District, Measured

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Some Effects of LEED Buildings in the District of Columbia

JUNE 3, 2019 ~ ROXANE SAZEGAR

Since the passage of the DC Green Building Act of 2006 (DCGBA), the District of Columbia became the first major city in the United States to require all commercial and institutional buildings and projects with at least 50,000 square feet of gross floor area to meet or exceed LEED standards. Leadership in Energy and Environmental Design (LEED) standards are the most widely used green building rating system in the world and are designed to help buildings achieve high performance in key areas of environmental sustainability, human health, and energy efficiency.

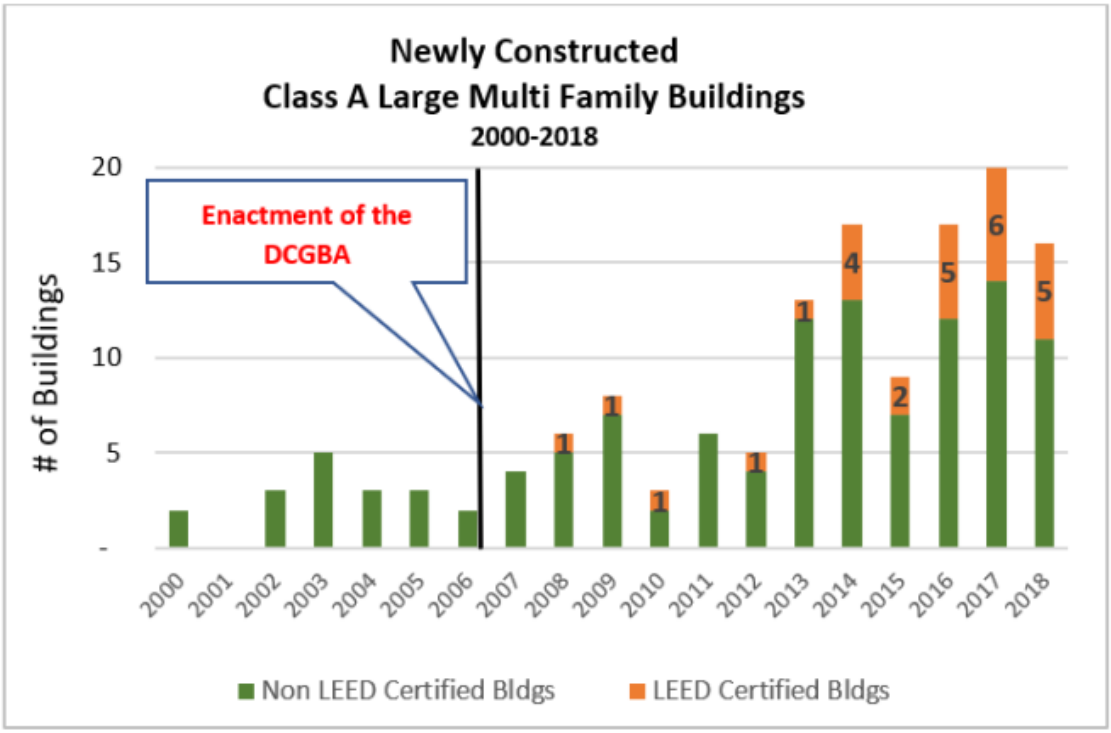
The city has consistently led the nation in the number of LEED certifications, according to the U. S. Green Building Council (USGBC). This consistency over the years culminated in the city becoming the world's first LEED Platinum city in 2017. In 2018, the city had 145 certified building projects with 37.1 million LEED-certified gross square feet. This amount of certified gross square footage represents 61.7 square feet of LEED-certified space per resident, the highest ratio among all states and major cities in the country (see **here** (https://www.usgbc.org/articles/us-green-building-council-announces-annual-top-10-states-leed-green-building-2018)).

The DCGBA is one of the reasons commercial developers incorporate a substantial number of LEED standards into practically all new medium and large buildings and projects in the city. With the residential development sector excluded from this local regulation, it appears that the law was intended to not subject the residential development sector to additional mandates and potentially higher construction costs (see **here** (https://www.hpac.com/archive/true-cost-leed-certified-green-buildings)) possibly because of the current affordable housing crisis in the city. Oddly enough, there is still a modestly growing number of entirely new LEED residential buildings being built in the city. This analysis examines the effect of LEED-certification for new large multifamily buildings (which are wholly exempt from the DCGBA) on the rental rates of these buildings.

Class-A LEED Multifamily Buildings

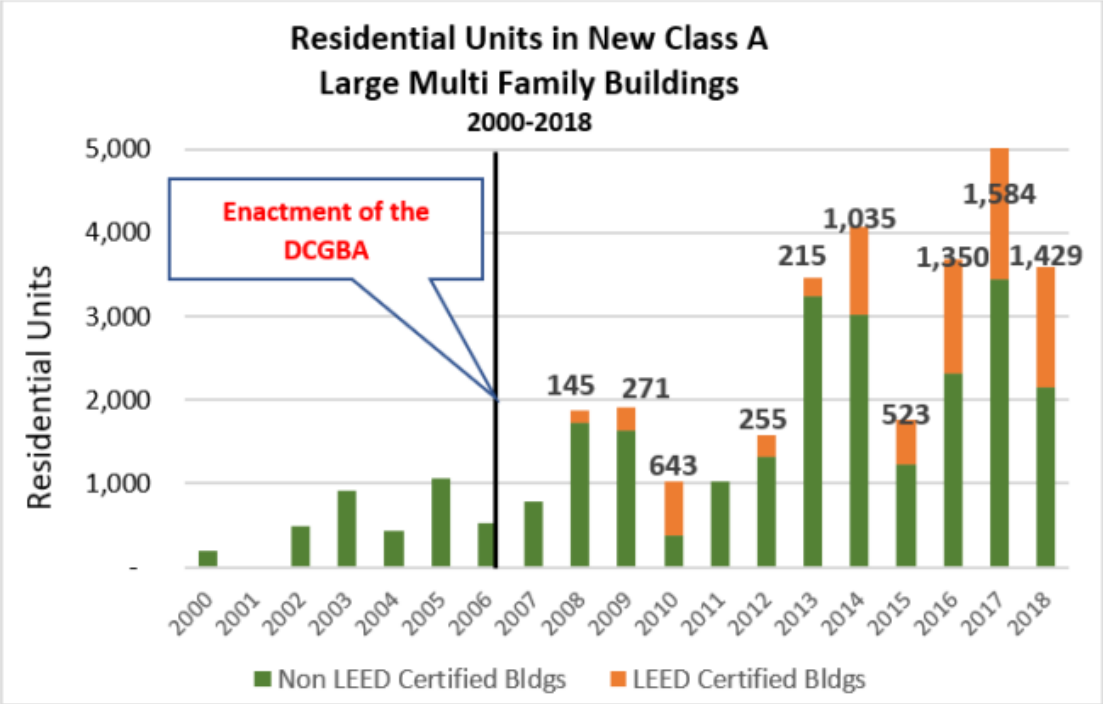
Of the city's 27 LEED-certified large multifamily buildings that were built after 2000, twenty-two were built after 2013 (Figure 1). In total, the city's Class-A LEED-certified residential buildings as of 2018 accounted for 7.5 of the total 24.7 million square feet (30 percent) of all large multifamily buildings built after 2000. This class of buildings delivered an average of 1,184 residential units annually to the market since 2014 (Figure 2).

Figure 1



Source: CoStar and Green Building Information Gateway (GBIG.org)

Figure 2

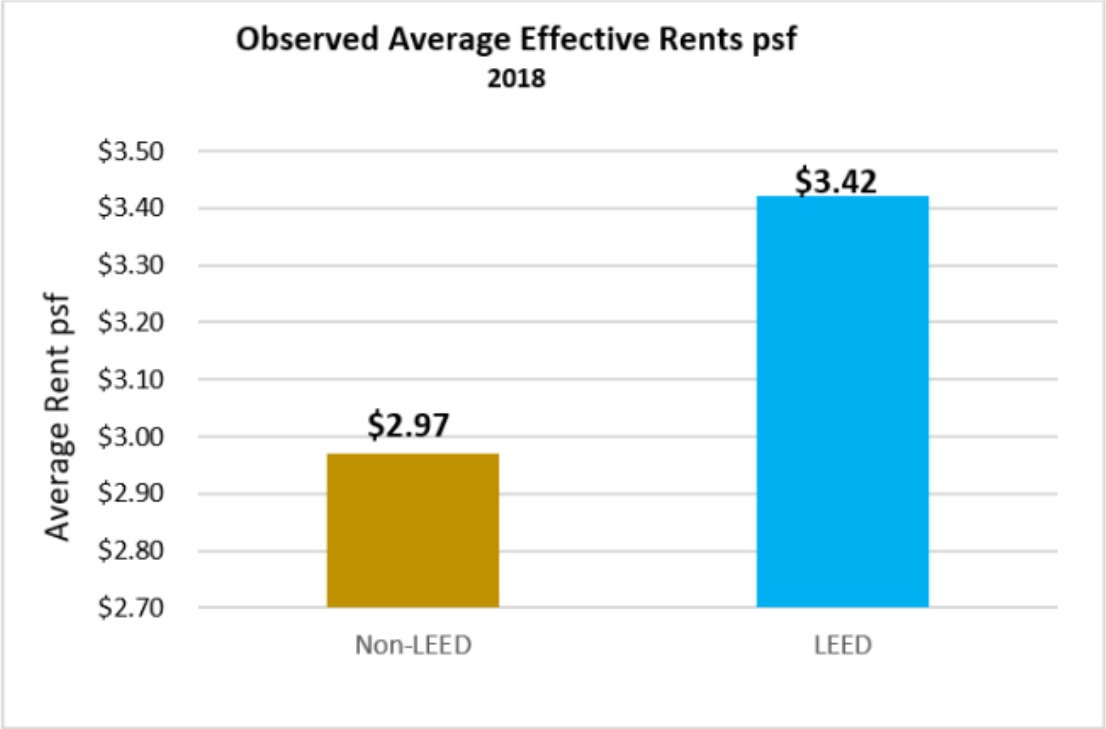


Source: CoStar and Green Building Information Gateway (GBIG.org)

Multifamily Building Rents

To better examine LEED-certified large multifamily buildings, we select 22 (of the 27 total available) LEED-certified Class-A large multifamily buildings that delivered prior to 2019 (which are listed in Table 2) and compare them to 21 similar non-LEED large multifamily buildings. This comparison group of buildings are similar in age, location, building size, vacancy rates, number of floors, proximity to grocery stores, mix of unit sizes, and amenities. Figure 3 shows the observed average effective rent per square foot (psf) for LEED buildings in 2018 was 15.2 percent higher than the average effective rent for non-LEED buildings. This suggests an average effective rent premium of $0.45 psf in 2018.

Figure 3

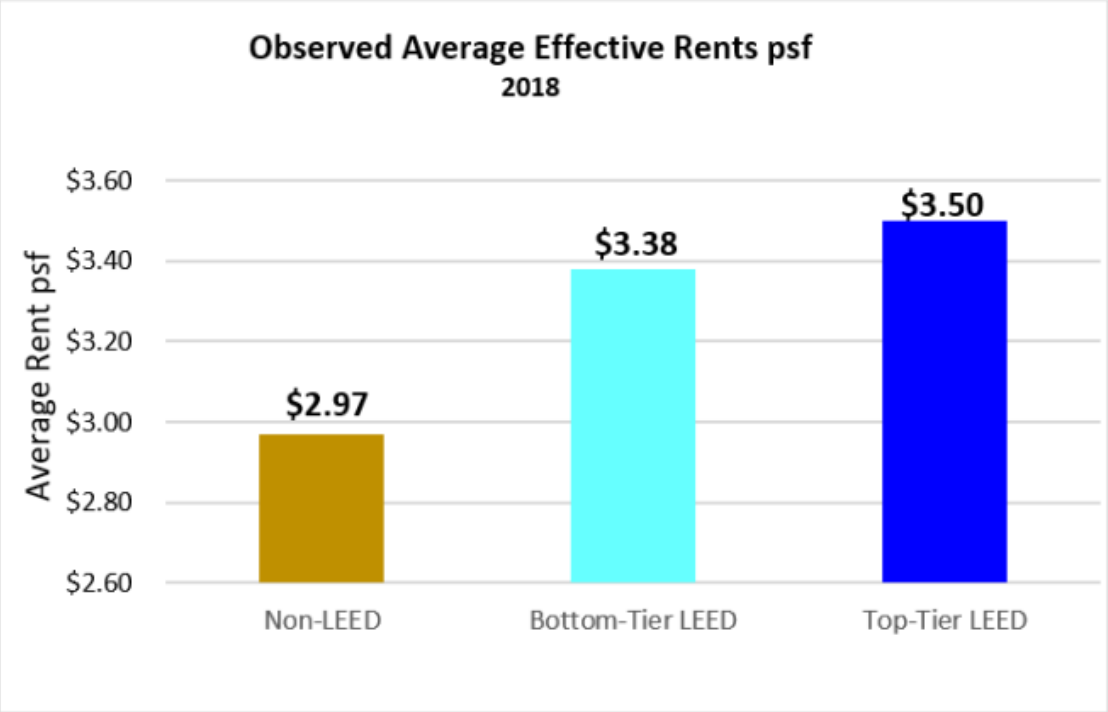


Source: CoStar

Projects pursuing LEED certification must meet requirements in several categories including location & transportation, sustainable sites, water efficiency, energy & atmosphere, materials & resources, and indoor environmental quality. The four LEED rating levels are Certified, Silver, Gold and Platinum. We further refine this statistical analysis by subdividing this study's LEED buildings into two subgroups: top-tier LEED and bottom-tier LEED. Top-tier LEEDs are comprised of the highest categories of Platinum and Gold, and bottom-tier LEEDS are comprised of the lower designations of Silver and Certified.

Figure 4 shows the observed average effective rent psf for bottom-tier LEED buildings in 2018 was 13.8 percent ($0.41) higher than the average effective rent for non-LEED buildings, and the average effective rent for top-tier LEED buildings was 17.8 percent ($0.53) higher than that of non-LEED buildings.

Figure 4



Source: CoStar

Are Tenants and Residential Units in LEED Buildings Different?

Figure 3 shows the difference in the observed average effective rents for LEED and non-LEED Class-A large multifamily buildings in the city in 2018. To test whether there is truly a meaningful or significant difference in the averages of the two groups, as opposed to the difference being solely a product random selection, we conduct a t-test on the effective rents for the two subpopulations of buildings, as well as several other key variables.

We find there is a statistically significant difference in the effective rents, unit size, tenant income and tenant age of the two groups. Table 1 shows that residential units in LEED buildings are on average 68 square feet (8.0 percent) smaller than residential units in non-LEED buildings. Tenants in LEED-certified buildings have annual income that was on average $10,533 (11.7 percent) higher and tended to be marginally older than tenants in non-LEED buildings. However, we did not find a statistically significant difference in the vacancy rates. CoStar is the data source for the 2018 rent, unit size and vacancy data, and the 2015 District of Columbia administrative individual income tax data is the data source for tax filer income and age for tenants of the 43 buildings under investigation.

Table 1

T-Test Results			
Variables	LEED Buildings	Non-LEED Buildings	Difference
Average Effective Rent psf	$3.423	$2.966	$0.458***
Average Unit Size in Square Feet	776.1	843.8	-67.7**
Vacancy Rate	5.91%	5.60%	0.31
Mean Tenant Income	$100,410.00	$89,876.70	$10,533.30*
Mean Tenant Age	32.2	31.6	0.58*
Number of Buildings	22	21	

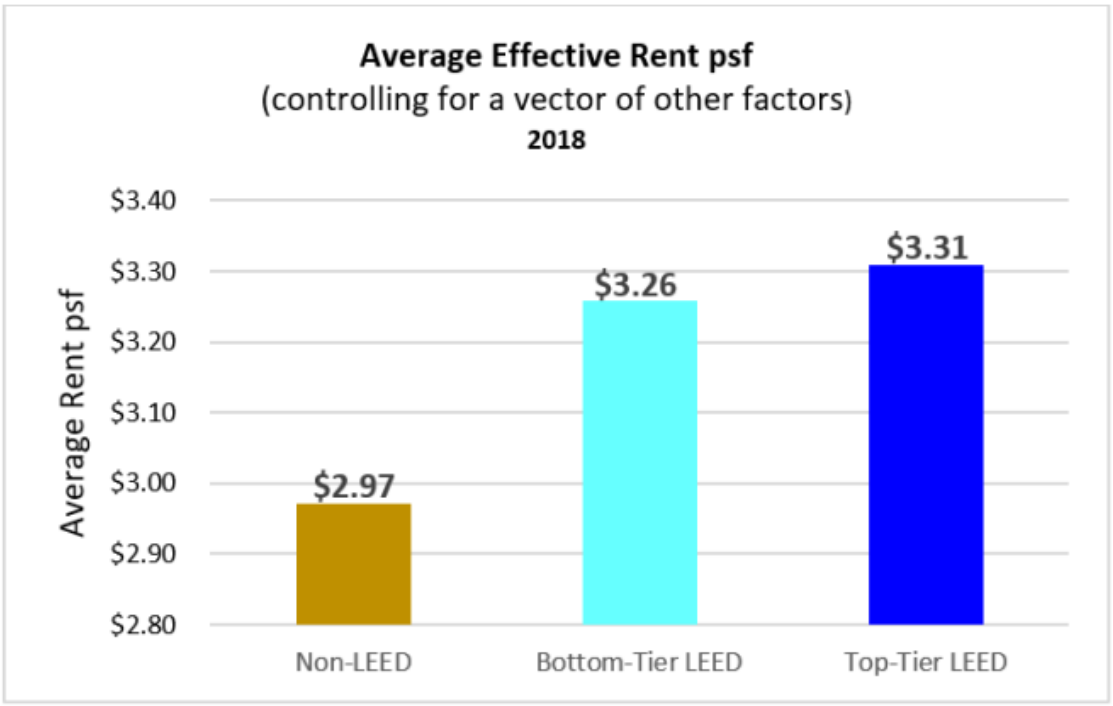
Statistical significance level: 1% (***), 5% (**), 10% (*)
Source: Author calculations

The Effect of LEED-Certification on Rents

Even though we found that the observed differences in rents are statistically significant and not merely a chance event, it is unlikely that these differences are wholly attributable to LEED certification.

As a result of an additional statistical analysis of the effect of LEED certification on average effective rents of our 22 LEED and 21 non-LEED buildings in the city, we found that LEED certification does indeed have a positive effect on rents. Controlling for other factors, bottom-tier LEED buildings were found to have 9.7 percent higher rents than non-LEED buildings, and top-tier LEED buildings were found to have 11.4 percent higher rents than non-LEED buildings. Applying these coefficients to the average 2018 effective rent of $2.97 for non-LEED buildings (see Figure 5), we find that the average rent premium psf was $0.29 for bottom-tier LEED buildings and $0.34 for top-tier LEED buildings instead of $0.41 and $0.53, respectively, as shown in Figure 4 before we controlled for the effect of these other variables.

Figure 5



Source: CoStar

Conclusion

The real estate sector plays a major role in the city's economy, and it appears the sector has embraced the construction of LEED-certified buildings even prior to the enactment of the DCGBA. This is demonstrated by CoStar research that reports 33 Class-A office LEED-certified buildings delivered before 2011 when the full impact of the DCGBA went into effect.

Even though USGBC certified LEED buildings may, in some cases, be costlier to build at the outset, it is often posited that customer demand and long-term savings for end users resulting from a high degree of building efficiencies make LEED projects a good investment for developers. This notion seems to be supported by the findings that the city's LEED Class-A multifamily buildings tend to command higher effective rents and attract higher income tenants while performing no differently from non-LEED comparables (i.e. vacancy rates that are low and not meaningfully different from other multifamily buildings).

The USGBC recognizes the District of Columbia as the nation's leader with its 145 certified building projects with 37.1 million LEED certified gross square feet in 2018. Given that Nationals Park is the first LEED-certified Major League Baseball Stadium in the country and the Museum of African American History being the Smithsonian's first project to receive LEED Gold certification (see **here** (http://www.deeproot.com/blog/blog-entries/leeding-by-example-how-d-c-became-the-first-leed-platinum-city-in-the-world)), it appears that the city's residents, workers and visitors value new buildings and facilities that are simultaneously innovative, attractive, inspiring and environmentally-friendly. As the city grows its LEED-certified footprint, it is likely that the city will remain a LEED Platinum city in the years to come.

Table 2

Multifamily LEED Buildings Used in this Analysis				
	Building Address	**Building Name**	**Year Built**	**LEED Certification**
1	1111 New Jersey Ave SE	Insignia on M	2017	Silver
2	1221 Van St SE	1221 Van	2018	Silver
3	1255 25th St NW	WestEnd25	2009	Gold
4	1263 1st St SE	F1RST Residences	2017	Silver
5	130 M St NE	Flats 130 at Constitution Square	2010	Gold
6	1331 4th St SE	Arris	2016	Gold
7	1550 7th St NW	Jefferson Marketplace	2014	Silver
8	2 M St NE	2M Street	2014	Gold
9	2101 Champlain St NW	Reed Row	2017	Silver
10	2400 14th St NW	Capitol View on 14th	2013	Platinum
11	28 K St SE	One Hill South	2017	Silver
12	3401 Idaho Ave NW	Cathedral Commons	2015	Silver
13	360 H St NE	360H Street	2013	Silver
14	3828 Georgia Ave NW	The Swift at Petworth Metro	2014	Silver
15	450 K St NW	450K	2014	Silver
16	4600 Wisconsin Ave NW	Tenley View	2016	Gold
17	600 H St NE	The Apollo	2016	Gold
18	701 2nd St NE	Station House	2015	Silver
19	7035 Blair Rd NW	Gables Takoma Park	2008	Silver
20	79 Potomac Ave SE	Dock 79	2016	Certified
21	82 I St SE	ORE 82	2016	Silver
22	880 P St NW	880 P	2017	Gold