

U.S.
GREEN BUILDING
ADOPTION INDEX
FOR OFFICE BUILDINGS
2019



GREEN BUILDING ADOPTION INDEX FOR OFFICE BUILDINGS 2019

TABLE OF CONTENTS

HIGHLIGHTS	3
CITY RANKINGS	5
METHODOLOGY	6

Environmental sustainability, social responsibility and responsible governance practices (ESG) have increasingly become a key component of corporate business models and investment criteria. Sustainability certification programs have become an important consideration for commercial real estate investments. The two main certification programs in the U.S. are the EPA's ENERGY STAR® rating and the U.S. Green Building Council's LEED certification. Green building certification has become more widespread in the U.S. and capital markets have taken notice. Recent research shows that commercial mortgages collateralized by green-certified buildings have significantly lower default rates, which implies that lenders are factoring the energy and sustainability performance of buildings into mortgage pricing.

To help the commercial real estate market measure and understand the importance of green buildings, CBRE and a consortium of Maastricht University and the University of Guelph developed the Green Building Adoption Index (GBAI) in 2014. The index tracks the adoption of green building certifications across the largest U.S. office markets since 2005.

2019 HIGHLIGHTS

The 2019 Green Building Adoption Index shows that 4,879 or 13.8% of all commercial office buildings across the 30 largest U.S. office markets are green certified—the highest total in the index's history. Measured in square footage, 42.2% of total space across the top 30 office markets is green certified, up from 41.9% last year.

Chicago maintained its No. 1 rank this year, with 71.1% of commercial office space being green certified, followed by San Francisco and Atlanta.

TOP FIVE OFFICE MARKETS

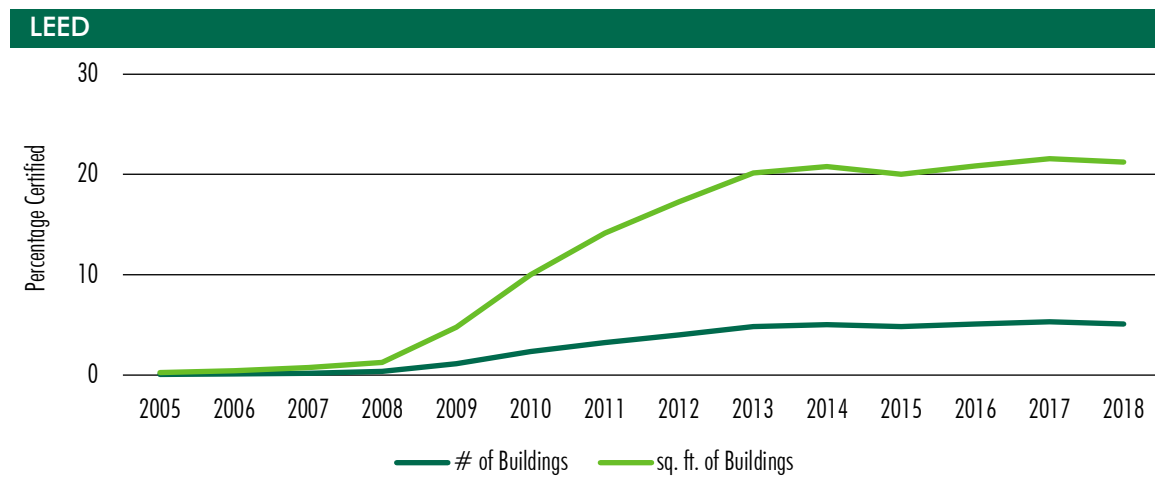
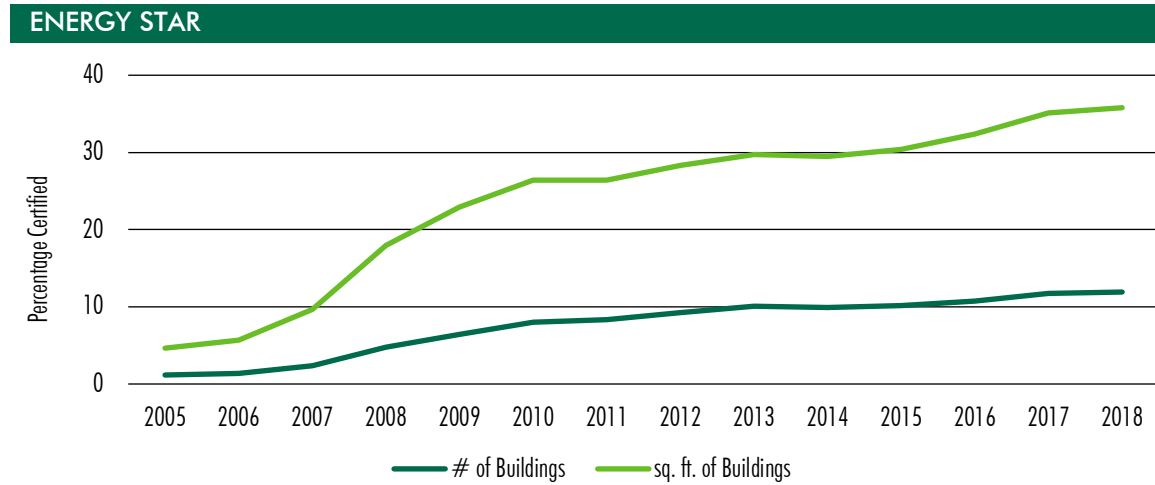
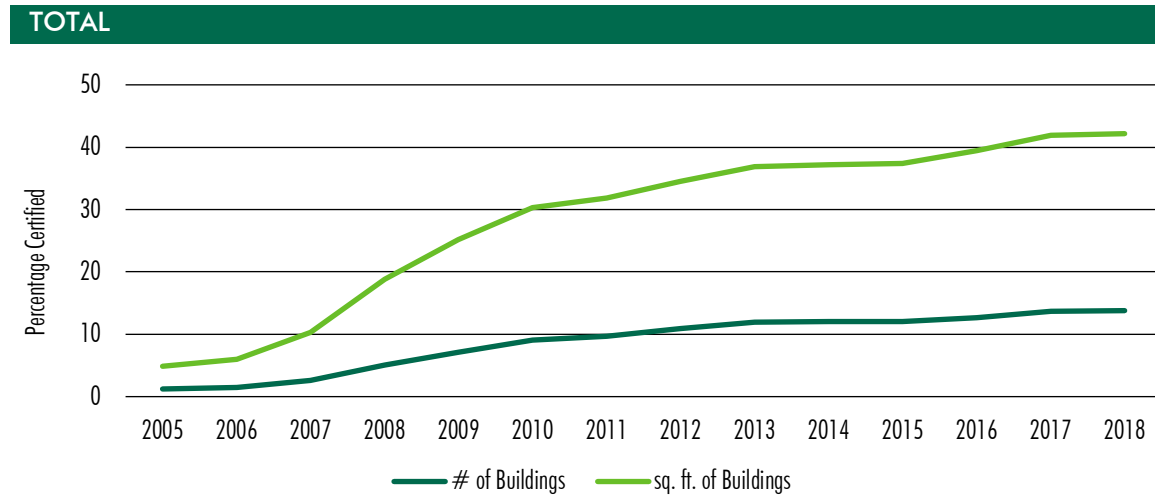
RANK	MARKET	TOTAL SF	TOTAL GREEN SF	% OF MARKET CERTIFIED GREEN
1	Chicago	235,167,156	167,159,631	71.1%
2	San Francisco	123,365,451	83,249,026	67.5%
3	Atlanta	135,269,837	80,204,198	59.3%
4	Minneapolis/St. Paul	70,147,960	40,038,997	57.1%
5	Los Angeles	204,047,455	115,487,171	56.6%
	TOP 30 MARKETS	3,687,331,582	1,554,921,831	42.2%

The ENERGY STAR program has increased across most markets, while the LEED program has decreased slightly on a percentage basis due to either fewer re-certifications or a rise in new supply without a commensurate rise in certifications.

GREEN BUILDING SUMMARY BY CERTIFICATION

	CURRENT YEAR		PRIOR YEAR	
	% GREEN BUILDINGS	% GREEN SF	% GREEN BUILDINGS	% GREEN SF
ENERGY STAR	11.9%	35.8%	11.7%	35.1%
LEED	5.1%	21.2%	5.3%	21.6%

30 LARGEST U.S. OFFICE MARKETS



Source: CBRE Research, Environmental Protection Agency, United States Green Building Council, and author's calculations Q4 2018.

CITY RANKINGS

MARKET	# OF BLDGS	TOTAL # GREEN BUILDINGS	TOTAL % GREEN BUILDINGS	NET RENTABLE AREA (SF)	TOTAL GREEN SF	TOTAL % GREEN SF
1. Chicago	1,411	282	20.0	235,167,156	167,159,631	71.1
2. San Francisco	1,391	298	21.4	123,365,451	83,249,026	67.5
3. Atlanta	915	265	29.0	135,269,837	80,204,198	59.3
4. Minneapolis/St. Paul	472	111	23.5	70,147,960	40,038,997	57.1
5. Los Angeles	1,676	378	22.6	204,047,455	115,487,171	56.6
6. Houston	1,279	278	21.7	213,505,123	111,905,436	52.4
7. Manhattan	788	276	35.0	407,502,573	200,794,977	49.3
8. Denver	1,357	235	17.3	116,087,609	55,898,026	48.2
9. Seattle	1,647	169	10.3	108,646,555	51,956,115	47.8
10. Washington, D.C.	3,332	619	18.6	369,719,798	172,570,655	46.7
11. Philadelphia	1,097	124	11.3	106,525,856	41,156,266	38.6
12. Orange County	1,850	226	12.2	104,406,974	39,753,621	38.1
13. Boston	1,922	242	12.6	219,199,173	81,941,489	37.4
14. Walnut Creek	821	81	9.9	43,383,871	16,034,640	37.0
15. Austin	667	114	17.1	49,794,360	18,395,301	36.9
16. Miami	447	62	13.9	48,791,423	18,007,641	36.9
17. Dallas/Fort Worth	1,526	212	13.9	220,257,078	76,989,339	35.0
18. Phoenix	1,256	129	10.3	88,894,090	28,035,222	31.5
19. San Diego	1,719	158	9.2	77,144,935	23,793,082	30.8
20. Portland	861	74	8.6	49,001,299	14,796,642	30.2
21. Tampa	872	51	5.8	46,260,986	12,641,873	27.3
22. San Jose	1,049	108	10.3	78,856,390	20,318,735	25.8
23. Sacramento	1,014	89	8.8	51,967,517	12,225,899	23.5
24. Baltimore	869	62	7.1	68,212,125	11,291,981	16.6
25. New Jersey	743	94	12.7	156,124,812	25,106,153	16.1
26. Pittsburgh	1,233	30	2.4	74,617,537	11,887,183	15.9
27. Milwaukee	932	21	2.3	41,907,405	5,735,878	13.7
28. Detroit	788	40	5.1	79,562,995	8,658,694	10.9
29. Kansas City	873	32	3.7	51,878,390	5,569,766	10.7
30. St. Louis	575	19	3.3	47,084,849	3,318,194	7.0

Source: CBRE Research, Environmental Protection Agency, United States Green Building Council, and author's calculations Q4 2018.

METHODOLOGY

For purpose of this study, green buildings are limited to those currently designated as ENERGY STAR or LEED certified.

The ENERGY STAR program, introduced by the U.S. Environmental Protection Agency (EPA), focuses specifically on energy efficiency. To qualify for an ENERGY STAR label, a building's energy efficiency must be in the top 25% of all buildings in the peer set, defined by a national census of buildings (CBECS).

The LEED program, developed by the U.S. Green Building Council (USGBC), considers the broader concept of sustainability. Certifications are available for different classifications and categories, including new construction (NC), core & shell (CS) and existing buildings (EB).

The EPA and USGBC maintain an up-to-date archive on ENERGY STAR and LEED certified buildings, including address details and underlying characteristics of the certifications. Some buildings hold both an ENERGY STAR and LEED certification.

The relative measure of green-certified office space in the various commercial real estate markets is calculated using information on the office inventory of the 30 largest U.S. office metro markets from CBRE Research. This information includes annual time series measures of total inventory by the number of buildings and the total square footage of the market. The inception date of the index is 2005.

CBRE Research defines competitive buildings as those that meet or exceed a minimum size requirement (determined per local market) and that offer a viable alternative to a business entity seeking to occupy space in the short term. Not included as competitive are buildings that are of such vintage or location as to be undesirable or functionally obsolete. For example, only Class A, B or C properties are considered competitive. Additionally, the following office buildings are excluded:

- Single-tenant, owner-occupied buildings (both criteria combined).
- Government-owned and occupied buildings.
- Medical buildings.

Matching procedure:

- CBRE Research employs specific geographic boundaries for each office metro market, defined by a set of longitudes and latitudes.
- The office buildings included in CBRE's measure of the overall inventory are subject to a square footage minimum. This threshold differs by market and is incorporated in matching the green office buildings (i.e., certified buildings smaller than the threshold are not incorporated in the adoption index).
- LEED certification includes three categories: existing buildings, new construction and core & shell. The adoption index excludes LEED for commercial interiors, since this is generally a tenant initiative.
- To account for the expiration of certification, a two-year window is applied to ENERGY STAR certification and a five-year window is applied to LEED certification. Hence, a green-certified office building is only included in the adoption index if the date of certification is not more than 2 or 5 years old.

It is important to note the following issues when evaluating the Green Building Adoption Index:

- The adoption figures in this index relate to office space and are not directly applicable to other building types.
- The deceleration of green-certified office space could to some extent be explained by the application of the two-year and five-year certification windows. In case buildings do not recertify, they are no longer incorporated in the index.
- The inventory of space in each of the 30 largest office metro markets does not include illiquid, owner-occupied office buildings, which might lead to an overestimation of the adoption numbers for individual markets. To assure robustness of the results, CBRE's local market teams annually review the green-certified buildings included in the adoption statistics to verify that these assets are indeed included in the measure of market size.
- The USGBC provides certification of office space for LEED on a project level, which does not necessarily include the entire building. A thorough analysis of the data has been carried out to ensure the reliability of the presented numbers.

CONTACT

For more information regarding this report, please contact:

Rogier Holtermans, PhD

Assistant Professor

Gordon S. Lang School of Business
and Economics

University of Guelph

t: +1 437 217 4080

e: rholter@uoguelph.ca

Nils Kok, PhD

Associate Professor

Department of Finance

Maastricht University

t: +1 510 333 2212

e: n.kok@maastrichtuniversity.nl

Spencer G. Levy

Chairman Americas Research

& Senior Economic Advisor

CBRE

t: +617 912 5236

e: spencer.levy@cbre.com

Attribution: We thank Yardi® Matrix for providing us with information on the U.S. multifamily market and the National Multifamily Housing Council for supporting this research.

Disclaimer: Information contained herein, including projections, has been obtained from sources believed to be reliable. While we do not doubt its accuracy, we have not verified it and make no guarantee, warranty or representation about it. It is your responsibility to confirm independently its accuracy and completeness. This information is presented exclusively for use by CBRE clients and professionals and all rights to the material are reserved and cannot be reproduced without prior written permission of CBRE.