

Numbers + Names

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Getting to Zero National Forum
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nbi new buildings
institute

RESEARCH REPORT
January 2014

2014 Getting to Zero Status Update:

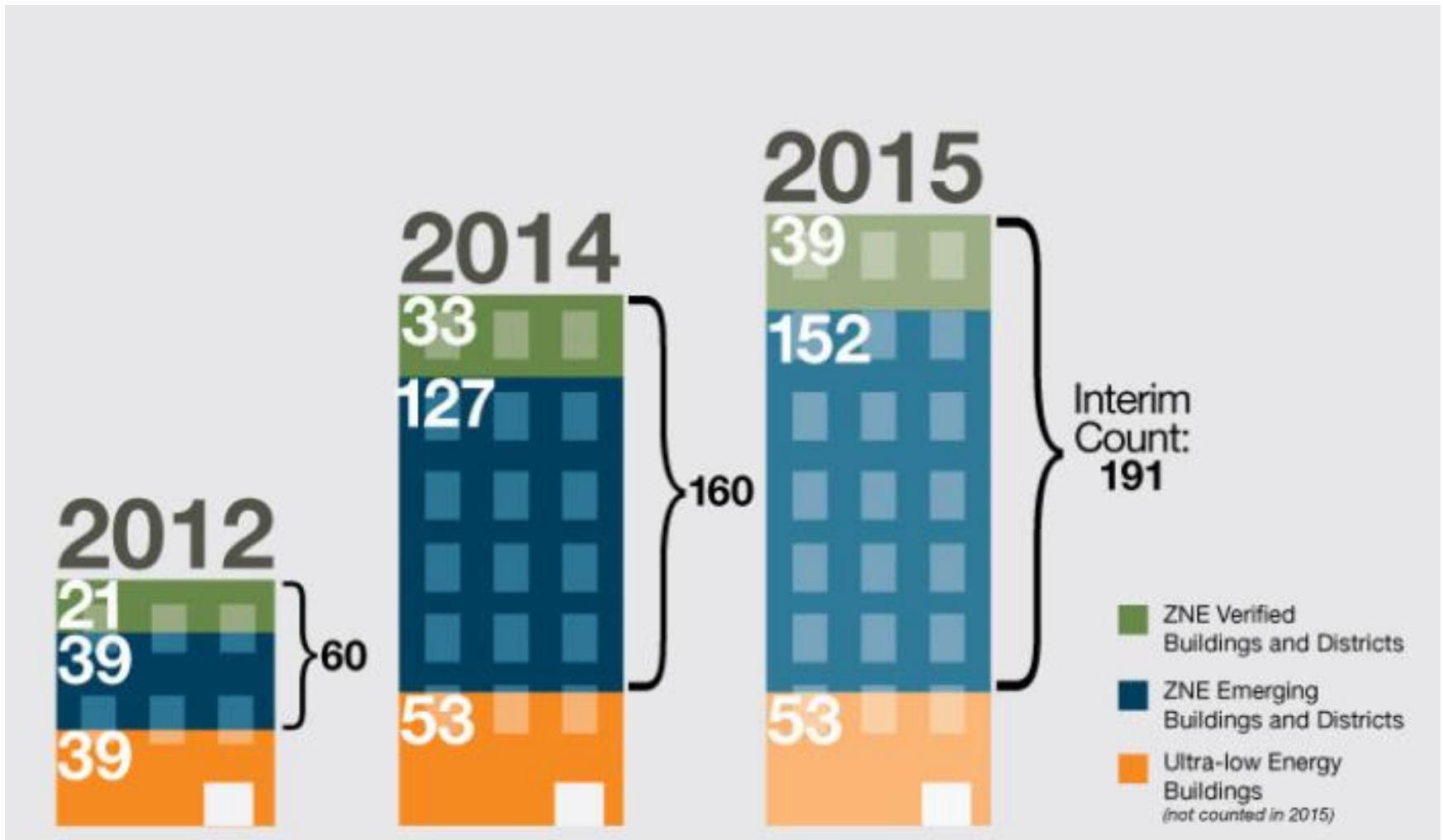
*A look at the
projects,
policies and
programs
driving zero net
energy
performance
in commercial
buildings*



David and Lucile Packard Foundation, Los Altos, California

Courtesy: Jerry Blum

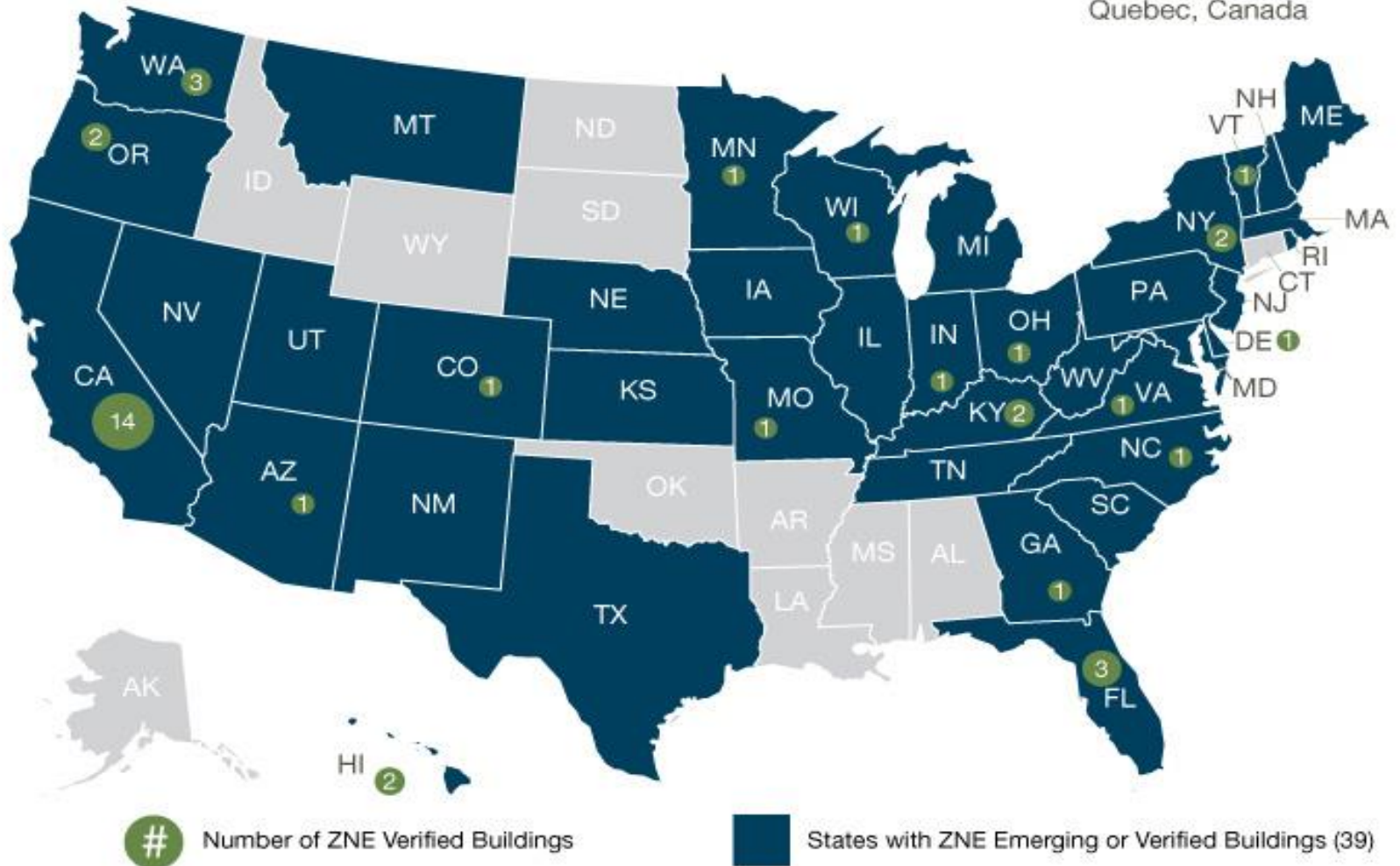
Numbers



ZNE Building Locations in North America

British Columbia, Canada

Quebec, Canada

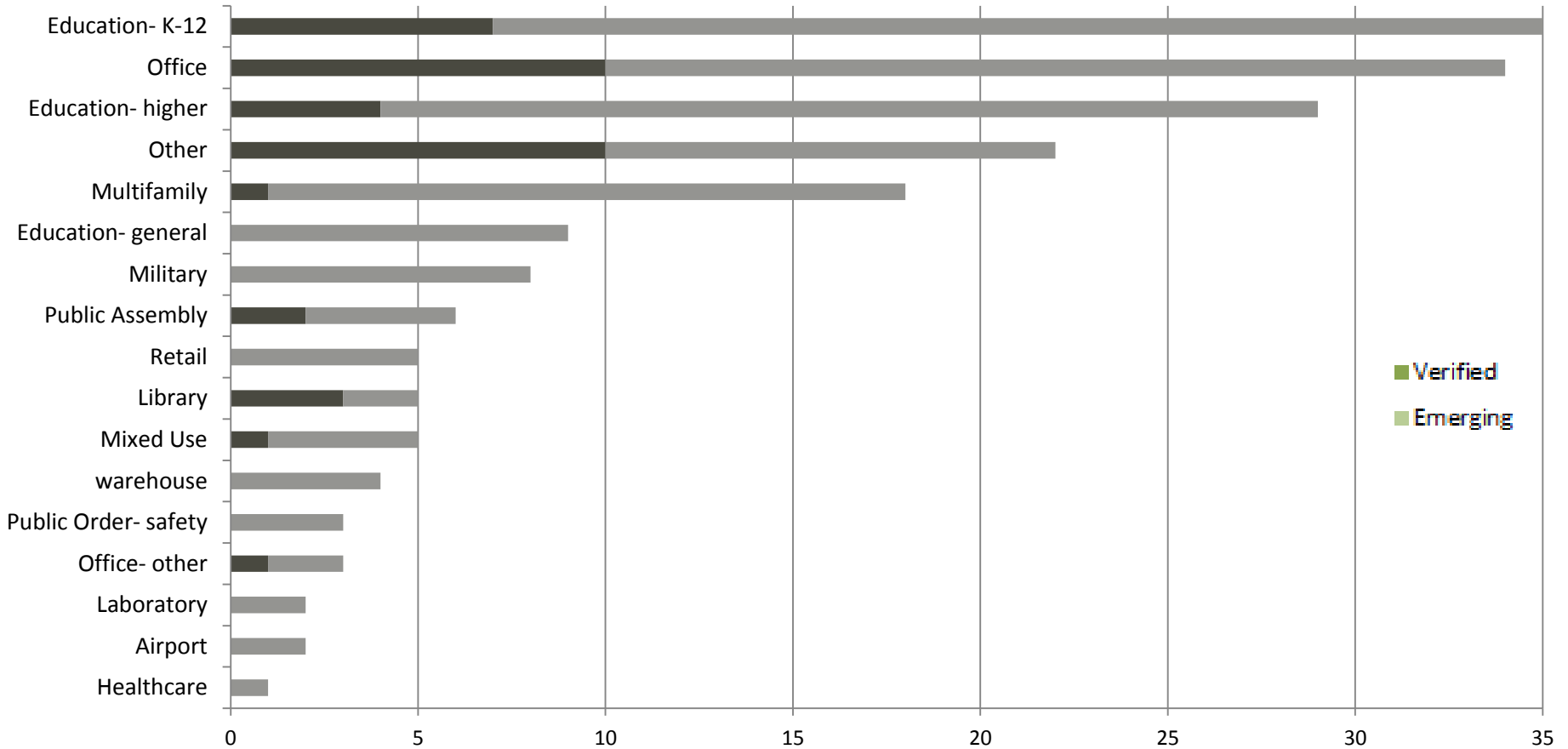


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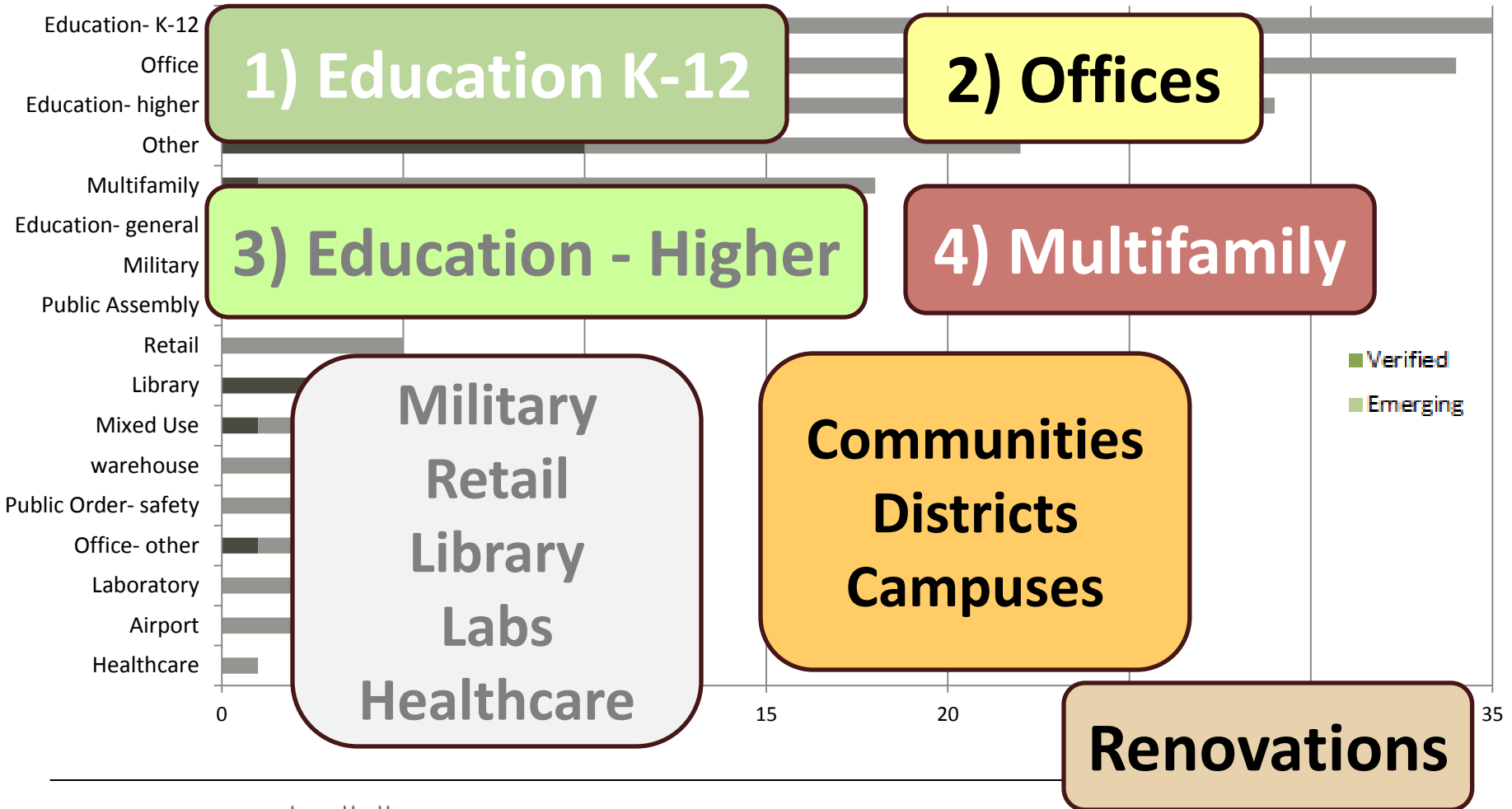
14 Building Types

ZNE Buildings by Type – NBI 2015 Interim Summary



14 Building Types and Trends

ZNE Buildings by Type – NBI 2015 Interim Summary

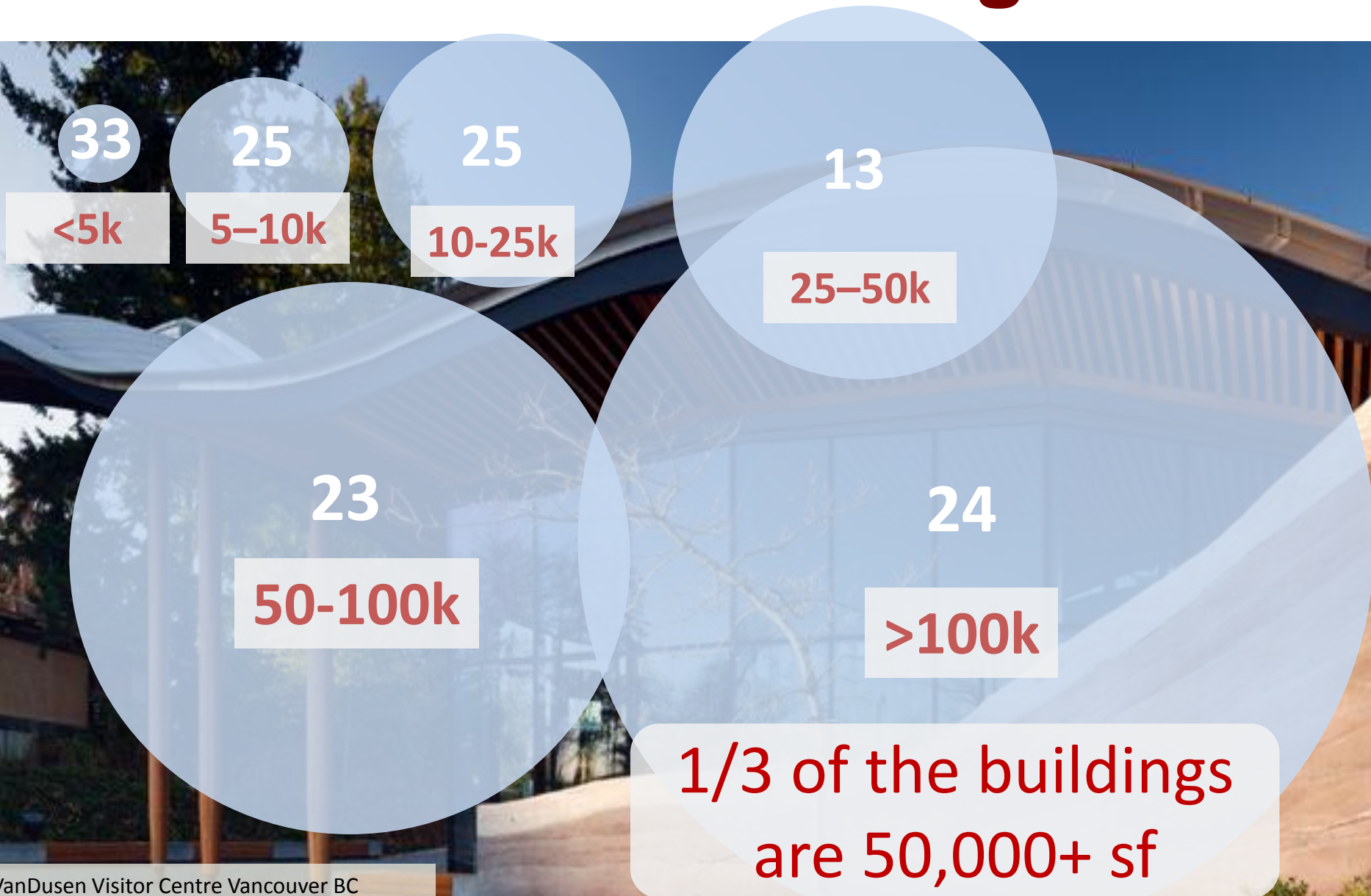


Size of ZNE Buildings

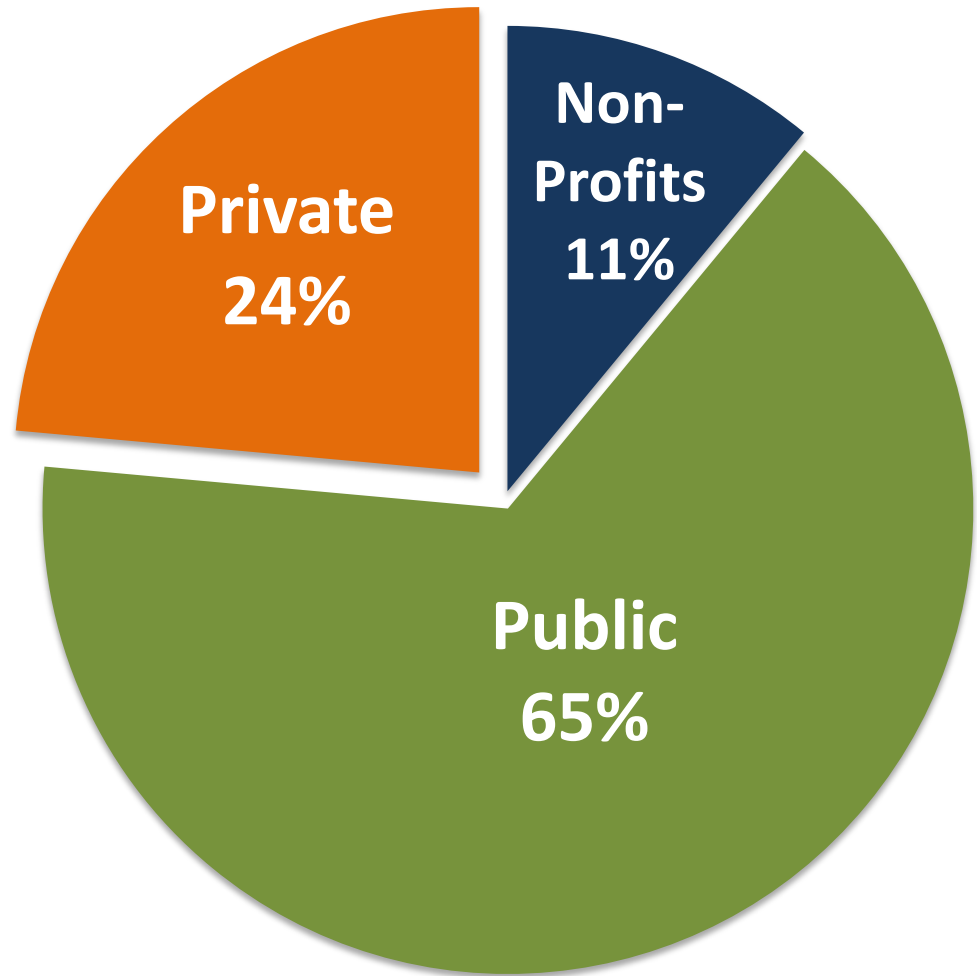


VanDusen Visitor Centre Vancouver BC
Photo: Nic Lehoux / Architect: Perkins+Will

Size of ZNE Buildings



Naming Names





2010 San Diego 24,000 sf

2012 Phoenix 16,500 sf

2014 San Francisco 24,000 sf

Walgreens

Hewlett Packard

KB Homes

PNC Bank

Adobe

TD Bank

Bayer

Frito-Lay

Bubbly Dynamics

Kaiser Permanente

JC Johnson

3C Company

McCormick Spices

Green Leaf Inn

Bagatelos Glass

Honda

Apple

Domus Development

DPR Construction

Hanover Page Mill Associates

Sokol Blosser Winery

Morphosis Architects

Hines

Melink

Georgia Peanut Commission

IBEW 595

Solterra

McDonalds

TNT Express

Disney

2015 List of Zero Energy Buildings

In 2011 and 2013 NBI conducted research to identify buildings with targets or actual outcomes of net zero energy. These results were published in "ZNE Status Reports" by NBI in early 2012 and 2014. NBI continues to track and document buildings with low and zero energy to support the market and policy interest in this data. This 2015 list of buildings is an interim count based on this ongoing work.

Emerging Zero Energy Buildings (or Districts) have a publicly stated goal of ZNE but do not yet meet the definition of ZNE verified. These may be in planning, design, under construction or have been in operation for less than a year. Others may have been operating for 12 months or longer, but their measured energy has either yet to achieve net zero or the measured data to document ZNE verified status was not available for this study. **Buildings new to the list are in bold italics.**

Emerging Zero Energy Buildings

Project Completion	Name	Location	State	Building Type	Size (sf)
	Mitrod	OH		Office	30,000
	Ricos	NE		Education-general	2,940
	shed Addition	Long Beach	CA	Education-general	2,500
	Solutions	Sacramento	CA	Warehouse	63,000
	Mills River	NC		Education-K-12	80,820
	Portland	OR		Education-K-12	1,485
	East Flat Rock	NC		Education-K-12	80,820
	Building 3156	Oak Ridge	TN	Office	6,900
	Duluth	MN		Education-higher	2,000
	Rocky Mount	VA		Education-K-12	3,600
	Denver	CO		Education-K-12	186,468
	Chicago	IL		Other	7,095
	Lowell	MA		Other	245,000
	Lakeland	FL		Retail	4,151
	Fayetteville	NC		Education-K-12	109,758
	Palmetto Bay	FL		Office	25,000
	Edgewood	KY		Education-K-12	133,000
	Denver	CO		Education-K-12	64,000
	Vancouver	Canada		Education-general	76,223
	Boothbay	ME		Education-general	8,200
	Reno	NV		Other	1,400
	Portland	OR		Multifamily	19,860
	Casa Grande	AZ		Other	188,000
	San Jose	CA		Office	9,200

2015 List of Zero Energy Buildings

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Verified Zero Energy Buildings (or Districts) are those with greatly reduced energy loads that have been documented to have met, over the course of a year, all net energy use through onsite renewable sources of energy. The energy use of all fuels (electric, natural gas, steam, etc.) is counted and offset. **Buildings new to the list are in bold italics.**

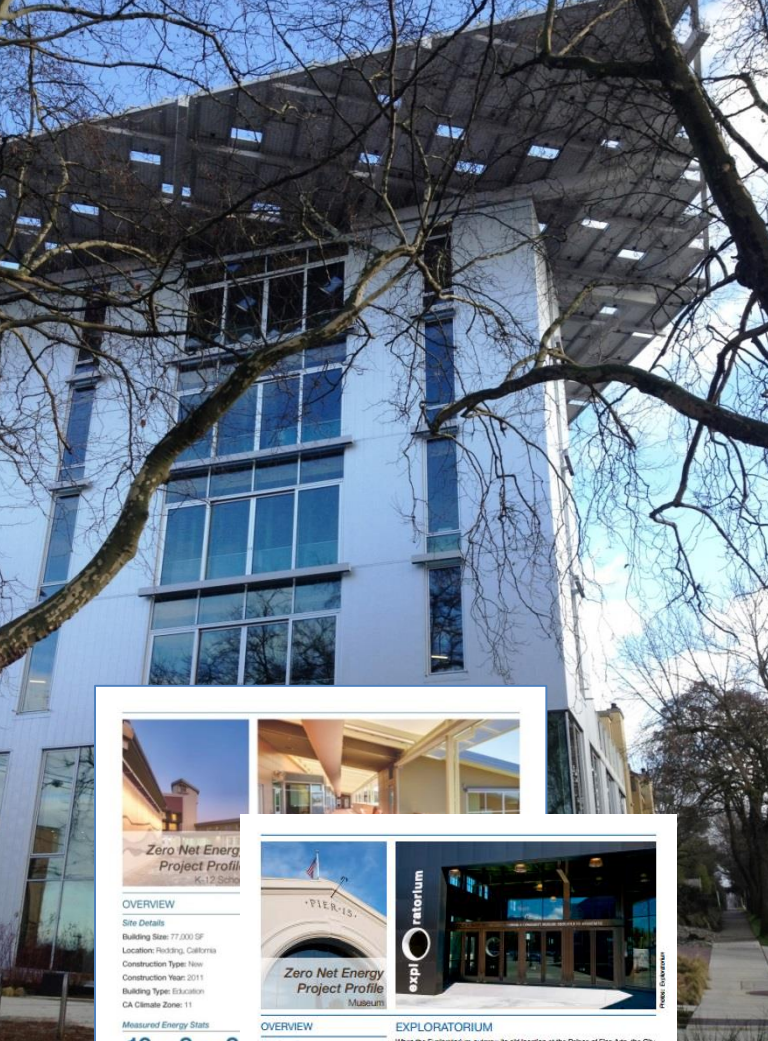
Verified Zero Energy Buildings

Year Completed	Name	Location	State	Building Type	Size (sf)	Total Building Actual EUI	Site Renewable EUI	Net Building EUI*
2000	Oberlin College Lewis Center	Oberlin	OH	Education-higher	13,600	32	36	-4
2001	Environmental Technology Center Sonoma State	Rohnert Park	CA	Education-higher	2,200	3	4	-1
2002	Challengers Tennis Club	Los Angeles	CA	Other	3,500	9	9	0
	Leslie Shao-Ming Sun Field Station	Woodside	CA	Education-higher	13,200	4	6	-2
	Audubon Center at	Los Angeles	CA	Other	5,020	17	17	0
	St. Paul	MN		Other	1,532	18	18	0
	Kailua-Kona	HI		Other	5,600	28	31	-3
	Baraboo	WI		Office	11,884	16	18	-2
	San Jose	CA		Office #	6,557	21	25	-4
	Camden	DE		Public Assembly	2,864	18	20	-2
	Newport Beach	CA		Other	8,535	18	28	-10
	Rhinebeck	NY		Other	5,470	13	13	0
	San Diego	CA		Office #	4,500	13	22	-9
	Christney	IN		Library	2,400	15	18	-3
	Eureka	MO		Education-higher	2,968	24	24	0
	Rhinebeck	NY		Laboratory	6,200	13	21	-8
	Salem	OR		Public Assembly*	3,600	21	21	0

GETTING TO zero BUILDINGS DATABASE

New Buildings Institute is proud to introduce our **Getting to Zero Buildings Database.**

Case Studies



K-12 Schools



Large Office Facilities



Higher Education



Small-Med Offices

Zero Net Energy Project Profile
16-17-2018

OVERVIEW

Site Details
Building Size: 77,000 SF
Location: Redding, California
Construction Type: New
Construction Year: 2018
Building Type: Education
CA Climate Zone: 11

Measured Energy Stats
16 - 8 = 8

OVERVIEW

Site Details
Building Size: 300,000 SF
Location: San Francisco, California
Construction Type: Major renovation
Construction Year: 2013, 1914
Building Type: Public Assembly - other
CA Climate Zone: 3

Predicted Energy Stats
16 - 8 = 8

EXPLORATORIUM

When the Exploratorium outgrew its old location at the Palace of the Arts, the City of San Francisco offered to provide Floors 15 and 17 on its historic waterfront as a larger relocation option for the science museum. After structurally shoring up the historic piers, the design team embarked on transforming the 3-acre site into the Exploratorium's campus. This included retrofitting the massive Pier 15 shed and constructing a small new structure to house a cafe and boy observation deck at the end of the pier. The waterfront shed houses the exhibition spaces as well as a mezzanine level for classrooms, conference rooms and office space.

Planning & Design Approach

Overarching projects goals:

- Preserve the interactive and explorative nature of the exhibition spaces that were so successful at the museum's former location
- Use the zero net energy goal as an educational tool that is highlighted throughout the exhibition spaces
- Maintain and meet the historical requirements of both protected structures
- Utilize the building's unique location and orientation for energy reducing design strategies

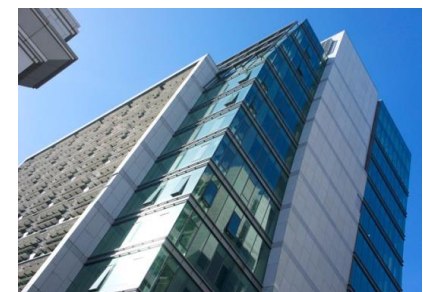
Energy Efficiency Strategies and Features

Radiant Heating and Cooling: Heating and cooling is provided to the building through a radiant concrete slab that conditions the space where the building occupants are. A four-cyle system provides either heated or chilled water to a 200,000-btu network of tubing imbedded in the concrete slab.

Efficient HVAC: The building uses its location above San Francisco Bay and its relatively constant temperature as a heat source or a heat sink depending on climatic conditions. Water-to-water heat pumps heat or cool the Bay water to meet the required load. Ventilation is provided by a separate dedicated outdoor air system (DOAS).



Environmental Centers



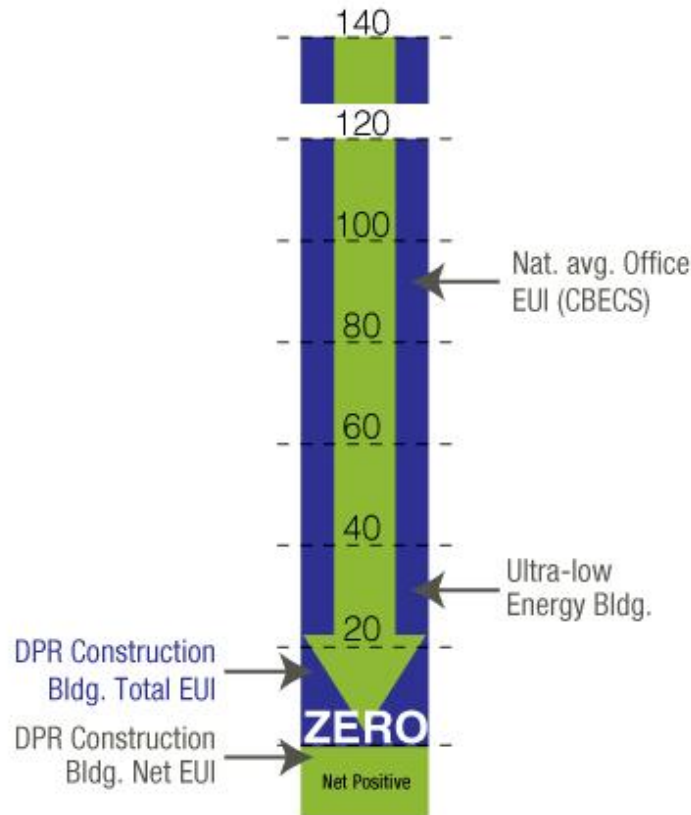
Public Buildings

DPR Construction San Diego

$$15 - 17 = -2$$

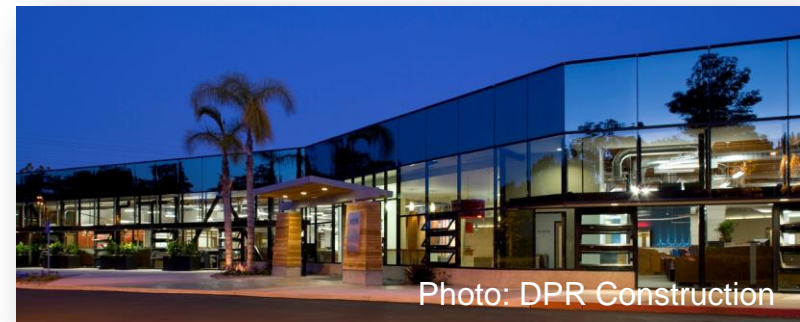
BUILDING'S TOTAL EUI RENEWABLE PRODUCTION BUILDING'S NET EUI

Site Energy Use Index (EUI) kBtu/sf/yr



Efficiency Measures:

- Natural ventilation
- Daylighting
- Roof monitors
- Efficient HVAC
- Solatubes and high performance lighting
- 64 kW PV



An aerial photograph of a city, likely Portland, Oregon, with a large, snow-capped mountain (Mount Hood) in the background. The city is densely packed with buildings of various heights and colors. The sky is clear and blue.

Numbers + Names *Tell the Story!*

Thank you