

# Path to Net Zero Energy Trust New Buildings

July 24, 2017



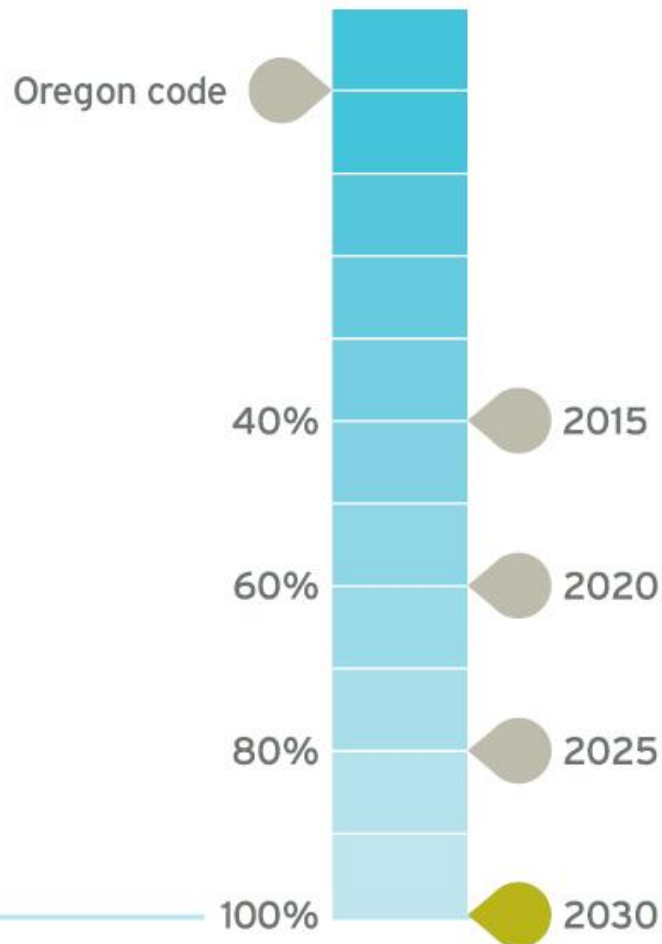


# Transforming a Market



PERCENT SAVINGS  
ABOVE OREGON CODE

2030 CHALLENGE  
YEAR



# It all adds up to zero

- Increased incentives for early design, technical assistance, installation and post-occupancy
- Technical resources and assistance from project kick-off through occupancy
- Incentives for net-zero certification

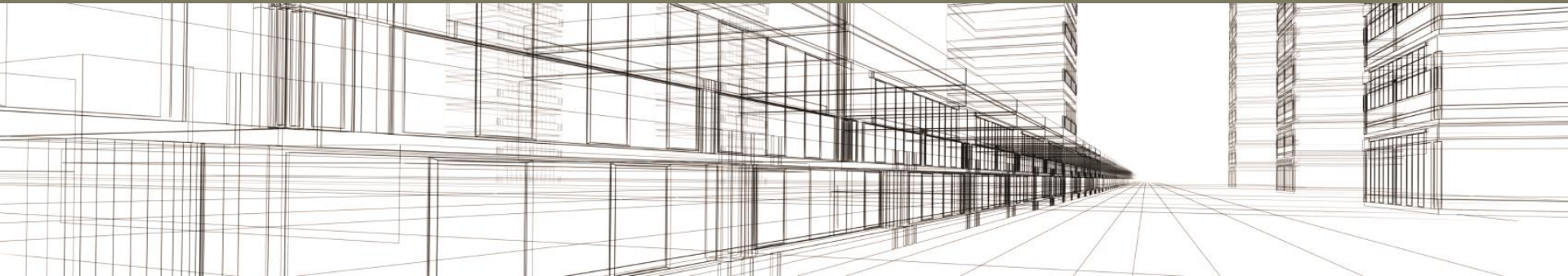
# Steps along the path to net zero

2009: Pilot first in the nation

2014: Expanded market delivery

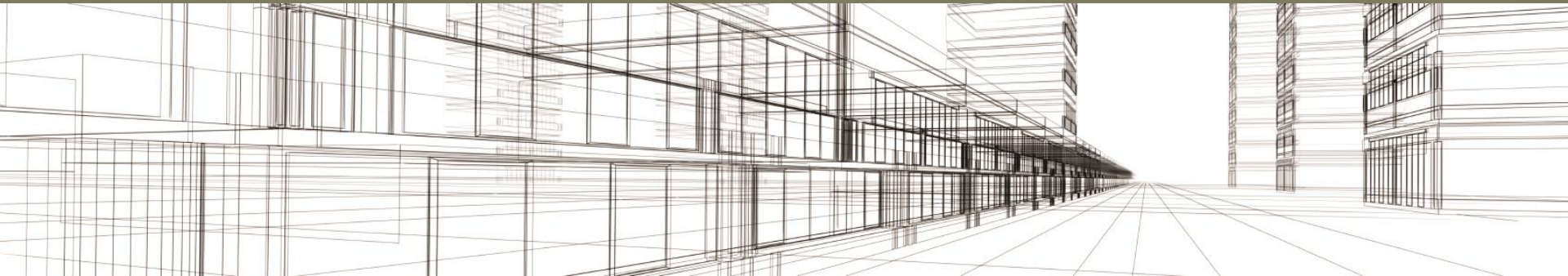
2016: Reached 1<sup>st</sup> milestone Path to Net Zero

2018: Oregon's first 100 Path to Net Zero buildings



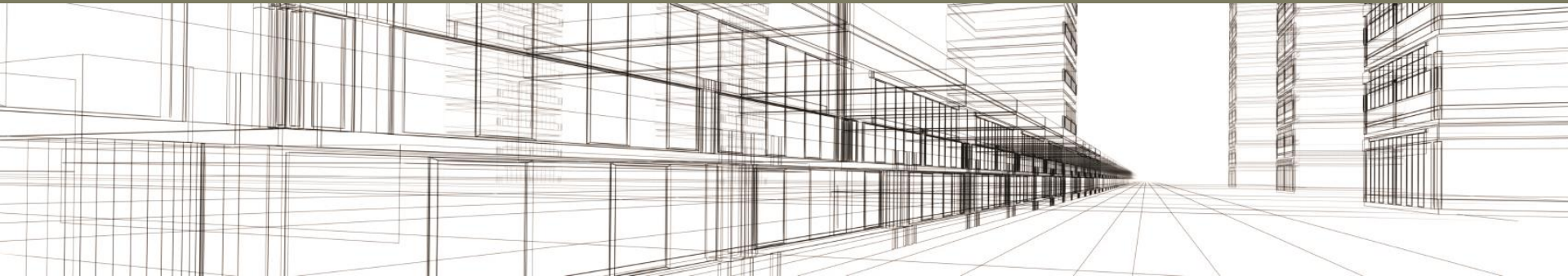
# Incentives & resources for early design

- Facilitated kick-off meeting to adopt an EUI target that aligns with the Architecture 2030 Challenge
- Up to \$10,000 to offset a design charrette to refine approach and goals using:
  - EUI targeting tool
  - Shoebox modeling
- Construction Document review (required)

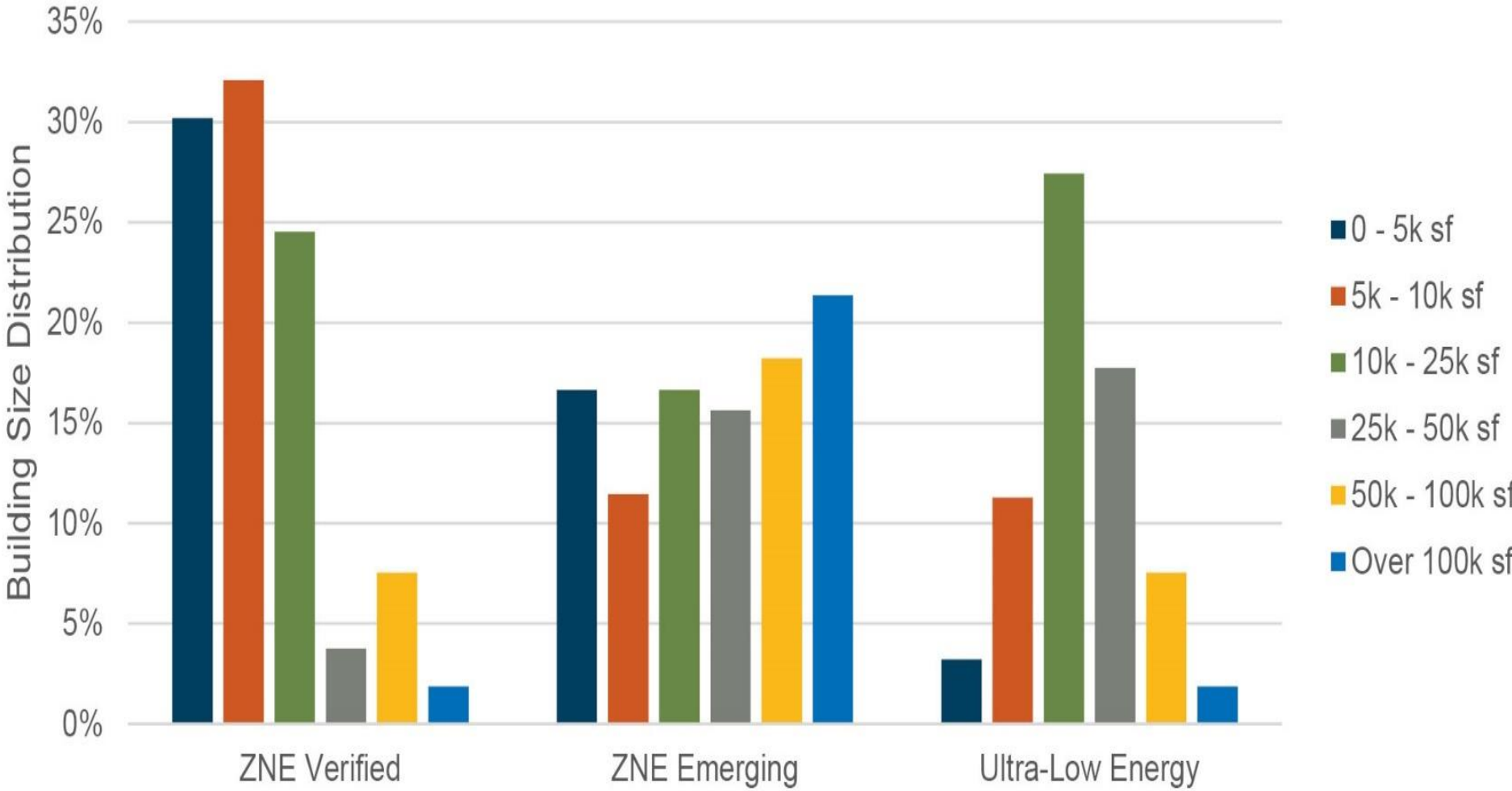


# Keys to success

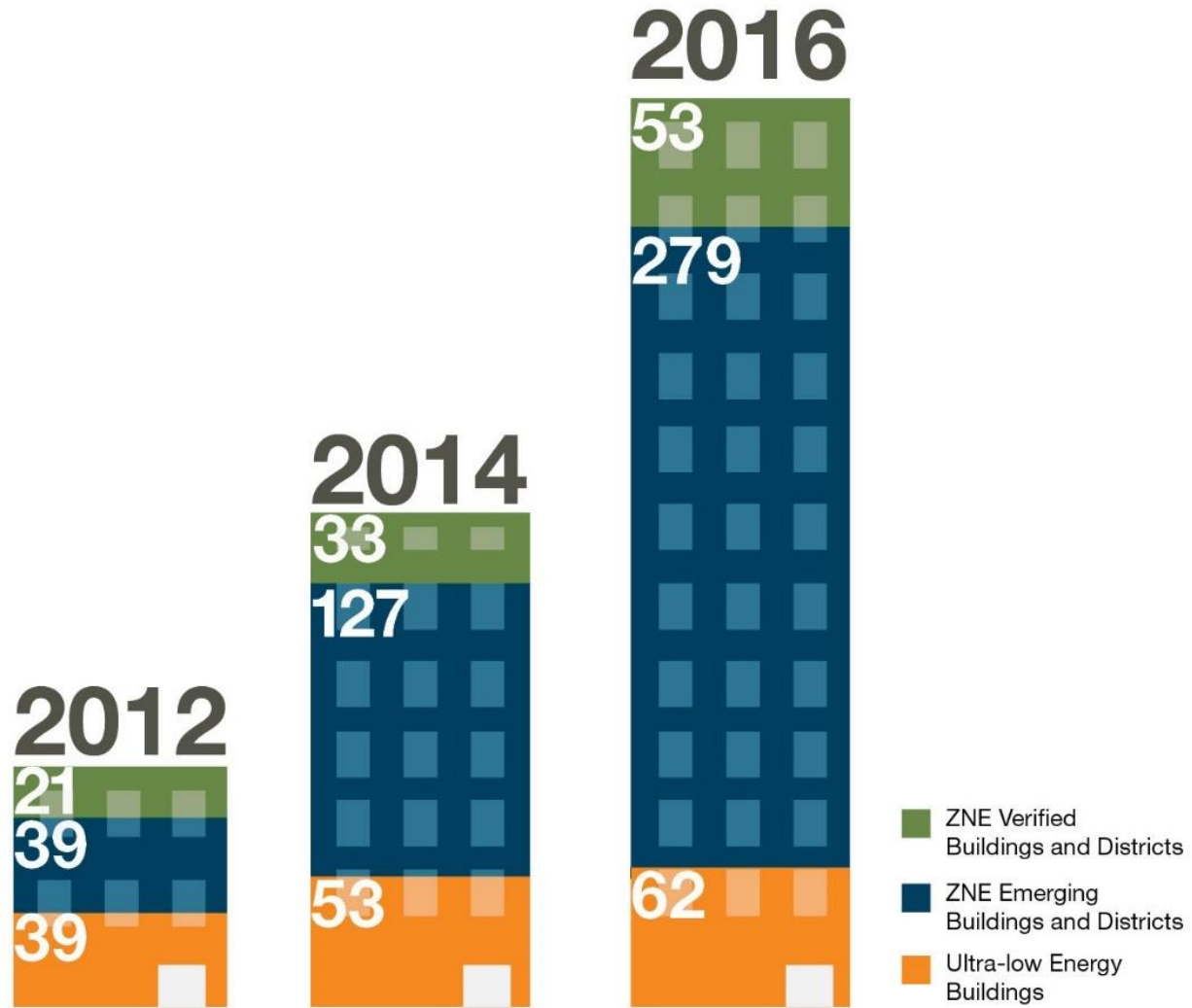
- Set 'Owner Project Requirements'
- Provide 'Early design assistance'
- Use 'Energy Target Setting', Energy Use Intensity that aligns to 2030 Challenge
- Check building design and final construction documents
- Require functional testing for each project



# Building Size by ZNE Status



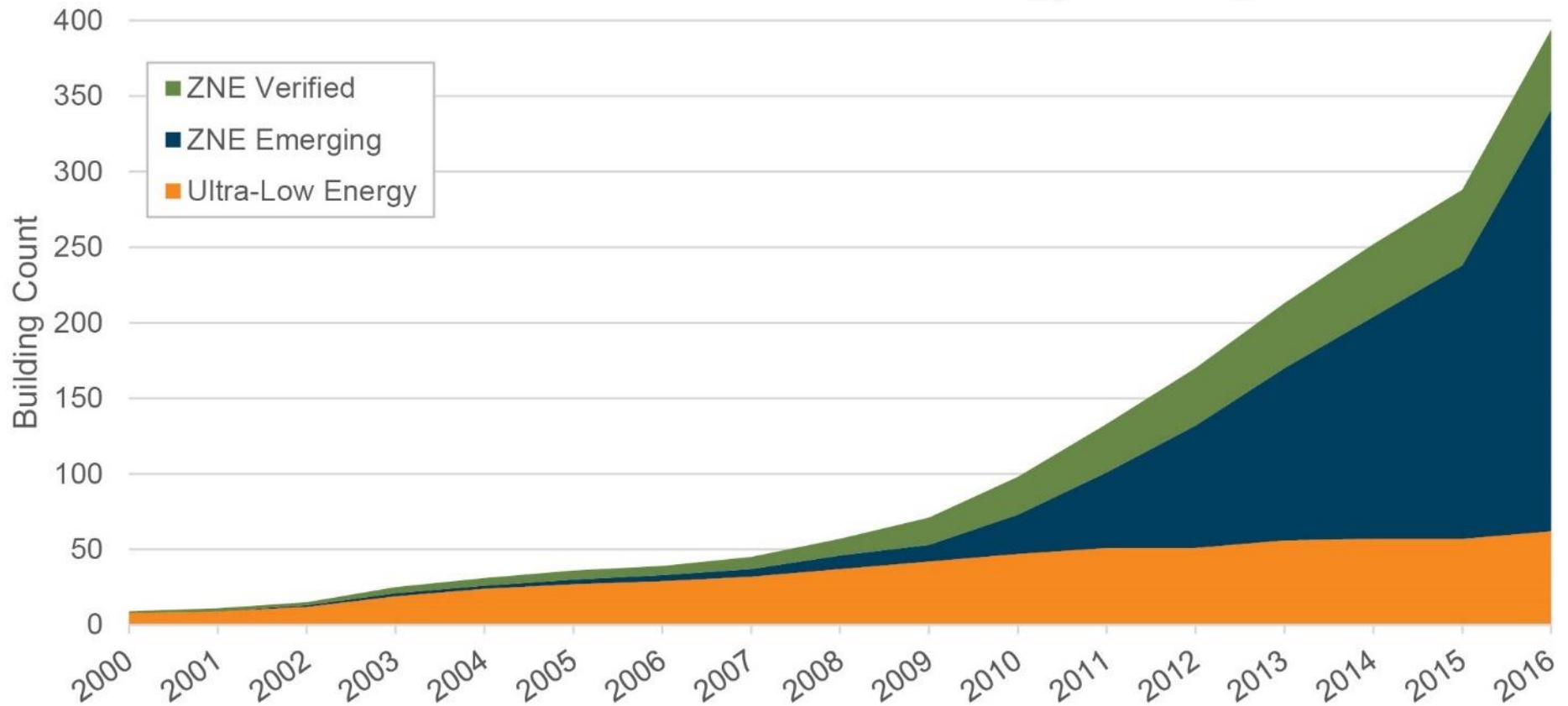
# Number of ZNE Projects





# National market progress: 400 by 2016

## Growth of ZNE and Ultra-Low Energy Buildings



# Market progress

Five states account for 56% of all Zero Net Energy buildings in the U.S. and Canada. California, Oregon, and north Atlantic coast are leading.

States with progressive policies and programs are leading – many with 2030 goals for commercial and residential buildings sectors.

State	Ultralow Verified	ZNE Emerging	ZNE Verified	Grand Total
CA	17	119	18	154
OR	4	14	2	20
NY	0	11	3	14
MA	3	11	0	14
FL	2	6	5	13

# Sample policies with 2030 goals

*California's "big, bold goals" in 2008 followed by 2012 executive order. Sets 2020 residential and 2030 commercial standards **to achieve net zero***

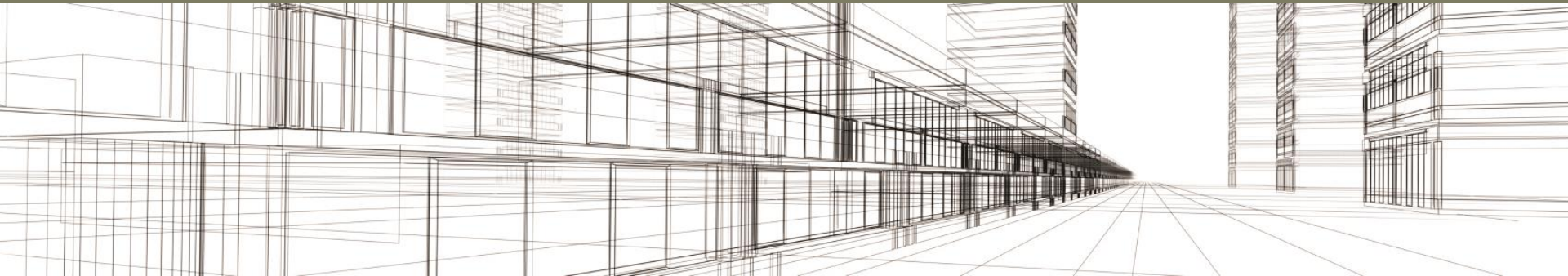
## *Washington state*

*Residential and Nonresidential construction permitted under the 2031 state energy code must achieve a 70 percent reduction in annual net energy consumption (compared to the 2006 state energy code) (RCW 19.27A.160)*

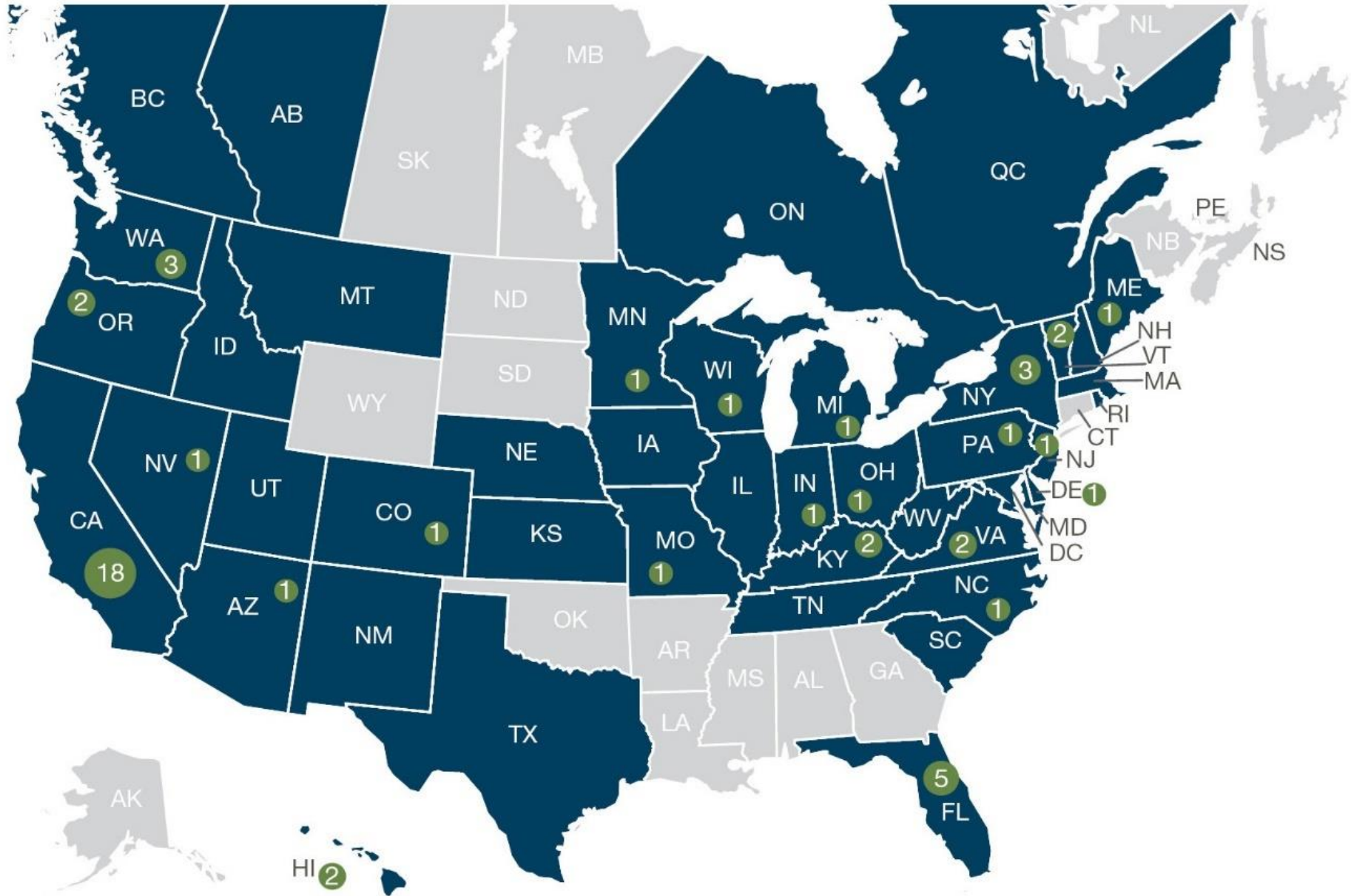
*Construct increasingly efficient homes and buildings that help achieve the broader goal of building zero fossil-fuel greenhouse gas emission homes and buildings by the year 2031 (RCW 19.27A.020)*

## *REV New York – 2015 State Energy Plan*

*"Will put New York State on a path to achieving the following clean energy goals by 2030: 40% reduction in GHG emissions from 1990 levels; 50% generation of electricity must come from renewable energy sources; 23% decrease in energy consumption in buildings from 2012 levels".*



# ZNE Building Locations in North America



States and Provinces with



A photograph of a modern, multi-story building with a prominent glass facade and a curved walkway. The building has a mix of white and grey panels and large windows. In the foreground, there are several large, light-colored planters with flowers. A few people are visible near the entrance, including one man in a light blue shirt and jeans looking at a clipboard. The sky is clear and bright.

# Thank You

Name, title

Email address

Phone #

# Technical assistance & incentives

- 75 percent of the cost of energy studies, up to \$50,000, including:
  - Early design shoebox modeling
  - CFD analysis
  - Daylighting studies
  - Energy modeling
  - Commissioning design review







# Performance & post-occupancy incentives

- \$0.15/sq ft for functional testing, up to \$40,000
- Up to \$40,000, or 50 percent of cost of energy metering



# Incentives for net-zero certification

- 50 percent of the cost of net-zero certification from the International Living Future Institute, ILFI (including application fee)

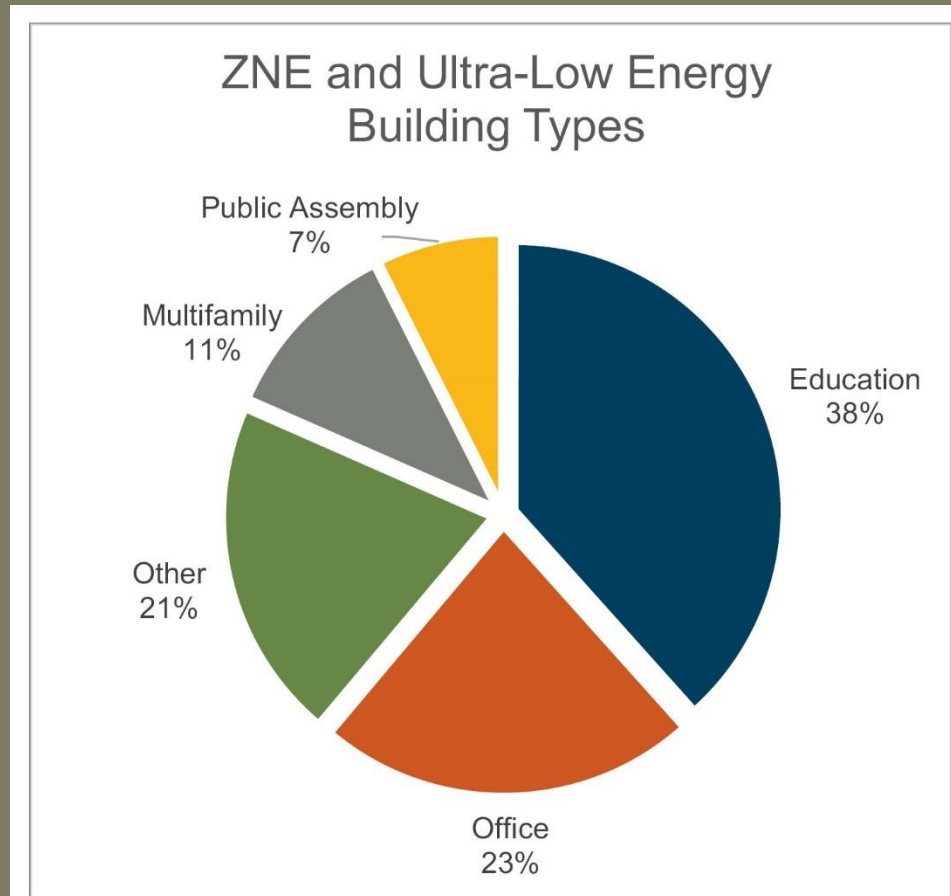


# Steps to achieve 2030 goals

- Set an Energy Use Intensity, EUI, target that aligns with the Architecture 2030 Challenge
- Achieve that target through a combination of efficiency and renewable energy strategies

<b>2030 Challenge Year</b>	<b>% Savings over CBECS</b> (Commercial Buildings Energy Consumption Survey)	<b>Estimated Savings over CBSA</b> (Commercial Building Stock Assessment)	<b>Estimated Savings over OEESC 2010/2014</b> (Oregon Energy Efficiency Specialty Code)
<b>2015</b>	70%	66%	<b>40%</b>
<b>2020</b>	80%	77%	<b>60%</b>
<b>2025</b>	90%	89%	<b>80%</b>
<b>2030</b>	100% (Net Zero)	100%	<b>100%</b>

# 2016 New Buildings Institute National List of Zero Net Energy Buildings Report



Year	Project Name	City	State	Building Type	Size (sq ft)	Base (Gross) Energy Use (kBtu/sf/yr)		Onsite Renewable Production (kBtu/sf/yr)		Net Grid Energy Use (kBtu/sf/yr)		zEPI Score
						Site	Source	Site	Source	Site	Source	
2000	Oberlin College Lewis Center	Oberlin	OH	Education	13,600	31.4	98.8	36.9	116.2	-5.5	-17.4	-5
2001	Environmental Tech. Center Sonoma State	Rohnert Park	CA	Education	2,200	2.3	7.3	3.8	11.9	-1.5	-4.6	-2
2003	Audubon Center at Debs Park (off grid)	Los Angeles	CA	Other	5,020	17.1	53.9	17.1	53.9	0.0	0	0
	Science House	St. Paul	MN	Other	1,532	18.0	56.7	18.0	56.7	0.0	0	0
2004	Challengers Tennis Club	Los Angeles	CA	Other	3,500	9.0	28.4	9.0	28.4	0.0	0	0
2005	Hawaii Gateway Energy Center	Kailua-Kona	HI	Other	5,600	28.0	88.2	31.0	97.7	-3.0	-9.5	-4
2007	Aldo Leopold Legacy Center	Baraboo	WI	Office	11,900	16.0	50.4	18.0	56.7	-2.0	-6.3	-2
	IdeAs Z2 Design Facility <sup>L</sup>	San Jose	CA	Office <sup>R</sup>	6,557	22.6	71.2	23.2	73	-0.6	-1.8	-1
2008	Camden Friends Meeting Social Hall	Camden	DE	Public Assembly	3,121	17.9	56.3	19.7	62	-1.8	-5.7	-2
	Environmental Nature Center	Newport Beach	CA	Public Assembly	8,535	17.6	55.4	27.7	87.3	-10.1	-31.9	-12
	Hudson Valley Clean Energy HQ	Rhinebeck	NY	Other	5,470	9.8	30.7	10.4	32.6	-0.6	-1.9	-1
2009	Bacon St. Offices	San Diego	CA	Office <sup>R</sup>	4,500	12.7	40	22.2	69.9	-9.5	-29.9	-13
	Chrisney Library	Chrisney	IN	Public Assembly	2,413	16.7	52.6	17.4	55	-0.8	-2.4	-1
	Living Learning Center at Tyson Research Center <sup>L</sup>	Eureka	MO	Education	2,968	24.5	77.1	26.4	83.2	-1.9	-6.1	-2
	Omega Center for Sustainable Living	Rhinebeck	NY	Other	6,200	13.2	41.6	21.5	67.6	-8.3	-26	-7
	Pringle Creek Painter's Hall	Salem	OR	Public Assembly <sup>R</sup>	3,595	11.1	35	15.4	48.4	-4.3	-13.4	-5
	Putney Field House	Putney	VT	Education	16,800	9.7	30.6	10.4	32.9	-0.7	-2.3	-1
	Watsonville Water Resources Center Admin Building	Watsonville	CA	Office	16,000	51.4	161.9	117.8	371.1	-66.4	-209.2	-101
2010	Bertschi School Science Wing	Seattle	WA	Education	1,425	48.0	151.2	48.4	152.5	-0.4	-1.3	0
	Dovetail Construction HQ Barn	Richmond	VA	Office <sup>R</sup>	6,800	UA	UA	UA	UA	0.0	0.0	0
	DPR Construction San Diego Net Zero Office	San Diego	CA	Office <sup>R</sup>	24,000	14.8	46.1	17.1	53.9	-2.4	-7.8	-3
	Energy Lab at Hawaii Preparatory Academy <sup>L</sup>	Kamuela	HI	Education	5,902	11.0	34.8	28.0	88.2	-17.0	-53.4	-15
	Hood River Middle School Net-Zero Addition <sup>L</sup>	Hood River	OR	Education	5,331	26.8	84.3	27.1	85.4	-0.4	-1.1	0
	NREL Research Support Facility	Golden	CO	Office	222,000	46.1	145.2	46.1	145.2	0.0	0.0	0
	Richardsville Elementary School	Bowling Green	KY	Education	72,285	19.0	59.9	21.6	68	-2.6	-8.1	-3
	Anna Maria Historic Green Village	Anna Maria	FL	Mixed Use <sup>R</sup>	District	28.2	88.8	34.8	109.6	-6.6	-20.8	-7
	Coastal Maine Botanical Gardens Bosarge Family Education Center	Boothbay	ME	Education	8,200	19.2	60.3	23.5	73.9	-4.3	-13.6	-4

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						Site	Source	Site	Source	Site	Source	
2011	<i>Diamond X Ranch Student Intern Center-Malibu</i>	Calabasas	CA	Other	3,500	31.5	99.3	35.1	110.5	-3.6	-11.2	-4
	<i>EcoCenter at Heron's Head Park (off grid)</i>	San Francisco	CA	Education	2,400	UA	UA	UA	UA	0.0	0.0	0
	<i>Locust Trace AgriScience Campus (High School)</i>	Lexington	KY	Education	70,000	9.9	31	10.6	33.3	-0.7	-2.3	-1
	TD Bank Branch	Fort Lauderdale	FL	Office	3,970	91.8	289.3	95.6	301.1	-3.8	-11.8	-4
	zHome - Issaquah <sup>1</sup>	Issaquah	WA	Multifamily	5,813	21.0	66.2	22.0	69.3	-1.0	-3.1	-2
2012	Bullitt Foundation Cascadia Center for Sustainable Design and Construction <sup>1</sup>	Seattle	WA	Office	51,800	9.7	30.6	16.6	52.4	-6.9	-21.8	-10
	David and Lucile Packard Foundation	Los Altos	CA	Office	49,161	24.4	76.8	29.0	91.4	-4.6	-14.6	-7
	DPR Construction Phoenix Net Zero Office <sup>2</sup>	Phoenix	AZ	Office <sup>R</sup>	16,533	26.8	84.3	29.5	92.9	-2.7	-8.6	-3
	Leon County Cooperative Extension	Tallahassee	FL	Office <sup>R</sup>	13,000	19.4	61.1	19.6	61.7	-0.2	-0.6	0
	<i>Phipps Center for Sustainable Landscapes<sup>1</sup></i>	Pittsburgh	PA	Public Assembly	24,350	18.2	57.3	18.7	58.8	-0.5	-1.5	0
	Sacred Heart Schools Stevens Family Library <sup>1</sup>	Atherton	CA	Education	6,300	16.9	53.2	29.1	91.7	-12.2	-38.5	-15
2013	<i>IBEW Local 595 Zero Net Energy Center</i>	San Leandro	CA	Education	45,001	15.0	47.3	21.0	66.2	-6.0	-18.9	-7
	<i>Lenawee Intermediate School District Center for a Sustainable Future</i>	Adrian Township	MI	Education	8,750	7.7	24.3	10.1	31.8	-2.4	-7.5	-2
	<i>PNC Net-Zero Branch<sup>1</sup></i>	Ft Lauderdale	FL	Mercantile (Enclosed and Strip Male)	4,900	59.1	186.0	64.4	203.0	-5.4	-16.9	-5
	Sandy Grove Middle School	Lumber Bridge	NC	Education	74,000	20.6	64.9	35.7	112.6	-15.1	-47.7	-15
	West Berkeley Public Library	Berkeley	CA	Public Assembly	9,399	21.7	68.3	25.5	80.4	-3.8	-12.1	-5
2014	<i>Brock Environmental Center<sup>1</sup></i>	Virginia Beach	VA	Education	10,500	14.6	45.9	28.6	90.1	-14.0	-44.2	-14
	<i>DPR San Francisco Office<sup>1</sup></i>	San Francisco	CA	Office <sup>R</sup>	24,010	144.1	453.9	147.5	464.7	-3.4	-10.8	-5
	<i>Jess Jackson Sustainable Winery Building</i>	Davis	CA	Warehouse and Storage	8,500	1.4	4.4	2.7	8.5	-1.3	-4.1	-5
	<i>Pahrangat National Wildlife Refuge Administrative Office and Visitor Contact Station</i>	Alamo	NV	Public Assembly	5,000	27.8	87.7	39.9	125.5	-12.0	-37.8	-12
	<i>Willow School</i>	Gladstone	NJ	Education	20,000	21.8	68.8	35.0	110.2	-13.1	-41.4	-12
2015	<i>231 Main Street</i>	New Paltz	NY	Office	5,400	45.2	142.3	52.6	165.8	-7.5	-23.5	-9
	<i>AP+I Design</i>	Mountain View	CA	Office	14,300	17.9	56.3	18.4	57.8	-0.5	-1.5	-1
	<i>DMV Fresno Field Office</i>	Fresno	CA	Public Assembly	19,908	12.4	39	19.9	62.7	-7.5	-23.7	-9
	<i>Maclay Architects' Office</i>	Waitsfield	VT	Office	2,568	22.1	69.5	25.0	78.6	-2.9	-9.1	-3
	<i>Suncoast Credit Union</i>	Bushnell	FL	Office	3,743	6.8	21.4	8.4	26.5	-1.6	-5.1	-2