



Zero

Anica Landreneau, Assoc. AIA, LEED AP, WELL AP,
BREEAM Assessor, fitwel Ambassador
Sustainable Design Director | HOK
Anica.landreneau@hok.com | 202.944.1490

- What is a Zero building?
- What do Zero buildings look like?
- Are Zero buildings really feasible?
- Is Zero really going mainstream?
- Why do codes matter?
- Will Zero energy or Zero carbon be required by code?
- What's next?

What is a “zero” building?

- Net Zero Energy (NZE) buildings combine energy efficiency and renewable energy generation to consume only as much energy as can be produced **onsite** through renewable resources over a specified time period (typically 1 year).
- Zero Carbon Building is a highly energy-efficient building that produces on-site, or **procures**, carbon-free **renewable energy** or high-quality **carbon offsets** in an amount sufficient to offset the annual carbon emissions associated with building materials and operations



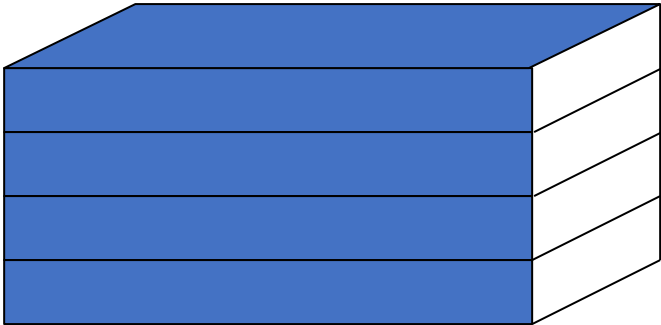
- **Emerging Net Zero Building**
- **Verified Net Zero Building**



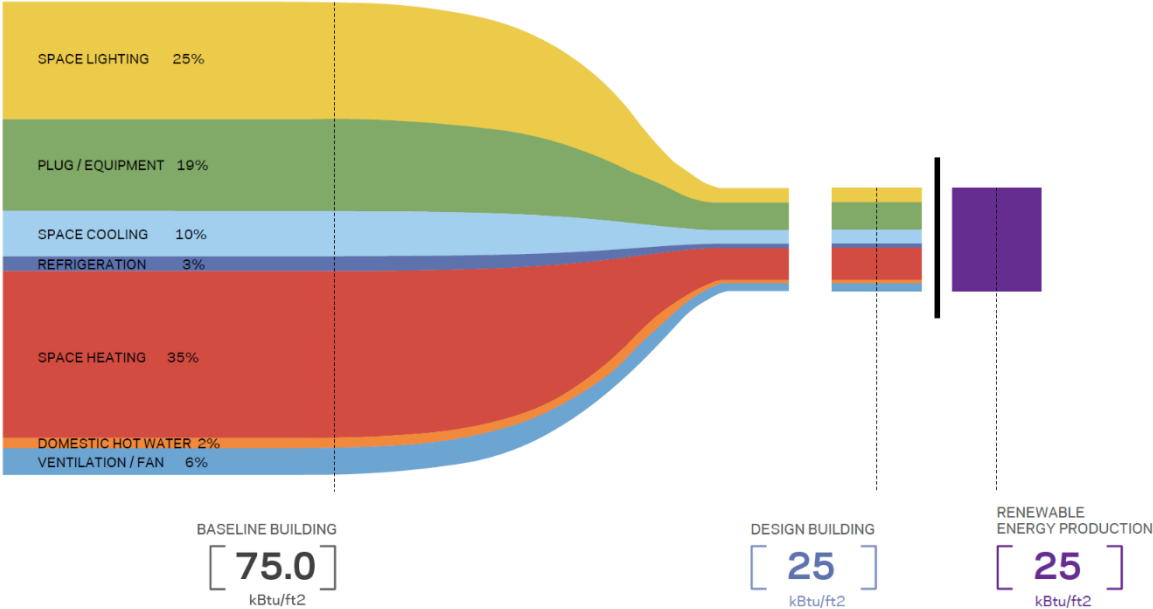
- **LEED Zero Carbon**
- **LEED Zero Energy**



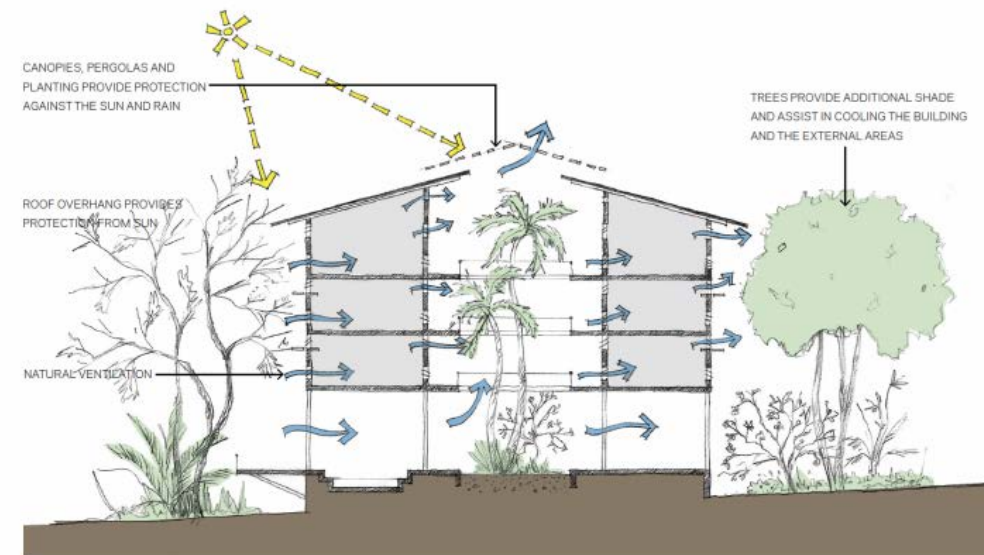
4 Story Office or Academic Building



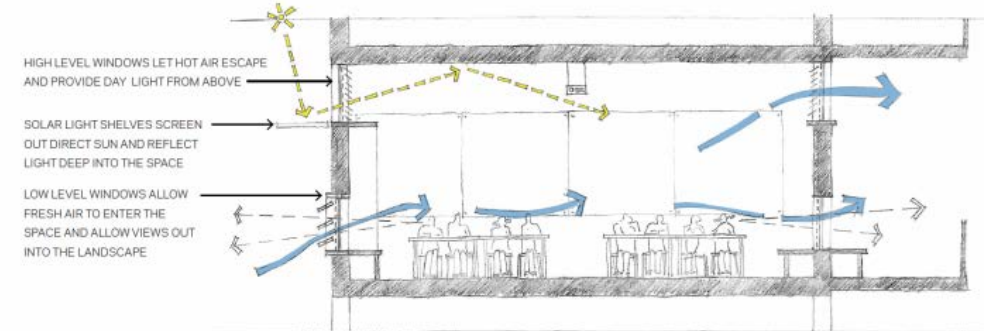
Target EUI: 25 kBtu/sf/yr



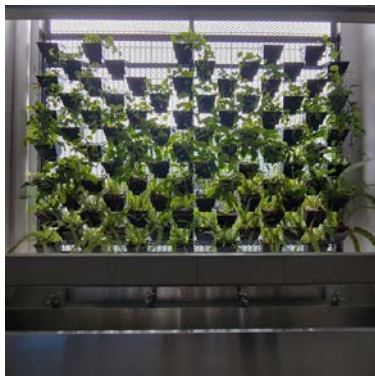




SECTION THROUGH TYPICAL CLASSROOM CLUSTER



SECTION THROUGH TYPICAL CLASSROOM

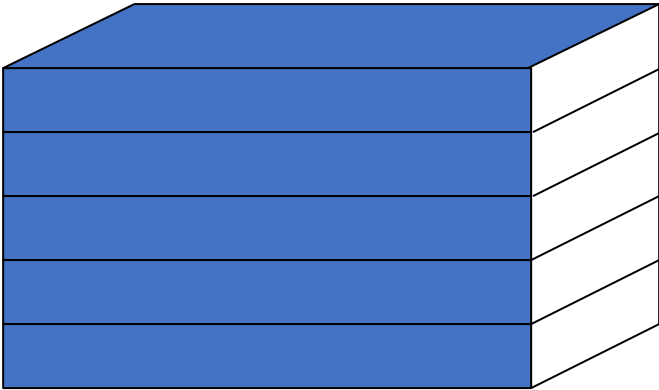


International School of Kuala Lumpur

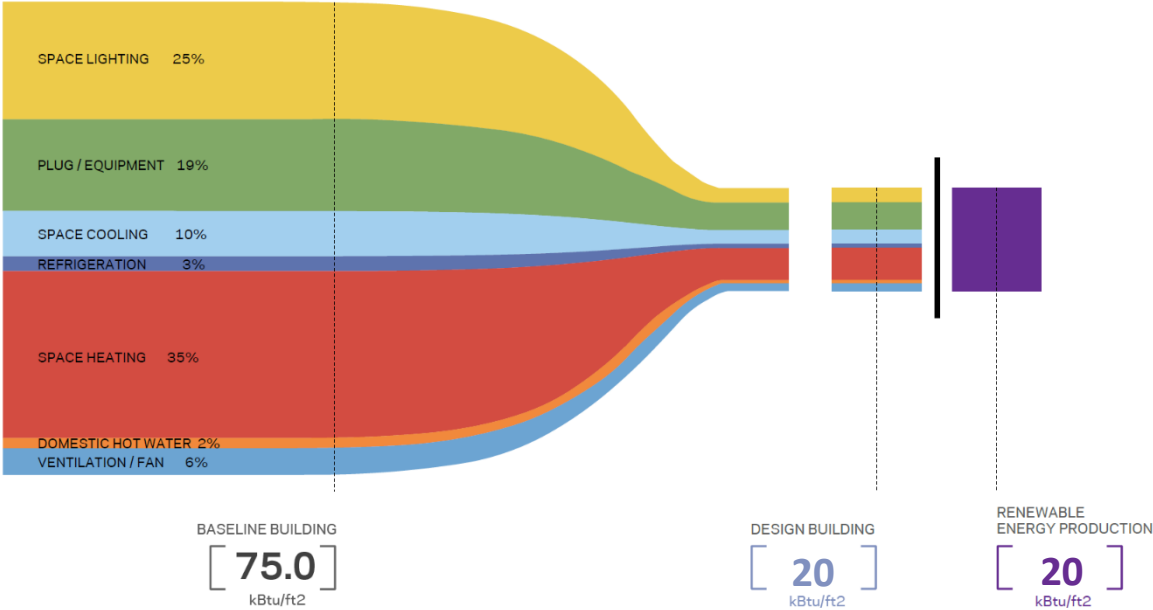
pEUI 19 kBtu/sf/yr + onsite renewable energy

75% reduction from AIA 2030 baseline before onsite RE

5 Story Office or Academic Building



Target Max EUI: 20 kBtu/sf/yr





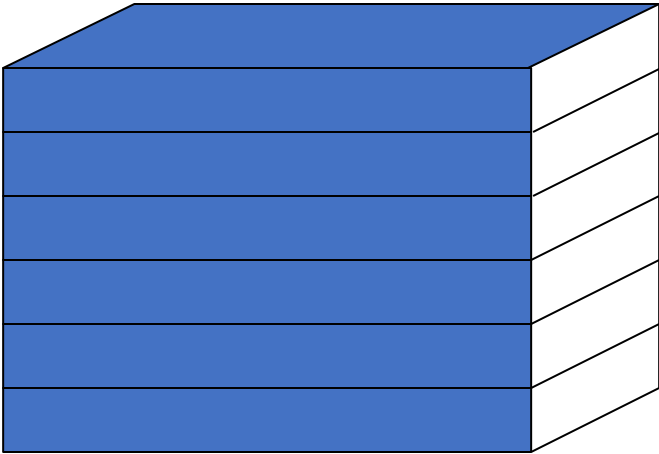
American Geophysical Union
Washington, DC
62,000 SF
5-Story
Retrofit

pEUI: **18** kBtu/sf/yr
EUI: TBD

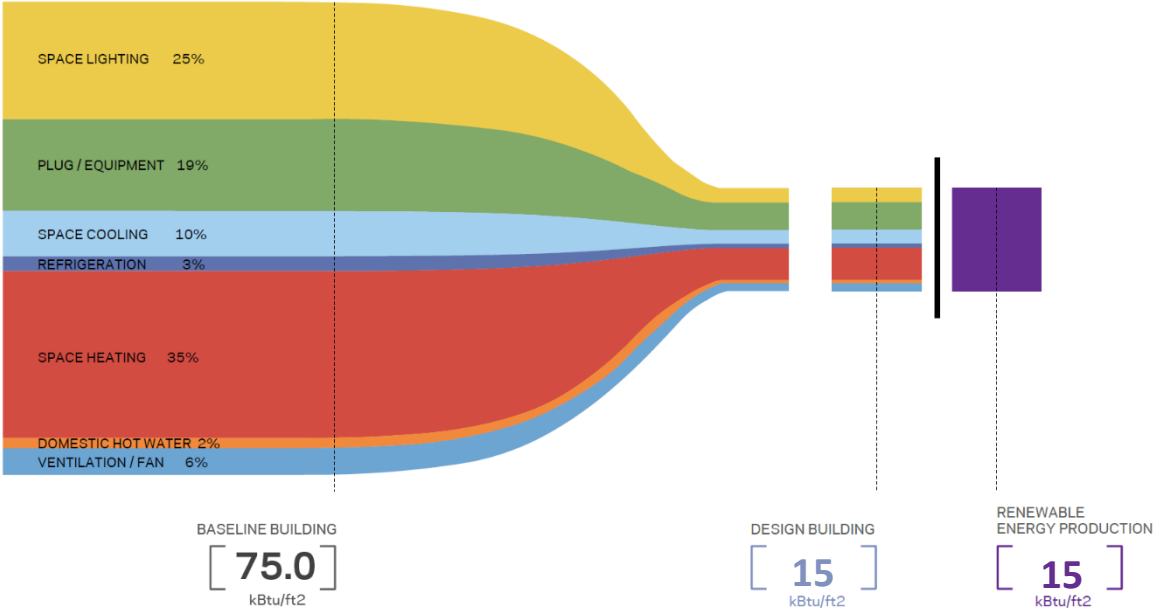
Hickok Cole Architects



6 Story Office or Academic Building



Target Max EUI: 15 kBtu/sf/yr





Bullitt Center
Seattle, WA
6-Story
52,000 SF

pEUI: 14 kBtu/sf/yr
EUI: 11~ kBtu/sf/yr

Miller Hull Architects



HOK NSTA HQ (Arlington)

The solar canopy for a 6-story building targeting an EUI of 25 kBtu/sf/yr must exceed its roof line.



Corporate Facility, Guyana
90,000 sf
pEUI 31 kBtu/sf/yr + onsite solar PV
66% reduction from 2030 baseline before PV



Life Sciences Campus

1M existing + 1.5M sf new

Gaithersburg, MD

pEUI 22 kBtu/sf/yr + onsite PV

79% reduction from 2030 baseline before onsite PV

But if the building gets taller, the program more energy intensive...

4th & Harrison

900,000 sf

San Francisco, CA

pEUI 25.6 kBtu/sf/yr + onsite solar PV (Net Zero Core & Shell) + offsite RE (tenant energy use)

75% reduction from 2030 baseline before PV



Howard County Circuit Courthouse, Maryland

237,000 sf

pEUI 34.5 kBtu/sf/yr + 45%-50% onsite solar PV + offsite solar through PPA

71% reduction from 2030 baseline before PV

>50% reduction in impervious surface from existing condition



Confidential Historic Building

Canada

pEUI 27.2 kBtu/sf/yr + onsite renewables + offsite district energy, renewables

(95% onsite/5% offsite zero carbon solution)

60% reduction from 2030 baseline before RE



excuses, excuses...

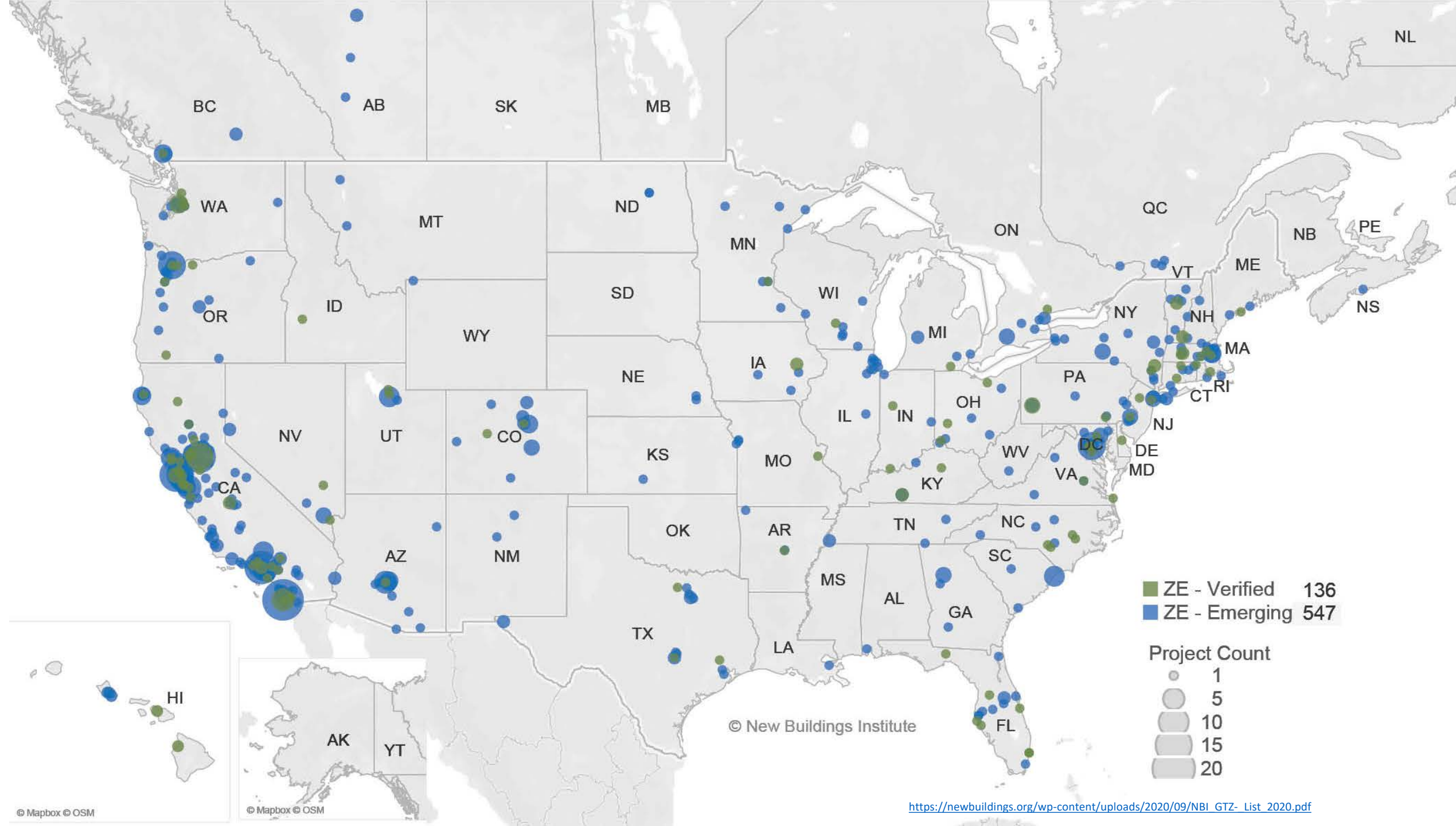
But there really aren't *that* many Zero Energy/Zero Carbon Buildings... right?

And we can't do it for *this* building type...

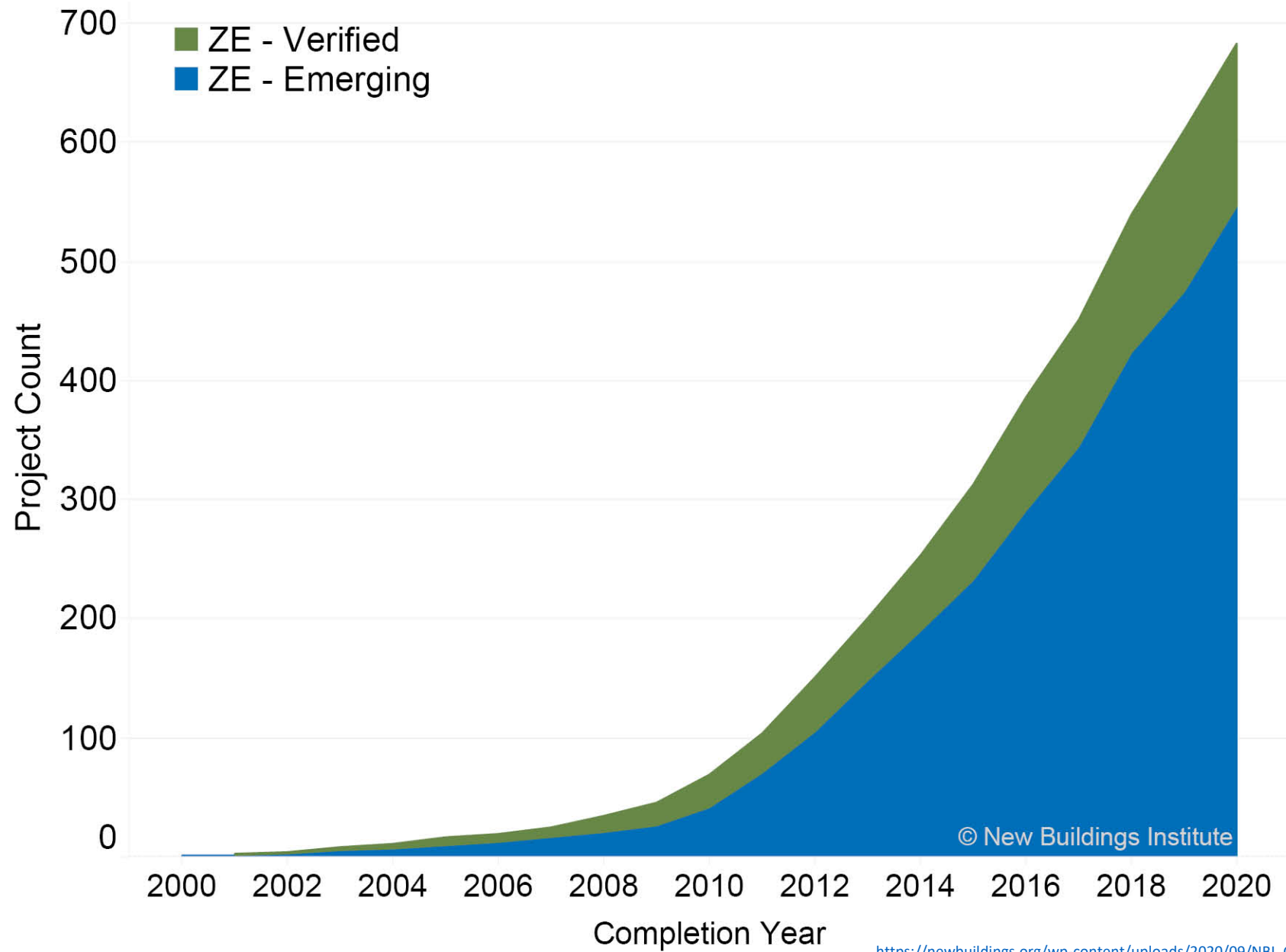
And we can't do it for *large* buildings...

Only environmental non-profits do Net Zero...

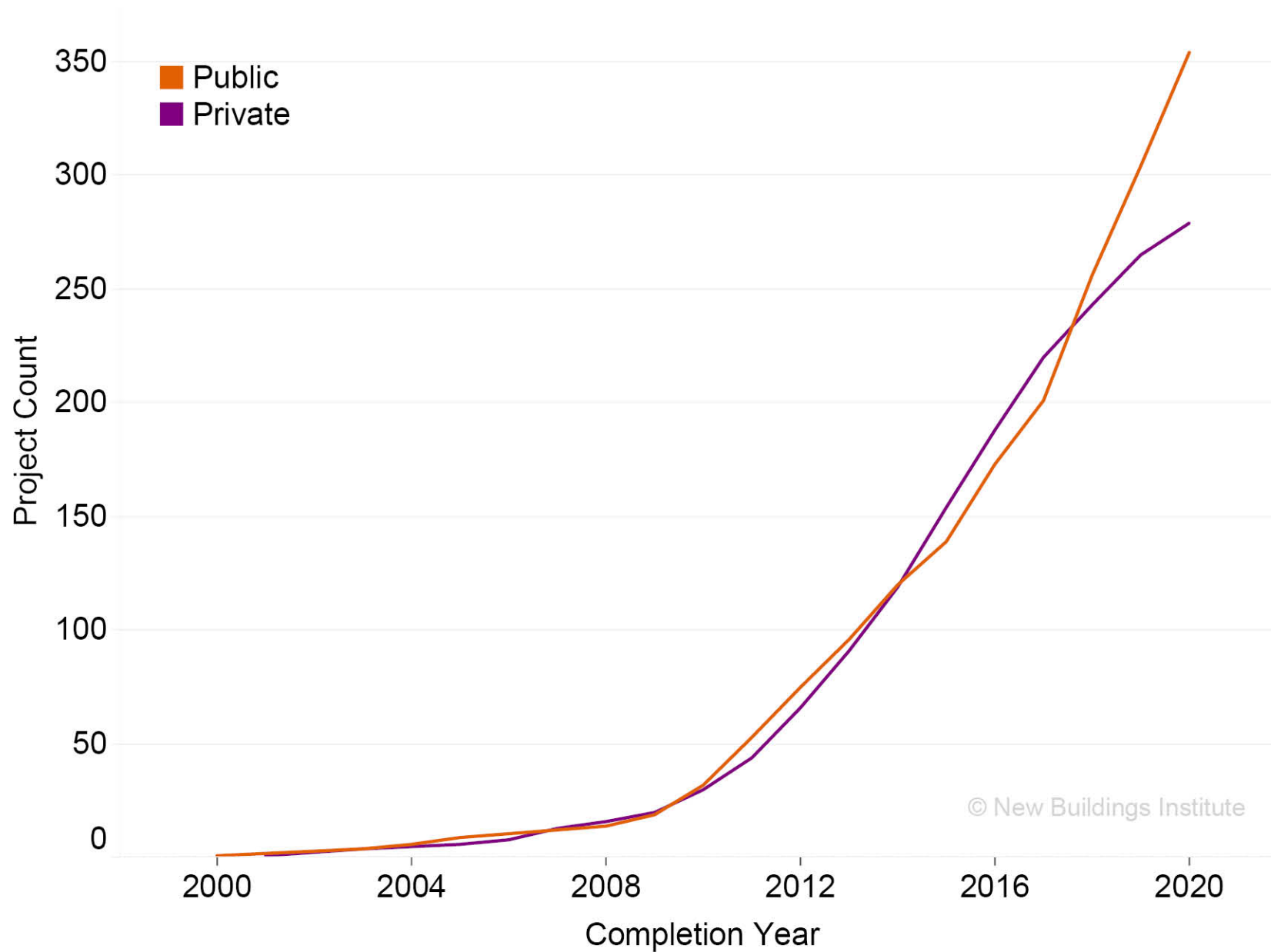
And we can't do it in *this* climate zone!



2020 ZERO ENERGY PROJECT GROWTH

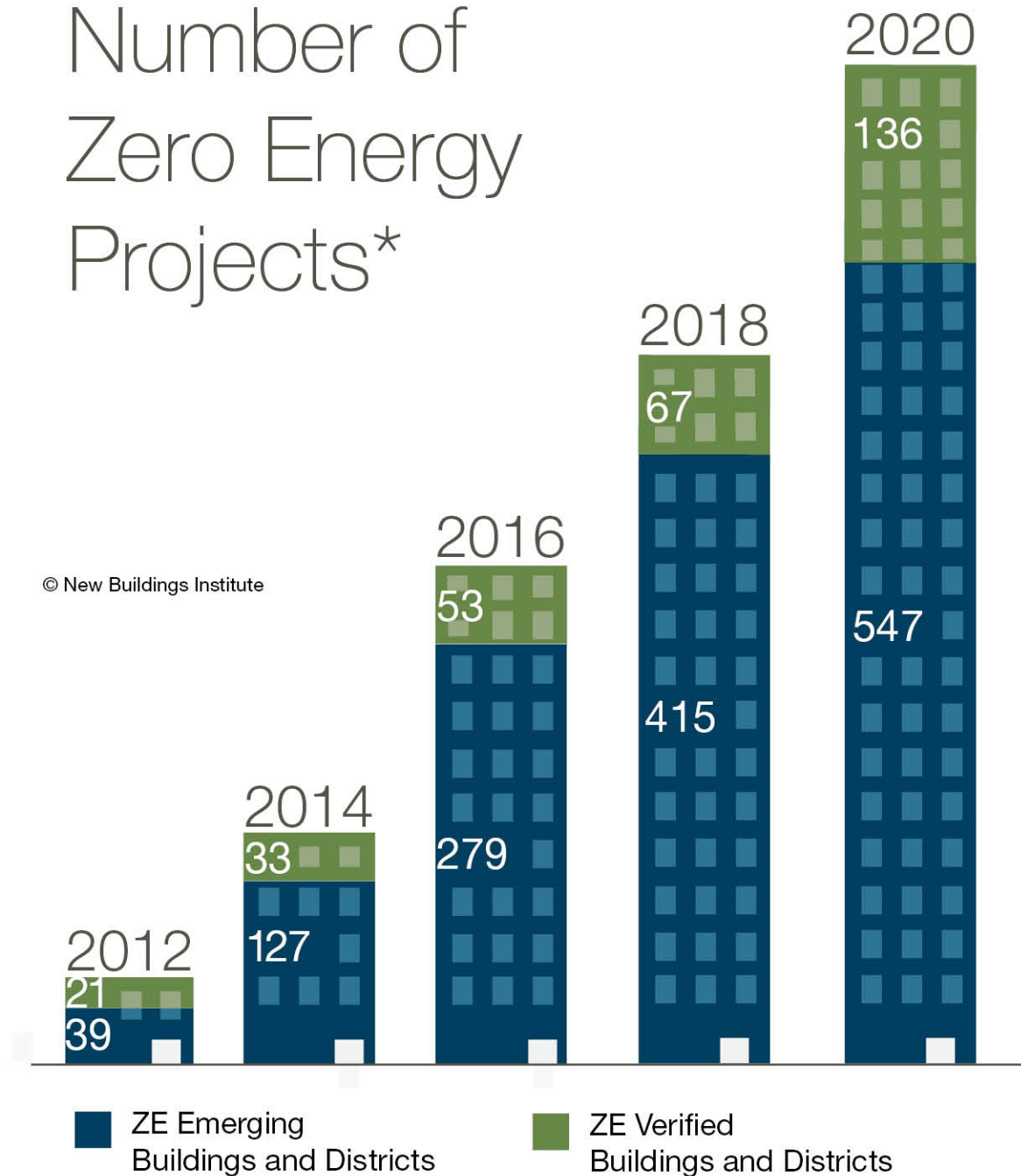


2020 ZERO ENERGY PROJECTS SECTOR GROWTH



© New Buildings Institute

Number of Zero Energy Projects*

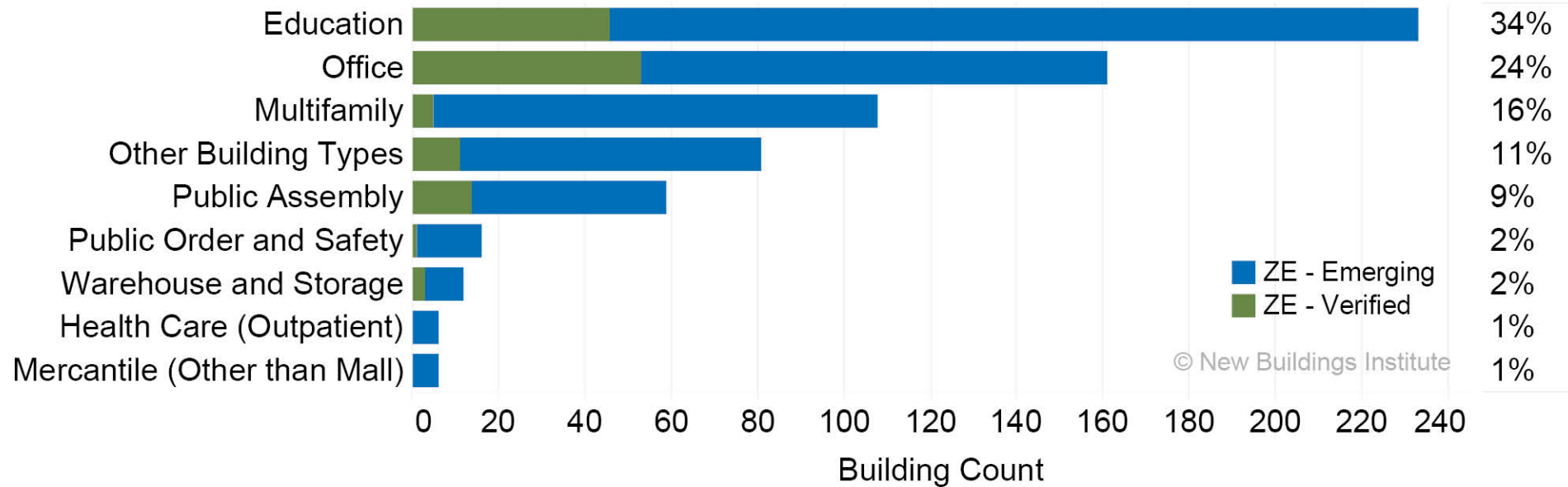


*Numbers reflect the size of the list at the time of publication.

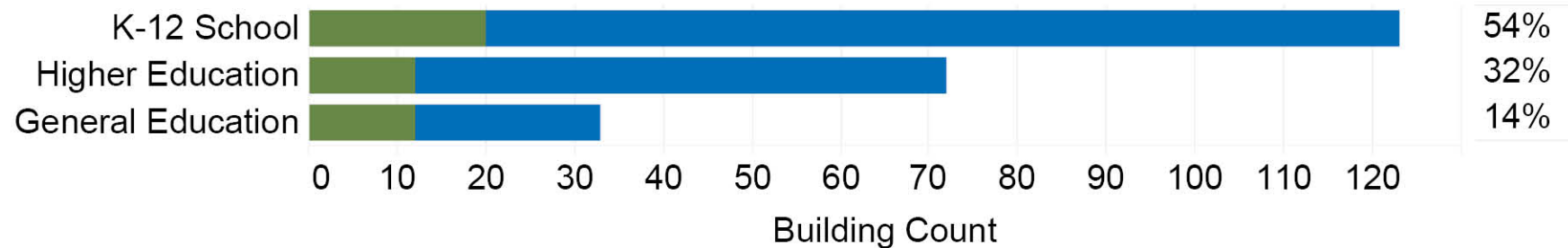
https://newbuildings.org/wp-content/uploads/2020/09/NBI_GTZ-List_2020.pdf

2020 ZERO ENERGY BUILDINGS BY BUILDING TYPE

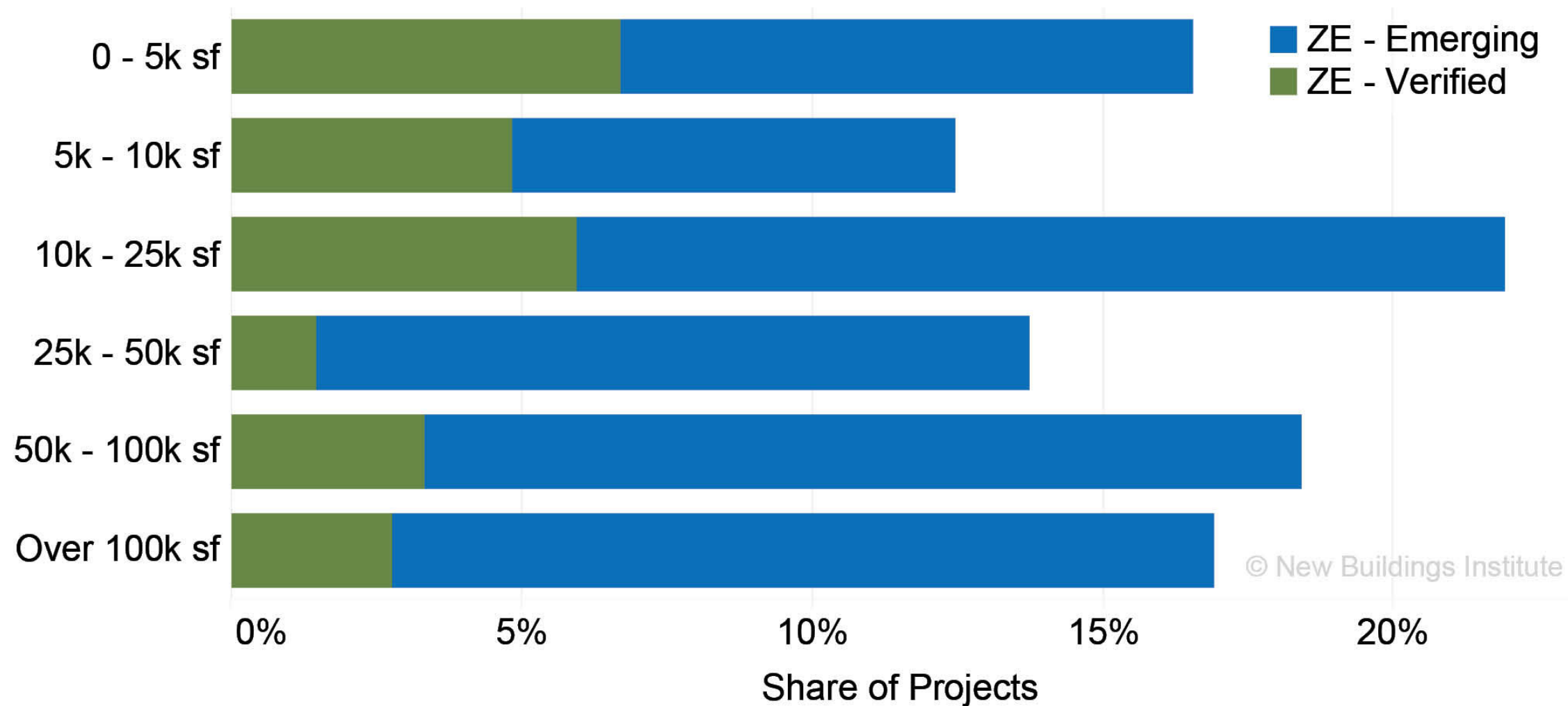
Building Type Breakdown



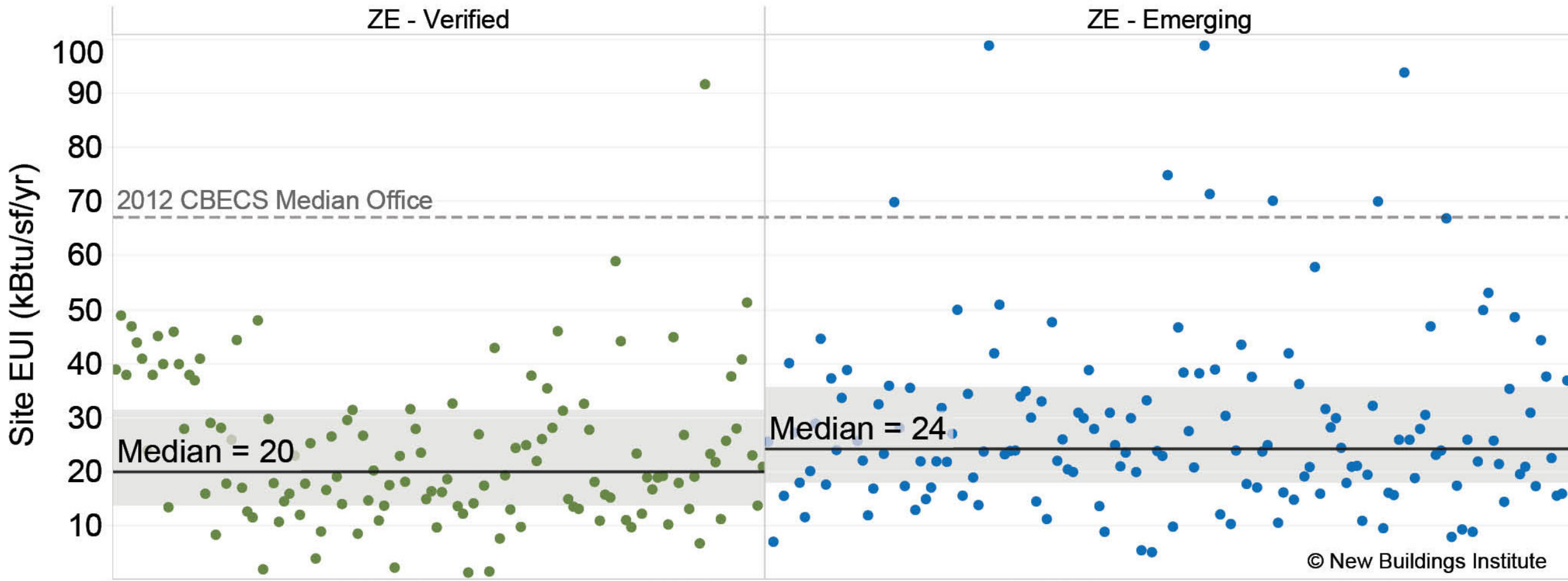
Education Breakdown



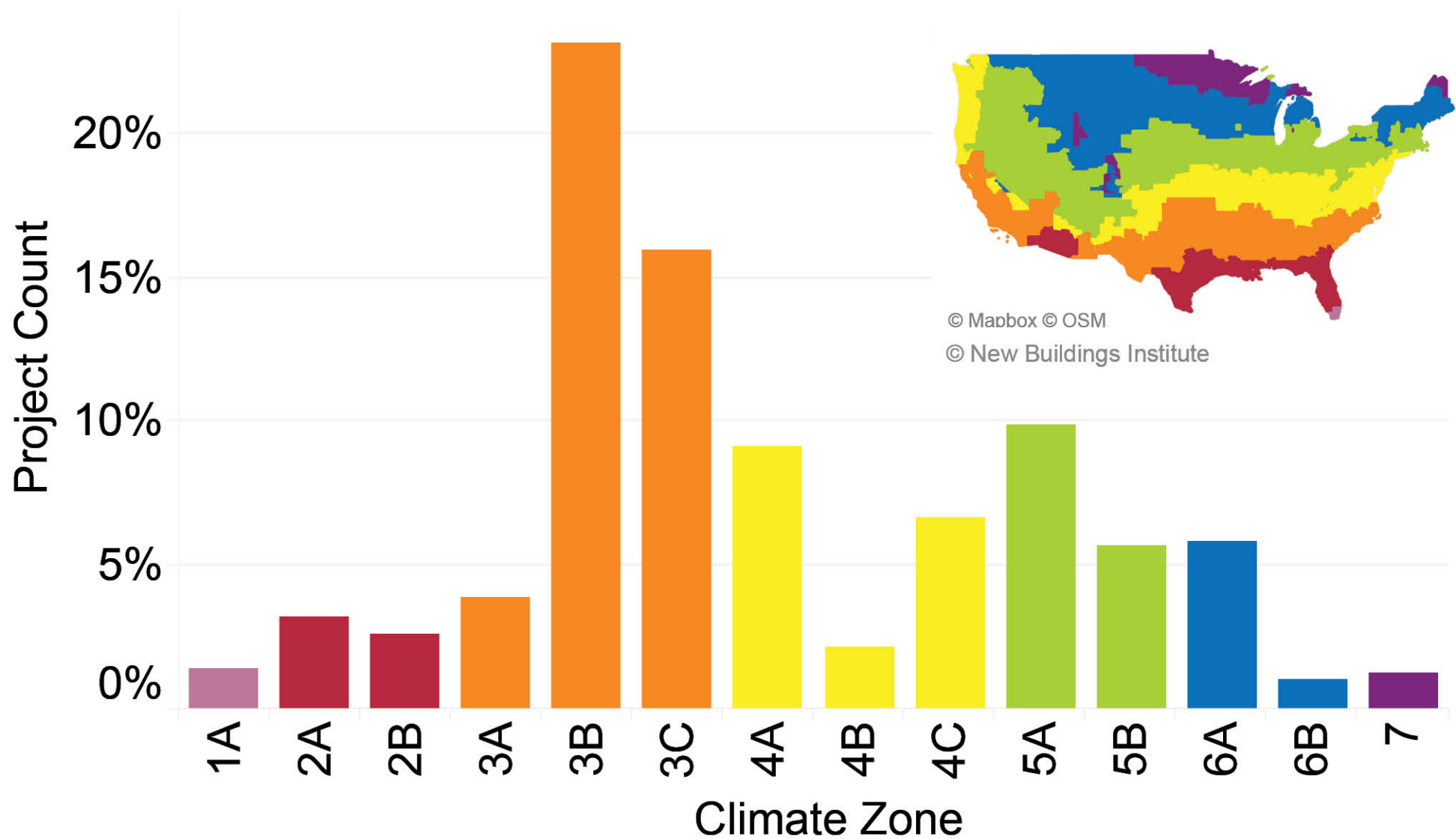
2020 ZERO ENERGY PROJECTS BY SIZE



2020 ZERO ENERGY BUILDINGS ENERGY USE INTENSITY (EUI)



2020 ZERO ENERGY PROJECTS CLIMATE ZONE BREAKDOWN



Why do **codes** matter?



The U.S. is projected to construct 45 billion square feet over the next decade.

*One of the biggest opportunities and one of the simplest solutions is to simply **bring all of our states and cities up to the most current energy codes** so that this new building stock is as efficient as possible for the next few generations.*

U.S. Energy Information Administration Annual Energy Outlook 2019



- LBNL, avg. cost to enforcing energy code:
 - \$139/commercial bldg
 - \$49/single-family home
- In larger cities (higher salary, overhead):
 - \$400–\$500/commercial bldg
 - \$150–\$200/single-family home

Every \$1
invested in
energy code
compliance
saves \$6.



We can't actually afford energy inefficiency:

1/3

U.S.
households
face
challenges
paying energy
bills.

25

million U.S.
households
report
*forgoing food
and medicine
to pay energy
bills.*

7

million U.S.
households
decide
between
paying energy
bills and basic
needs *nearly
every month.*

Mortgage
default risks
are on average

32%

lower in
energy-efficient
homes.



- **Austin:** buildings generate **49%** of emissions.
- **Boston:** buildings generate **75%** of emissions.
- **Cambridge:** buildings generate **65.8%** of emissions.
- **Chicago:** buildings generate **53.7%** of emissions.
- **Houston:** buildings generate **49%** of emissions.
- **Minneapolis:** buildings generate **63%** of emissions.
- **New York City:** buildings generate **71%** of emissions.
- **St. Louis:** buildings generate **80%** of emissions.
- **Washington, DC:** buildings generate **75%** of emissions.

in cities, on average

50-75%

emissions are from
bldgs.

- **California:** buildings generate **25%** of state emissions.
- **Washington State:** buildings generate **27%** of state emissions.

25%

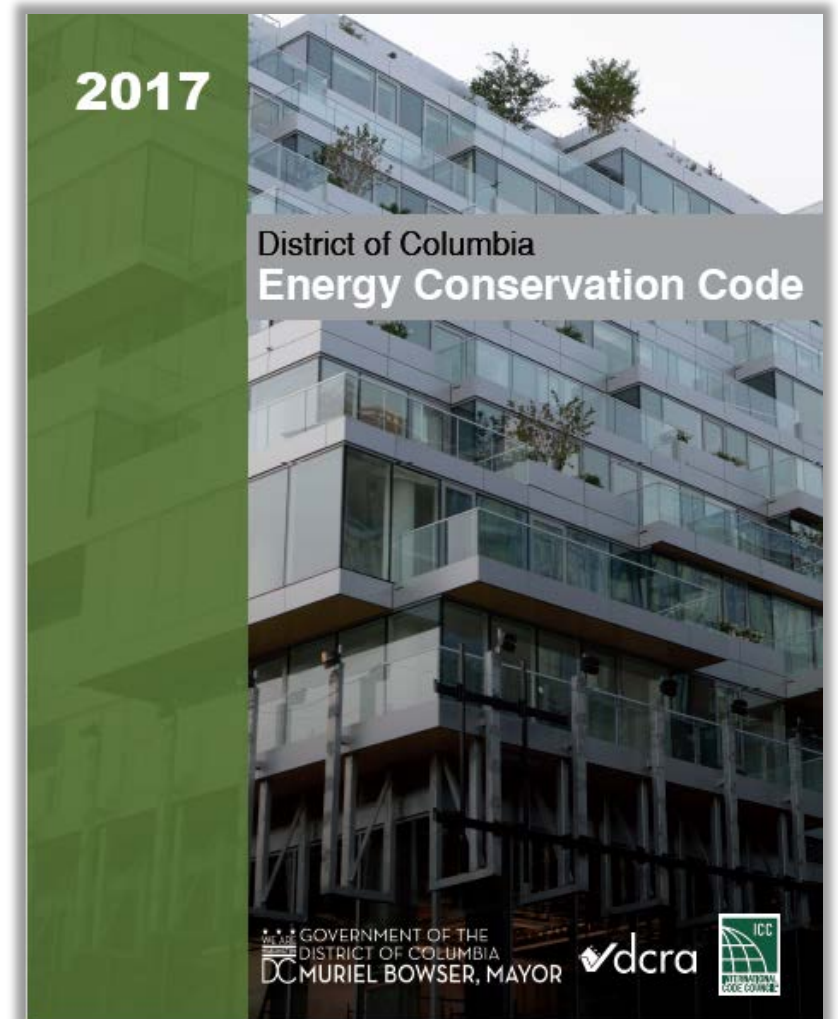
emissions are from
bldgs. in most states.

- *Has passed a building performance standard at state or local level*
- *Building performance standard under discussion or proposed*

Will Zero Energy & Zero Carbon buildings ever be required by code?

Local codes

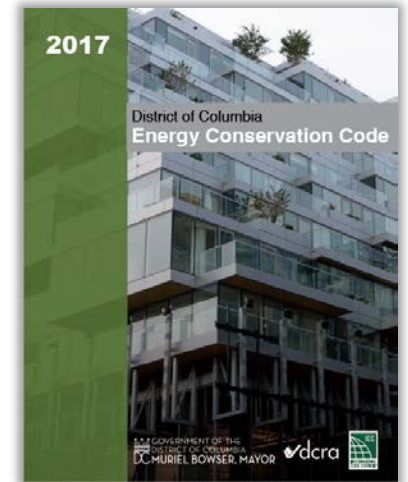
- DC Green & Energy Codes TAG 2008-present
- IgCC 2012 + DC amendments; 2015 update
- 2017 Energy Code:
 - ASHRAE 90.1 2013
 - + Ch. 7, 189.1
 - + Appendix G, 90.1-2016
 - DC amendments
 - “Appendix Z”



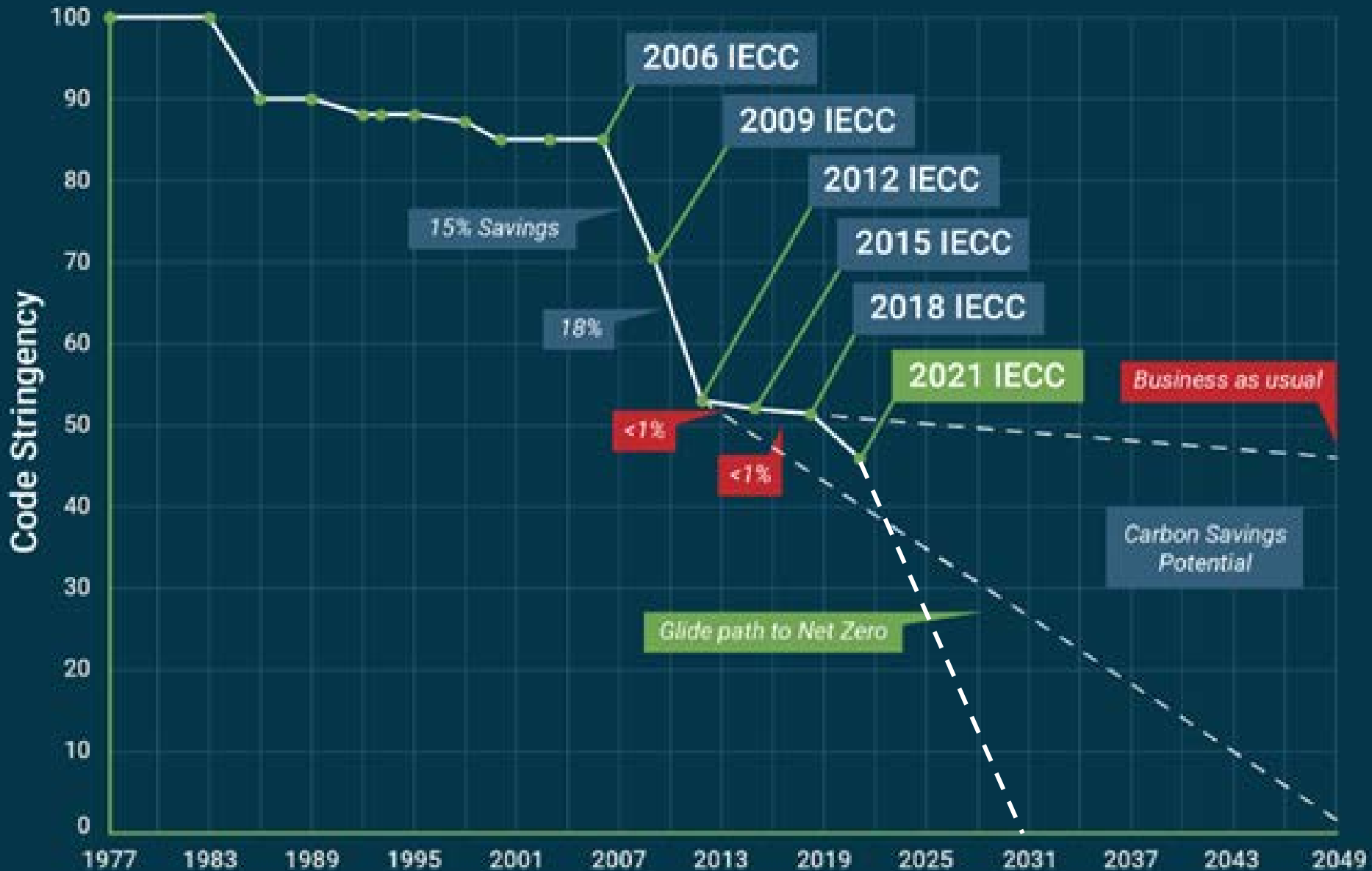
Appendix Z

- May be incentivized
- Stretch code (pre-2026 code)
- Minimum Performance Req'ts:
 - Energy Use Intensity (EUI)
 - Thermal Energy Performance
 - Commissioning
 - Modeling Professional Quals
 - Air Tightness
- No onsite combustion fossil fuels (i.e. electrification)
- Metering, Monitoring, Reporting

- Renewable Energy
 - Photovoltaic panels
 - Solar thermal systems
 - Wind turbines
 - Biogas
- Minimum 5% onsite RE
- 25% site area used for PV
- Offsite Tier I RE meeting DC RPS
- 5-yr agreement for offsite RE



Efficiency Improvements of IECC: Historic and Projected



This map shows effective statewide commercial energy codes as of November, 2018.

Legend:

- Meets or exceeds **ASHRAE 90.1-2016** or equivalent (2)
- Meets or exceeds **ASHRAE 90.1-2013** or equivalent (19)
- Meets or exceeds **ASHRAE 90.1-2010** or equivalent (10)
- Meets or exceeds **ASHRAE 90.1-2007** or equivalent (13)
- Meets or exceeds **ASHRAE 90.1-2004** or equivalent (1)
- No statewide code or predates ASHRAE 90.1-2004 (11)
- Home-rule states with significant local adoptions

Map Labels:

- WA, OR, ID, MT, ND, MN, WI, MI, NY, PA, NJ, DE, MD, DC, ME
- CA, NV, UT, CO, WY, SD, NE, IA, MO, IL, IN, OH, WV, VA, NC, SC, GA, FL, AL, MS, TN, KY, AR, LA, TX, NM, OK, AK, HI

Inset Map Labels:

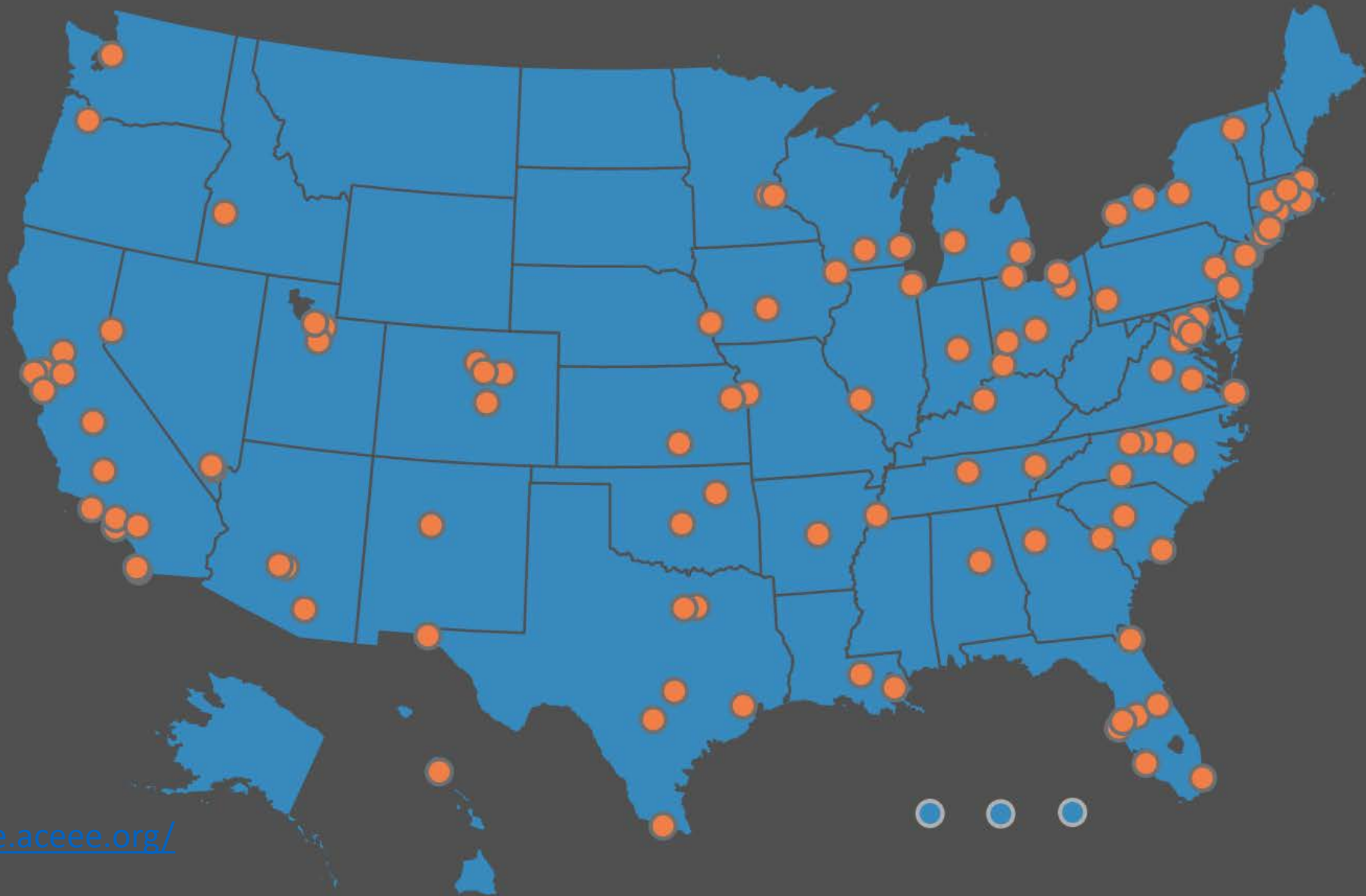
- NH, VT, MA, RI, CT, NJ, DE, MD, DC
- AS, MP, GU, VI, PR

BCAP Building Codes Assistance Program

An IBTS program

ASHRAE 90.1-2004	IECC 2006
ASHRAE 90.1-2007	IECC 2009
ASHRAE 90.1-2010	IECC 2012
ASHRAE 90.1-2013	IECC 2015
ASHRAE 90.1-2016	IECC 2018
ASHRAE 90.1-2018	IECC 2021

Cities and Counties may *require* more stringent standards than at state level (ex. MD), when state law doesn't prohibit; may *incentivize* more stringent standards and codes where they cannot require (ex. VA)



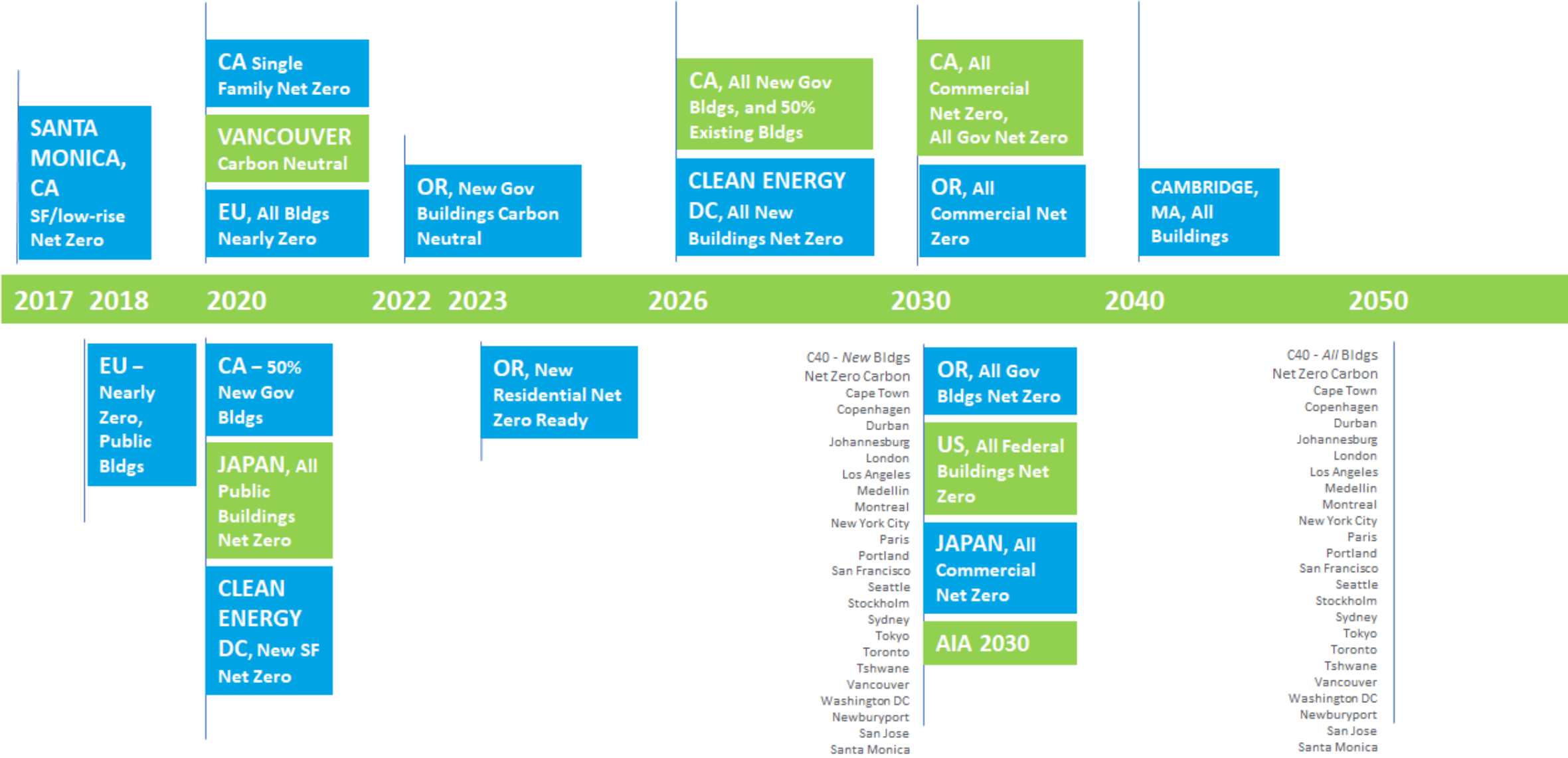
<https://database.aceee.org/>



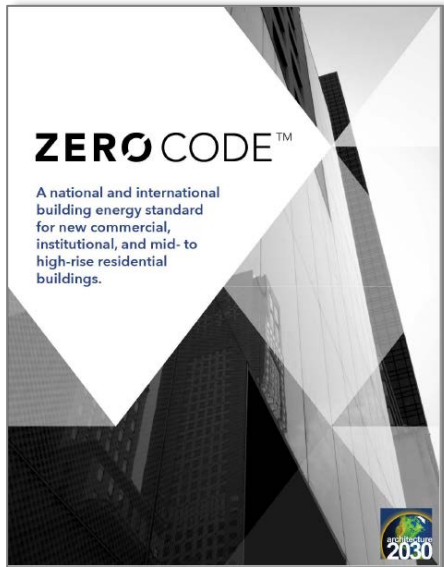
Alameda, CA	Brisbane, CA	Cupertino, CA	Falls Church, VA	Hollywood, FL	Los Angeles, CA	Mukilteo, WA	Portland, ME	Santa Fe, NM	Torrance, CA
Albany, CA	Buchanan, MI	Cutler Bay, FL	Fanwood, NJ	Holyoke, MA	Los Gatos, CA	Napa, CA	Portland, OR	Santa Monica, CA	Traverse City, MI
Albany, OR	Buffalo, NY	Dallas, TX	Fayetteville, AR	Honolulu, HI	Louisville, KY	Nashua, NH	Portsmouth, NH	Santa Rosa, CA	Trenton, NJ
Albany, NY	Burlingame, CA	Daly City, CA	Ferndale, MI	Hood River, OR	Lynnwood, WA	Nashville, TN	Prairie Village, KS	Sarasota, FL	Tualatin, OR
Albuquerque, NM	Burlington, VT	Davis, CA	Flagstaff, AZ	Houston, TX	Macon-Bibb County, GA	National City, CA	Princeton, NJ	Saratoga Springs, NY	Tucson, AZ
Alexandria, VA	Burnsville, MN	Dayton, OH	Flint, MI	Hudson, NY	Madison, WI	Nederland, CO	Providence, RI	Satellite Beach, FL	Union City, NJ
Allentown, PA	Cambridge, MA	DeKalb, IL	Fort Bragg, CA	Huntington Woods, MI	Malden, MA	Newark, DE	Racine, WI	Savanna, IL	University City, MO
Ambler, PA	Camuy, PR	Delray Beach, FL	Fort Collins, CO	Huron, CA	Malibu, CA	New Bedford, MA	Raleigh, NC	Savannah, GA	Urbana, IL
Amesville, OH	Cape Canaveral, FL	Denver, CO	Fort Lauderdale, FL	Hyattsville, MD	Manchester, NH	New Haven, CT	Rancho Cordova, CA	Seattle, WA	Vail, CO
Annapolis, MD	Cape May Point, NJ	Des Moines, IA	Fort Wayne, IN	Imperial Beach, CA	Manhattan Beach, CA	New Orleans, LA	Redmond, WA	Scranton, PA	Vancouver, WA
Anderson, SC	Carmel, IN	Detroit, MI	Framingham, MA	Indianapolis, IN	Manitou Springs, CO	New Paltz, NY	Redwood City, CA	Secaucus, NJ	Venice, FL
Ann Arbor, MI	Carrboro, NC	Dobbs Ferry, NY	Franklin, NC	Iowa City, IA	Manor, TX	New York City, NY	Rehoboth Beach, DE	Skokie, IL	Ventura, CA
Apalachicola, FL	Carroll, NC	Dover, NH	Fremont, CA	Irvington, NY	Maplewood, MN	Newark, NJ	Reno, NV	Sleepy Hollow, NY	Verona, NJ
Arcata, CA	Carson, CA	Downingtown, PA	Frisco, CO	Ithaca, NY	Maplewood, MO	Newburyport, MA	Richmond, CA	Smithville, TX	Verona, WI
Ardsey, NY	Carver, MN	Dublin, CA	Gainesville, FL	Jackson, MI	Marbletown, NY	Newport News, VA	Richmond, VA	Snoqualmie, WA	Village of Lake George, NY
Arvin, CA	Champaign, IL	Dubuque, IA	Gambier, OH	Jackson, MS	Marlboro, NJ	Newton, MA	Rochester, MN	Somersworth, NH	Washington, D.C.
Asheville, NC	Chapel Hill, NC	Duluth, MN	Garwood, NJ	Jackson, WY	Martinez, CA	Niagara Falls, NY	Rochester, NY	Somerville, MA	Watsonville, CA
Aspen, CO	Charles Town, WV	Dunedin, FL	Gary, IN	Jersey City, NJ	Maui, HI	Normal, IL	Rochester, NH	Sonoma, CA	Waukegan, IL
Athens, OH	Charleston, SC	Dunell, NJ	Gladstone, OR	Kalamazoo, MI	Medford, MA	Norman, OK	Rochester Hills, MI	South Bend, IN	West Chester, PA
Atlanta, GA	Charlotte, NC	Dunn, WI	Glen Rock, NJ	Kansas City, MO	Melrose, MA	North Bay Village, FL	Rockaway Beach, OR	South Miami, FL	Westfield, NJ
Austin, TX	Charlottesville, VA	Duquesne, PA	Glendale, WI	Kauai, HI	Memphis, TN	North Brunswick, NJ	Rockford, IL	South Orange Village, NJ	West Hartford, CT
Baltimore, MD	Chattanooga, TN	Durham, NC	Glendale, CA	Keene, NH	Menlo Park, CA	Northglenn, CO	Rockwood, MI	South Portland, ME	West Haven, CT
Baltimore, MD	Cherry Hill, NJ	East Brunswick, NJ	Gloucester, MA	Kenosha, WI	Miami, FL	North Miami, FL	Rohnert Park, CA	Springfield, MA	West Hollywood, CA
Bayfield, WI	Chicago, IL	East Lansing, MI	Golden, CO	Ketchum, ID	Miami Beach, FL	Northampton, MA	Royal Oak, MI	St Louis, MO	West Lafayette, IN
Beacon, NY	Chicago, IL	Eden Prairie, MN	Goleta, CA	Kingston, NY	Middleton, WI	Nyack, NY	Sacramento, CA	St Louis Park, MN	West Linn, OR
Beaverton, OR	Chula Vista, CA	Edgewater, CO	Goleta, CA	Kirkland, WA	Middletown, CT	Oakland, CA	Saint Helena, CA	St Peters, MO	West New York, NJ
Bellevue, ID	Chula Vista, CA	Edina, MN	Grand Rapids, MI	Kissimmee, FL	Milford, PA	Ojai, CA	Saint Paul, MN	St Petersburg, FL	West Palm Beach, FL
Bellingham, WA	Cincinnati, OH	Edmonds, WA	Greenbelt, MD	Knoxville, TN	Milford, CT	Olympia, WA	Salem, MA	St. Joseph, MO	West Sacramento, CA
Belmont, CA	Claremont, CA	El Cerrito, CA	Greensboro, NC	Laconia, NH	Millbrae, CA	Orlando, FL	Salem, OR	Stamford, CT	West Wendover, NV
Berkeley, CA	Claremont, CA	El Monte, CA	Greenville, SC	Lafayette, CO	Millcreek, UT	Ossining, NY	Salisbury, MD	State College, PA	Westland, MI
Bethlehem, PA	Claremont, NH	Elburn, IL	Greenville, SC	Lafayette, CO	Millwaukee, WI	Palo Alto, CA	Salt Lake City, UT	Statesville, NC	Westminster, CO
Beverly, MA	Clarkston, GA	Elgin, IL	Gresham, OR	Laguna Woods, CA	Milwaukee, OR	Park City, UT	San Antonio, TX	Stockton, CA	Weston, FL
Beverly Hills, CA	Clearwater, FL	Elgin, IL	Gulfport, FL	Lakewood, OH	Minneapolis, MN	Pawtucket, RI	San Carlos, CA	Sunnyvale, CA	Wheat Ridge , CO
Bexley, OH	Cleveland, OH	Emeryville, CA	Half Moon Bay, CA	Lakewood, CO	Miramar, FL	Pembroke Pines, FL	San Diego, CA	Sunrise, FL	White Plains, NY
Binghamton, NY	Coconut Creek, FL	Encinitas, CA	Hallandale Beach, FL	Lancaster, PA	Missoula, MT	Petaluma, CA	San Fernando, CA	Surfside, FL	Whitefish, MT
Birmingham, AL	College Park, MD	Englewood, NJ	Hallandale Beach, FL	Lanesboro, MN	Moab, UT	Philadelphia, PA	San Francisco, CA	Swarthmore, PA	Whitney Point, NY
Bisbee, AZ	Columbia, MO	Erie, PA	Hastings-on-Hudson, NY	Lansing, MI	Monona, WI	Phoenix, AZ	San Jose, CA	Swedesboro, NJ	Wilmette, IL
Blacksburg, VA	Columbia, SC	Eugene, OR	Hawai'i , HI	Lapeer, MI	Montgomery, IL	Pinecrest, FL	San Leandro, CA	Syracuse, NY	Windsor, CA
Bloomington, IL	Columbus, OH	Evanston, IL	Hayward, CA	Las Cruces, NM	Montpelier, VT	Pittsboro, NC	San Luis Obispo, CA	Tacoma, WA	Windsor Heights, IA
Bloomington, IN	Concord, NH	Evansville, IN	Healdsburg, CA	Lauderhill, FL	Mooresville, NC	Pittsburg, KS	San Marcos, TX	Takoma Park, MD	Winston Salem, NC
Bloomington, MN	Conshohocken, PA	Everett, WA	Helena-West Helena, AR	Laurel, MD	Morgantown, WV	Pittsburgh, PA	San Mateo, CA	Tallahassee, FL	Woodland, CA
Boise, ID	Cooperstown, NY	Fairbanks North Star Borough, AK	Highland Park, NJ	Lawrence, KS	Morristown, NJ	Pittsfield, MA	San Rafael, CA	Tampa, FL	Woodside, CA
Boston, MA	Coral Gables, FL	Fairfax, VA	Highland Park, IL	Lebanon, NH	Morro Bay, CA	Plainsboro, NJ	Santa Ana, CA	Tarrytown, NY	Woodstock, IL
Boulder, CO	Corte Madera, CA	Fairfield, IA	Highlands, NC	Lewes, DE	Mosier, OR	Pleasant Ridge, MI	Santa Barbara, CA	Telluride, CO	Worcester, MA
Bowie, MD	Cortland, NY	Falcon Heights, MN	Hillsborough, NC	Little Rock, AR	Mount Pocono, PA	Pompano Beach, FL	Santa Clara, CA	Tempe, AZ	Yonkers, NY
Boynton Beach, FL	Corvallis, OR	Falls Church, VA	Hoboken, NJ	Long Beach, CA	Mountain View, CA	Port Townsend, WA	Santa Cruz, CA	Toledo, OH	Ypsilanti, MI
Bozeman, MT	Cotati, CA	Fanwood, NJ	Hoffman Estates, IL	Long Branch, NJ					
Breckenridge, CO	Crete, NE	Fayetteville, AR		Longmont, CO					
Bridgeport, CT	Culver City, CA	Falcon Heights, MN		Los Altos, CA					
Brighton, NY				Los Altos Hills, CA					



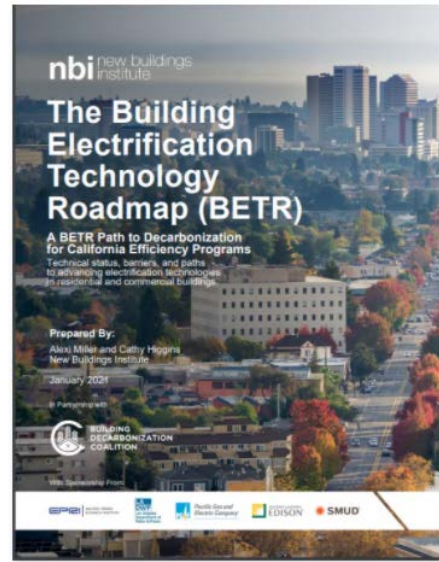
City & State: Mandatory Net Zero Energy/Carbon Building Codes



Model Code Language + Tools



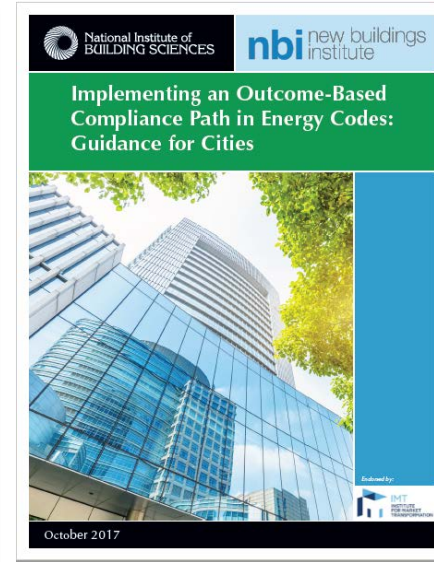
<https://zero-code.org/>



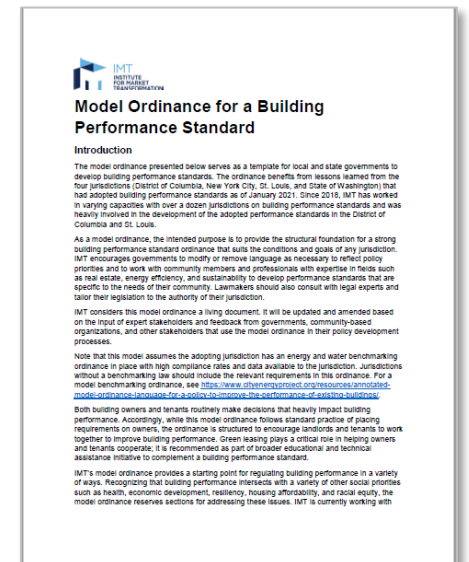
<https://newbuildings.org/resource/building-electrification-technology-roadmap/>



<https://newbuildings.org/resource/building-decarbonization-code/>



<https://newbuildings.org/resource/implementing-outcome-based-compliance/>



<https://www.imt.org/resources/model-ordinance-for-building-performance-standards/>



Scott Copp

Anica Landreneau

Emi

 **COMMITTEE
ACTION HEARINGS**
GROUP B CODES | ALBUQUERQUE | 2019

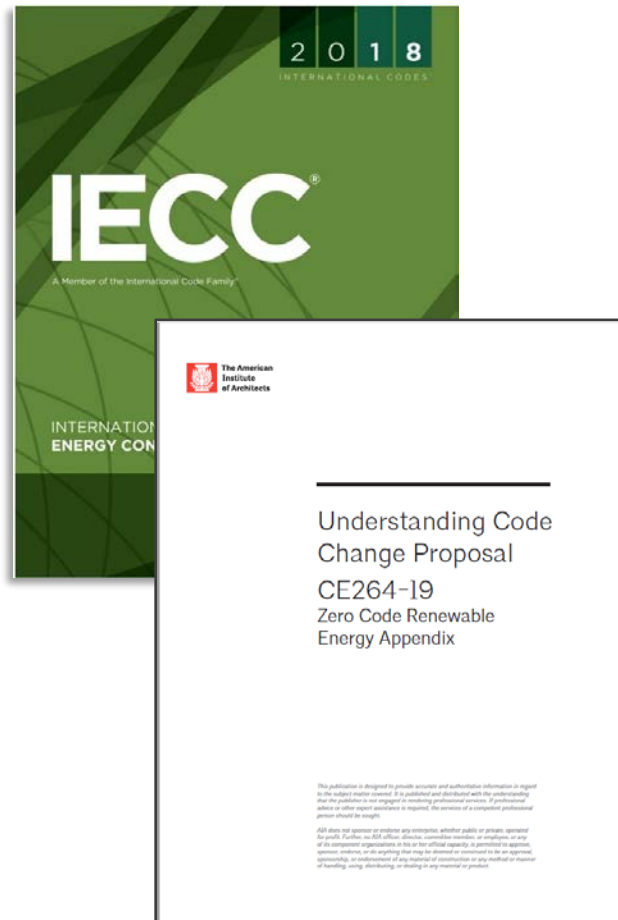
CE257-19

Next: **CE258-19**

IECC-Commercial

Track 1: **COMPLETE**

CE264-19 Zero Code Appendix IECC 2021



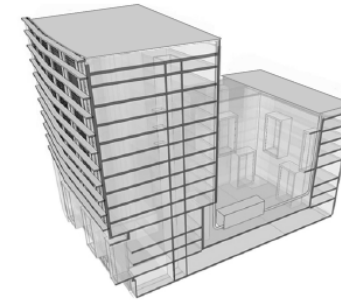
ZERO CODE™

Commercial • Institutional • Mid-Rise/High-Rise Residential Buildings

1 Design an energy efficient building

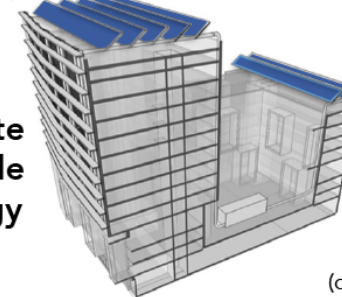
Efficiency Standard: ASHRAE 90.1-2016 minimum;
ASHRAE 189.1-2017; others

- Efficient building envelope / daylighting
- Passive heating / cooling / ventilation
- Efficient systems / equipment / controls



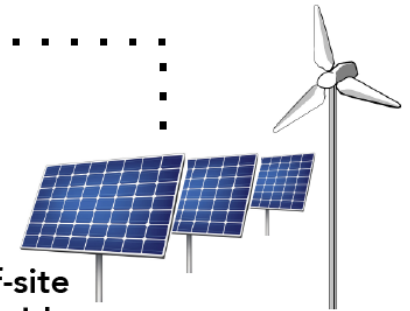
2 Address the remaining building's energy needs with:

on-site
renewable
energy



and/or off-site
renewable
energy

wind • solar • hydro
(other non-CO₂ emitting sources)



Source: Architecture 2030
Graphic adaptations: Sefaira; DOE

House Committee on the Climate Crisis, 17 October 2019



Performance + Accountability: The Changing Landscape of Building Codes + Policy



Str. SH clad
furniture member

Str. SH articulation

pre-wot.

pre-wot. Beyond.

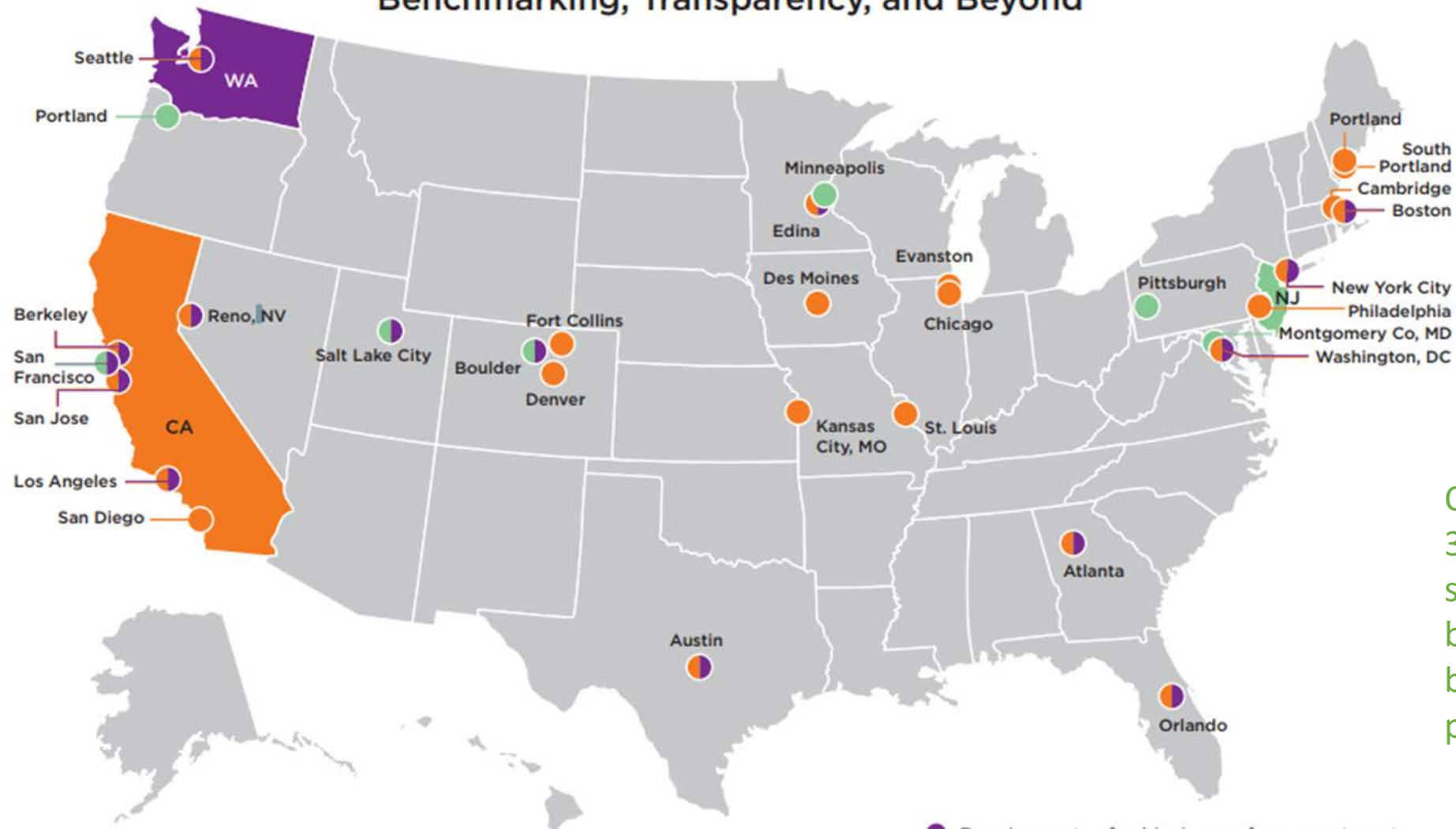
pre-wot. @ 3 Plot. O.C.

STUDY OF
DIRECTED EXPRESSION
LCCA Sydney
170K 19 Jan 07
NTS



what?

U.S. City, County, and State Policies for Existing Buildings: Benchmarking, Transparency, and Beyond



Cities are seeing
3-14% energy
savings in
buildings from
benchmarking
policies alone.

- Requirements of achieving performance targets or completing additional actions
- Benchmarking policy for public, commercial, and multifamily buildings adopted
- Benchmarking policy for public and commercial buildings adopted

EUI

WUI

GHG

Reporting Year

2017

Year Built

1900

2017

Floor Area (ft²)

10,000

500,000+

EUI

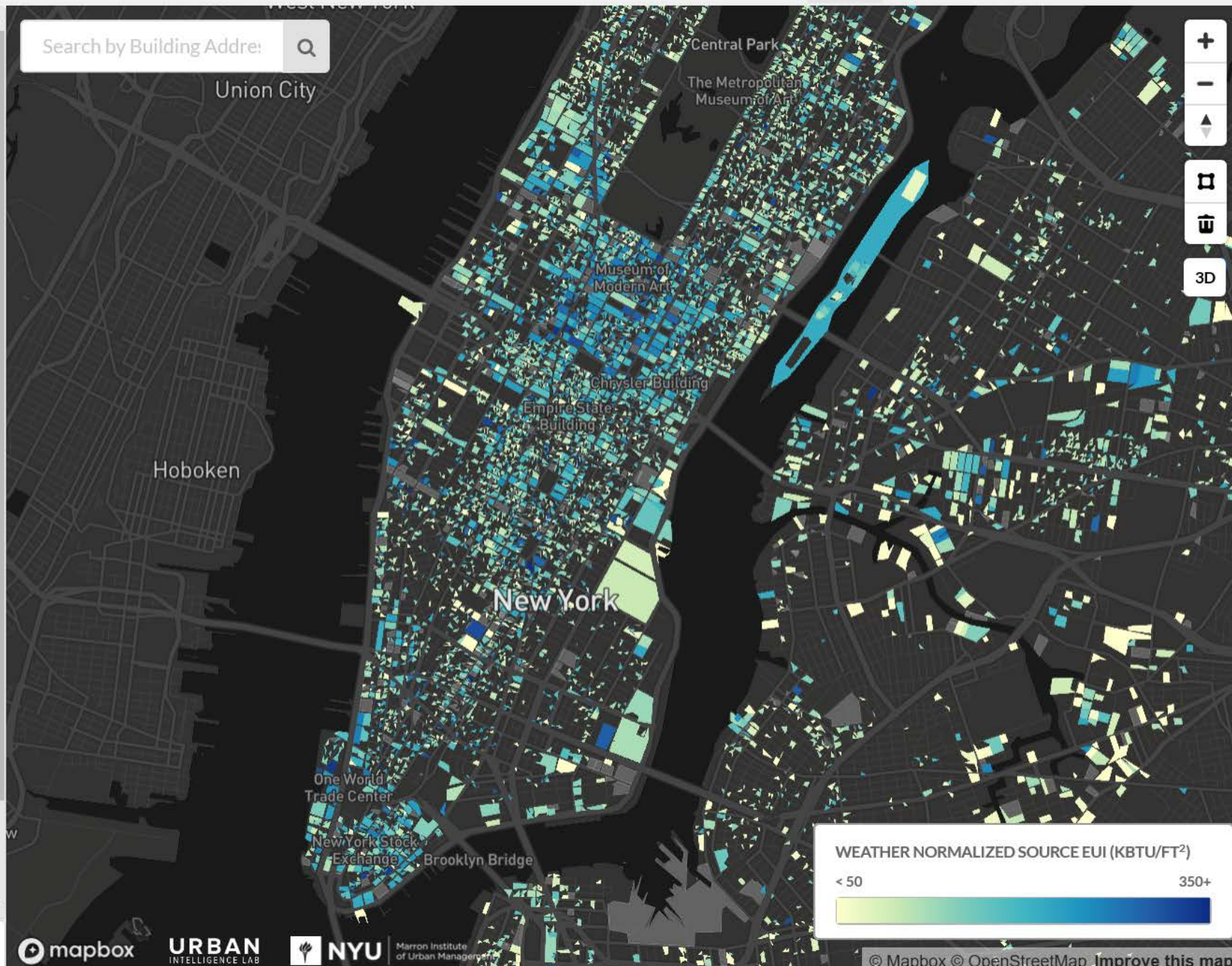
50

350+

ENERGY STAR® Eligible

☐

Property Type	No. of Properties	
All Property Types	21708	
Multifamily Housing	14866	
Office	1795	
K-12 School	1407	
Hotel	348	
Non-Refrigerated Warehouse...	287	
Retail Store	172	
Self-Storage Facility	154	
College/University	137	
Residence Hall/Dormitory	137	
Manufacturing/Industrial P...	135	
Mixed Use Property	132	
Senior Care Community	130	

[Download CSV](#)
[Reset Filters](#)




EUI WUI GHG

Reporting Year 2017

120 Broadway



Google Office

168.1

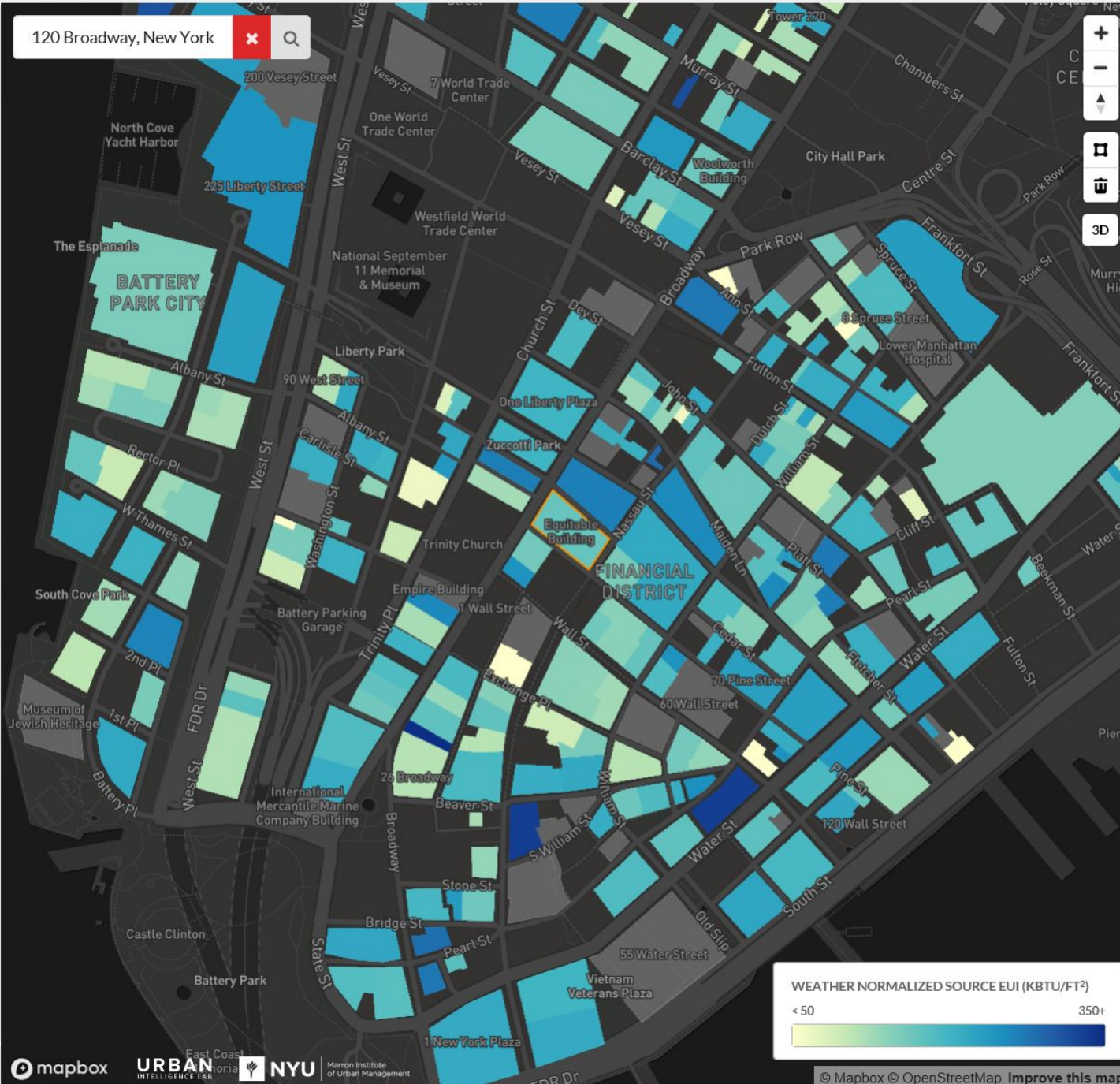
Energy Use Intensity
(kBTU/ft²)

86

ENERGY STAR[®] Score

- ▶ Building Information
- ▶ Distribution Comparison
- ▶ Time Series Comparison
- ▶ Building Type Breakdown
- ▶ Energy Type Breakdown

Download CSV Reset Filters





Energy Efficiency accounted for **>2.3 million new jobs in 2018**,
2x as many as all fossil fuel jobs in the U.S.

The energy efficiency sector has already
created more than 65,000 jobs in
Washington State,
more than 66% of which are in A/E/C





Atlanta determined investment in energy efficiency would return \$41 in local benefits for every \$1 invested.

Atlanta now requires commercial buildings 25,000+ sf to report annual EnergyStar scores and perform energy audits every 10 years.



Building Performance Standards

Building Codes apply at permit and inspections, to new construction or planned renovations.

Building Performance Standards apply to all existing buildings over a certain size, no matter what code they were delivered under or when, and they impact a building for its entire lifespan. Building Performance Standards may escalate over time, may not be coordinated with local energy codes, and they **trigger renovations**.

Existing Building Performance Standards



Washington, DC

- 2021, 5+1 year cycles
- Min: Median local ENERGY STAR score by peer building group
- All buildings: 10,000 SF or larger



New York City

- 2024, 2030, 2040, 2050
- Max CO₂ emissions intensity by occupancy type
- All buildings: 25,000 SF or larger



Washington State

- 2026, 5-year cycles
- Max: site EUI by occupancy type, lower EUI for new construction
- Commercial buildings: 50,000 SF or larger

Existing Building Performance Standards



Philadelphia

- 2021-2024
- LEED Gold, Energy Star 75
- All buildings: 50,000 SF or larger



St. Louis

- 2025, 4-year cycles
- Max EUI in 65th percentile
- All buildings: 50,000 SF or larger



NEXT: Boston, Cambridge, Montgomery County

- When
- Metrics
- Impacted Buildings

What's Next?

2006: Green Building Act: Green Communities & LEED to be required for public & pvt bldgs.		2008: Green Building Act kicks in for public bldgs: Affordable Housing: Green Communities; Schools: LEED Gold; all else: LEED Silver
2008: Clean & Affordable Energy (Amendment) Act: establishes Sustainable Energy Utility (SEU); requires benchmarking for public & pvt bldgs		2009: Clean & Affordable Energy Act kicks in for public bldgs: Benchmarking 10,000+ sf
		2010: Clean & Affordable Energy Act kicks in for pvt bldgs: Benchmarking pvt buildings 200,000+ sf
		2011: Clean & Affordable Energy Act kicks in for pvt bldgs: Benchmarking pvt buildings 150,000+ sf
		2012: Green Building Act kicks in for pvt bldgs: LEED Certified required 50,000+ sf
		2012: Clean & Affordable Energy Act kicks in for pvt bldgs: Benchmarking 100,000+ sf
		2013: Clean & Affordable Energy Act kicks in for pvt bldgs: Benchmarking pvt buildings 50,000+ sf;
2018: Clean Energy DC Plan: road map for 1.5°C; calls for BEPS, Green Bank, NZE bldg code by 2026		
2018: Clean Energy DC Omnibus (Amendment) Act passed by DC Council; establishes BEPS, Green Bank		
2019: Clean Energy DC Omnibus (Amendment) Act signed by mayor; public engagement process; BEPS Task Force;		
2020: BEPS draft rulemaking, draft standard released for public comment; BEPS published		2020: 2017 DC Energy & Green Codes adopted: mandatory Cx 10,000+ sf, mandatory BECx 50,000+ sf
		2021: 1st BEPS cycle begins: public bldgs. 10,000+ sf, pvt bldgs. 50,000+ sf; Benchmarking: pvt bldgs. 25,000+ sf
		2024: Benchmarking: pvt bldgs. 10,000+ sf
2026: NZE bldg code called for in Clean Energy DC Plan		2026: 1st BEPS cycle ends: public bldgs. 10,000+ sf, pvt bldgs. 50,000+ sf <i>(optional one year Delay of Compliance available for COVID-19, on request)</i>
		2027: 2nd BEPS cycle begins: public bldgs. 10,000+ sf, pvt bldgs. 50,000+ sf; 1st BEPS cycle begins: pvt bldgs. 25,000+ sf
2032: 50% GHG & energy reduction, 50% RE increase called for in Clean Energy DC Plan		2032: 2nd BEPS cycle ends: public bldgs. 10,000+ sf, pvt bldgs. 50,000+ sf; 1st BEPS cycle ends: pvt bldgs. 25,000+ sf
		2033: 3rd BEPS cycle begins: public bldgs. 10,000+ sf, pvt bldgs. 50,000+ sf; 2nd BEPS cycle begins: pvt bldgs. 25,000+ sf; 1st BEPS cycle begins: pvt bldgs. 10,000+ sf

Lifecycle Performance Accountability

- Benchmarking *(vehicle for reporting onsite generation & offsite RE procurement)*
- New Construction: onsite solar
- Performance standard
- New Construction: Net Zero
- Existing Buildings: improved performance
- Existing Buildings: Net Zero



Anica Landreneau, Associate AIA, LEED AP BD+C, WELL AP, BREEAM, fitwel
Senior Principal | Director of Sustainable Design | HOK
202.944.1490 | anica.landreneau@hok.com