Health Benefits

- NBI’s Energy Policy Health Impacts Calculator (EPHIC), based on EPA’s COBRA Tool, simplifies the calculation of public health impacts associated with primary pollutants from building combustion and energy consumption for policy makers.
- It contains code comparison module (new construction), customer scenario module (new and existing buildings) , and policy sce nario module (high-level policy impact)

Criteria Air Pollutant Intensity of the Electricity Grid with Fuels shown to the right



View on Tableau Public | Share

GTZ FORUM

October 5-6 2026
New York, NY

Join us to continue the conversation in NYC

Contacts

Nora Wang Esram, Ph.D., CEO
nora@newbuildings.org

nbi new buildings institute

www.newbuildings.org

Frick Environmental Center | Pittsburgh, PA | Photo by Ed Massey