

Office Insights

November 23, 2021

DJIA: **35,814** | RMZ: **1,502** | 10-Year T-Note: **1.67%**

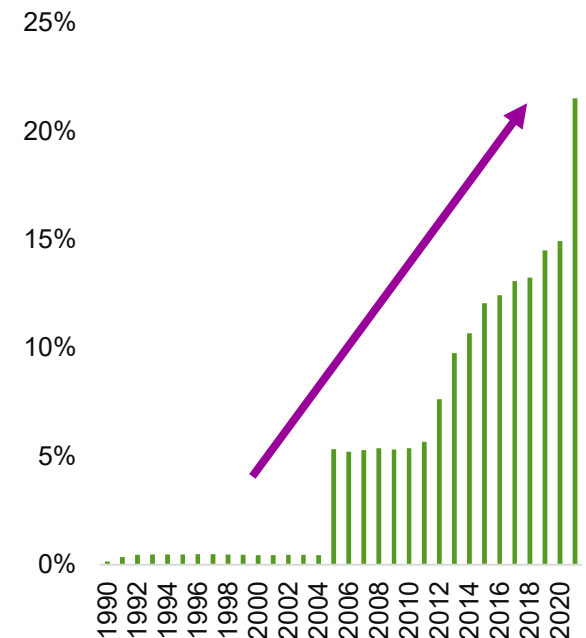


Scoping Out Emissions Regulations

Overview

- Reducing greenhouse gases (GHG) is a global effort; momentum picking up
- Office buildings serve a corporate tenant and have high emissions = easy target
- No U.S. federal law exists to reduce/penalize/fine CRE-related emissions
- Yet recent local laws impact ~1/3 of office s.f. covered by Green Street
- Laws set to phase in over next decade; more prevalent in coastal markets
- However, GHG emissions were found to be higher (>20%) outside the coasts
- Lower rents + higher emissions = potentially more risk in non-gateway markets
- Compliance with existing U.S. laws could cost ~2% of office NOI...
- ...but achieving net-zero emissions is likely to cost ~4% of office NOI (at least)
- Emissions-related risks highest for smaller office landlords, older buildings

**Global GHG Emissions
Covered By Taxes/Carbon
Exchanges
(% of Total Emissions)**



Important disclosure on page 16

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Executive Summary

Emissions 101

- Reducing greenhouse gases (GHG) is (and has been) a global effort with momentum picking up in the U.S.
- A "green" building is subjective; measuring GHG emissions is a more tangible metric but analysis is difficult
- Scope 1 and 2 (direct and indirect property-level emissions) are the focus of this report
- Scope 3 (related activity emissions) = largest GHG category; difficult to track and not subject of regulation yet

Market Regulations

- Local regulations and tenant demands for "greener" offices were assessed to determine carbon-related impacts
- There are no current federal regulations on GHG, but local regulations cover ~1/3 of office markets by s.f.
- Regulations range from reporting GHG emissions to property-level fines for exceeding allowable limits
- Laws are set to phase in over the next decade; end of 2030 is generally when penalties become the steepest
- Increased regulations are likely to impact coastal markets more, but offset by higher rents

GHG Emissions Findings

- Green Street analyzed public and private market-level office GHG emissions (scope 1 and 2)
- Office REITs have ~15% less GHG emissions than the private market on average
- West Coast office markets are generally less GHG-intensive than the rest of the country (~40% lower)
- Sun Belt office buildings emit more GHG emissions, but likely lower risk of regulations in the near-term

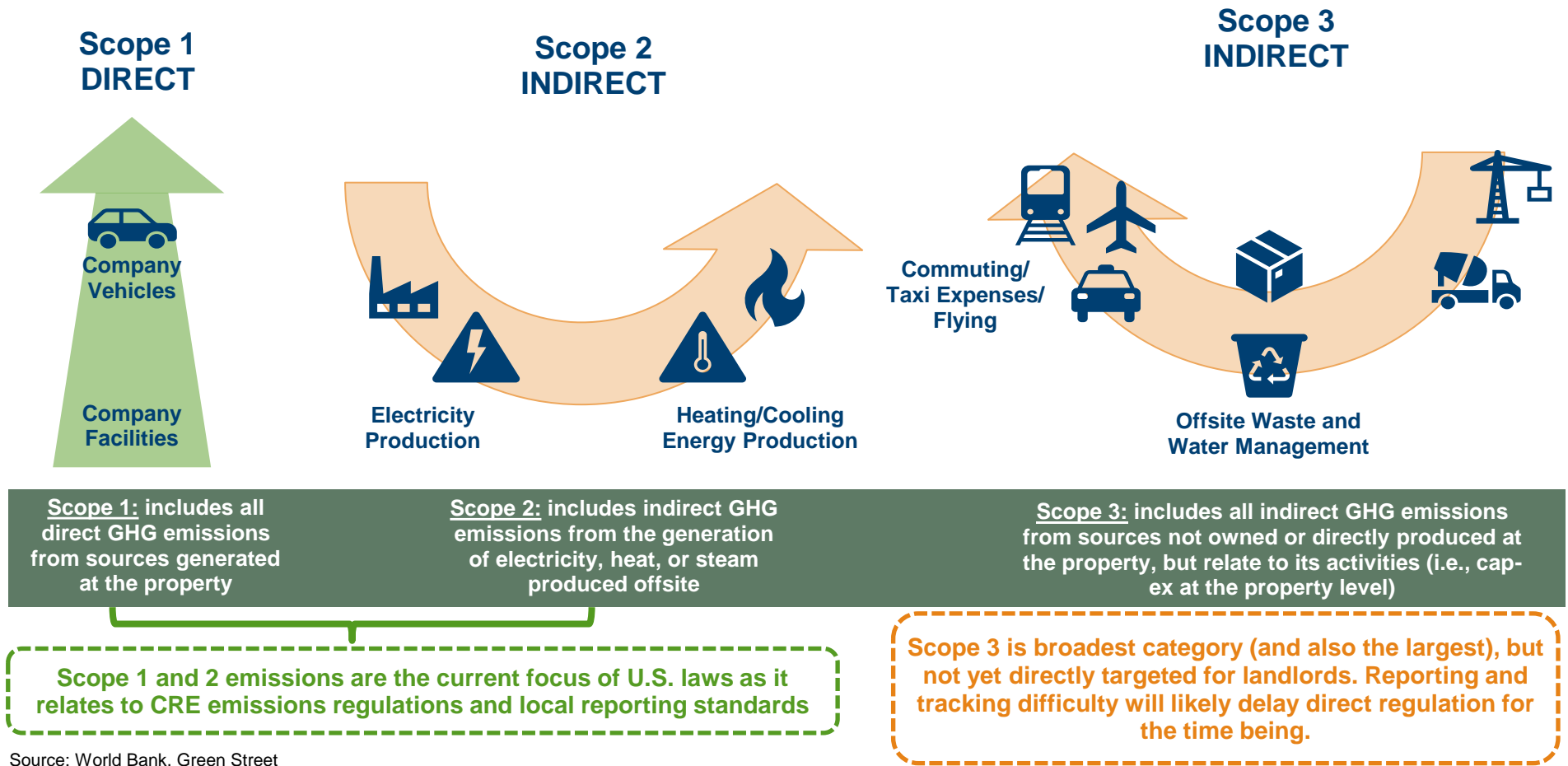
Cost of Zero

- The estimated cost to get to net zero emissions (using ~\$100/metric ton to price carbon) is ~4% of current NOI
- To comply with the toughest U.S. GHG law produces a similar result: ~2% of NOI
- These costs likely more onerous for smaller landlords (i.e., lack economies of scale) and older properties

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Emission in Focus

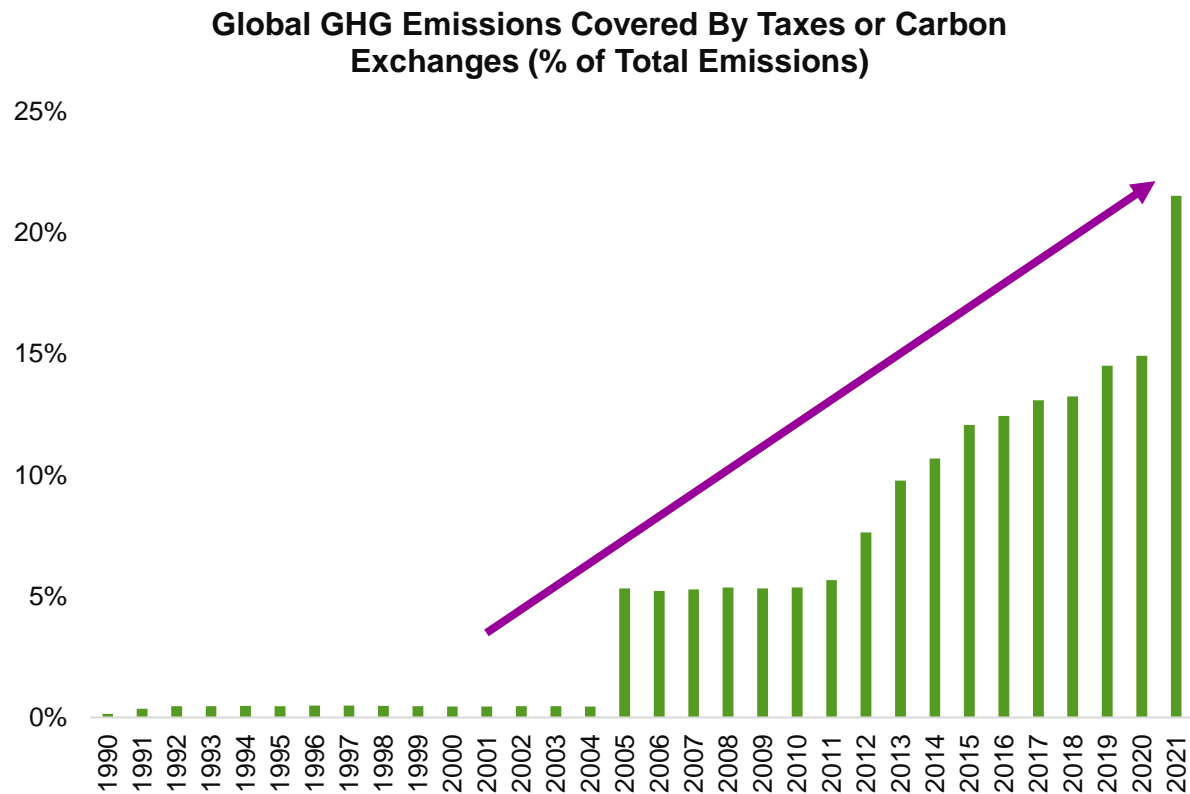
Definition Check: GHG emissions are classified and reported by various standards into three "scopes": scope 1 (direct emissions); scope 2 (indirect emissions caused by generation of electricity, heat or steam); and scope 3 (indirect caused by sources not owned or controlled, but related to business activities). Scope 3 notably includes energy consumed/paid for tenants as well as cap-ex. Of these measures, scope 1 and 2 are generally the most tracked and thus the "easiest" to regulate.



Source: World Bank, Green Street

Emission Regulations in Focus

Growing Focus: Carbon taxes or the establishment of carbon exchanges have grown over the last fifteen years. The U.S. has lagged behind other nations' efforts with relatively limited action at the Federal-level. However, several U.S. states and cities have already announced or enacted their own versions of "green" deals. A growing focus on emissions is likely in the U.S., which should trickle from the bottom up starting in large coastal markets. A regulatory focus on emissions reductions centers on commercial real estate.



Trickle-up Economics

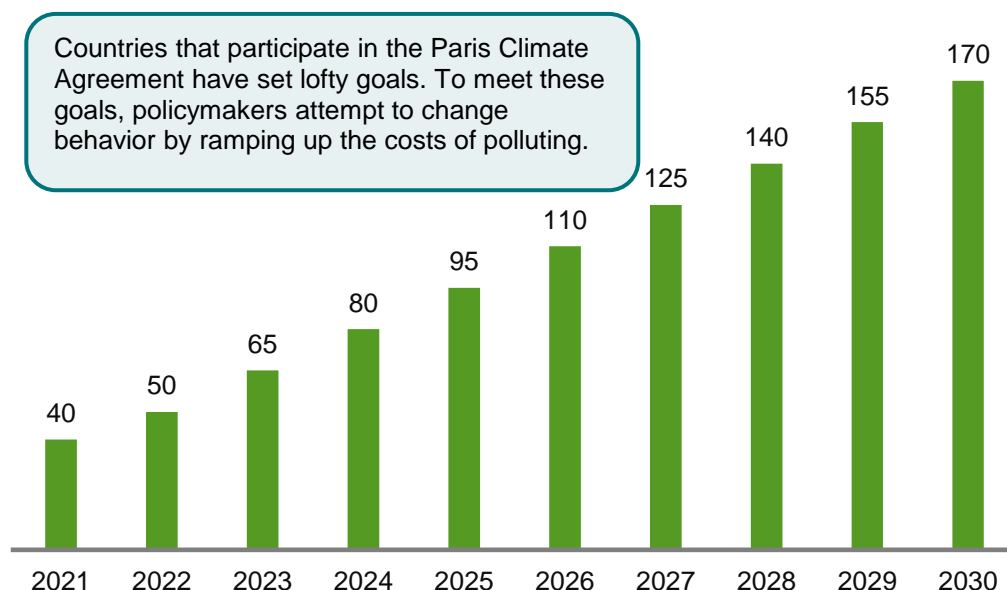
There is no nationwide standard for regulating/taxing/pricing carbon in the U.S. However, several U.S. cities and states have put forward guideposts or penalties towards reducing GHG emissions. Continued action will likely take place at the local level before Federal action is taken. For example, the U.S. withdrew from the Paris Agreement on climate change mitigation in '17 under the Trump Administration (it has since rejoined under the Biden Administration), whereas NYC passed climate-related legislation in '19.

Source: World Bank, Green Street

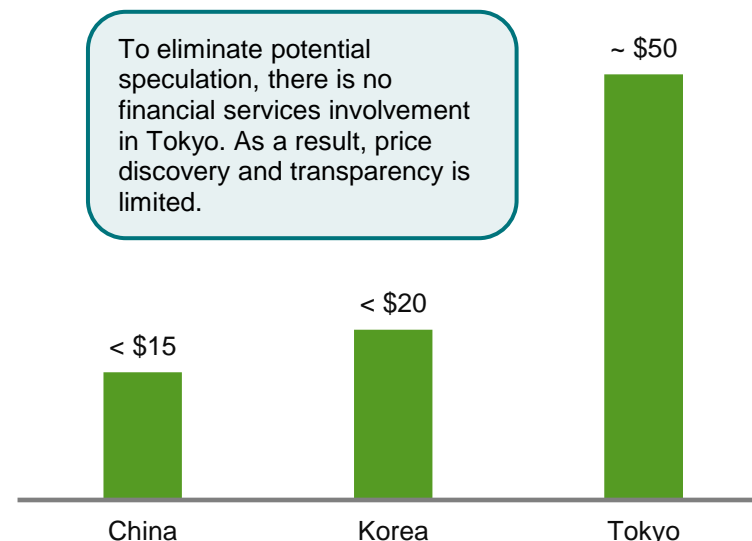
A View Outside the U.S.

International Sensation: Policymakers across the globe have taken legislative action to reduce greenhouse gases and the trend seems to only be building momentum. Tokyo is one of the few markets with current policy targeted specifically at office buildings. The Tokyo Emission Trading Scheme (ETS) is estimated to cost approximately \$50* per ton of CO₂. This price is estimated to have been as high as \$125 in 2011 before experiencing a rapid decline. Although Canada's policy is structured as a tax and is applied to all greenhouse gas emissions, it is notable that officials recently announced a plan to increase the tax from the current \$40 a ton to \$170 a ton by 2030, an astonishing **325% increase (~17% CAGR)**.

Canada: Proposed Cost per ton (CAD) of CO₂E



Asia ETS - Cost per CO₂ Ton (USD)*

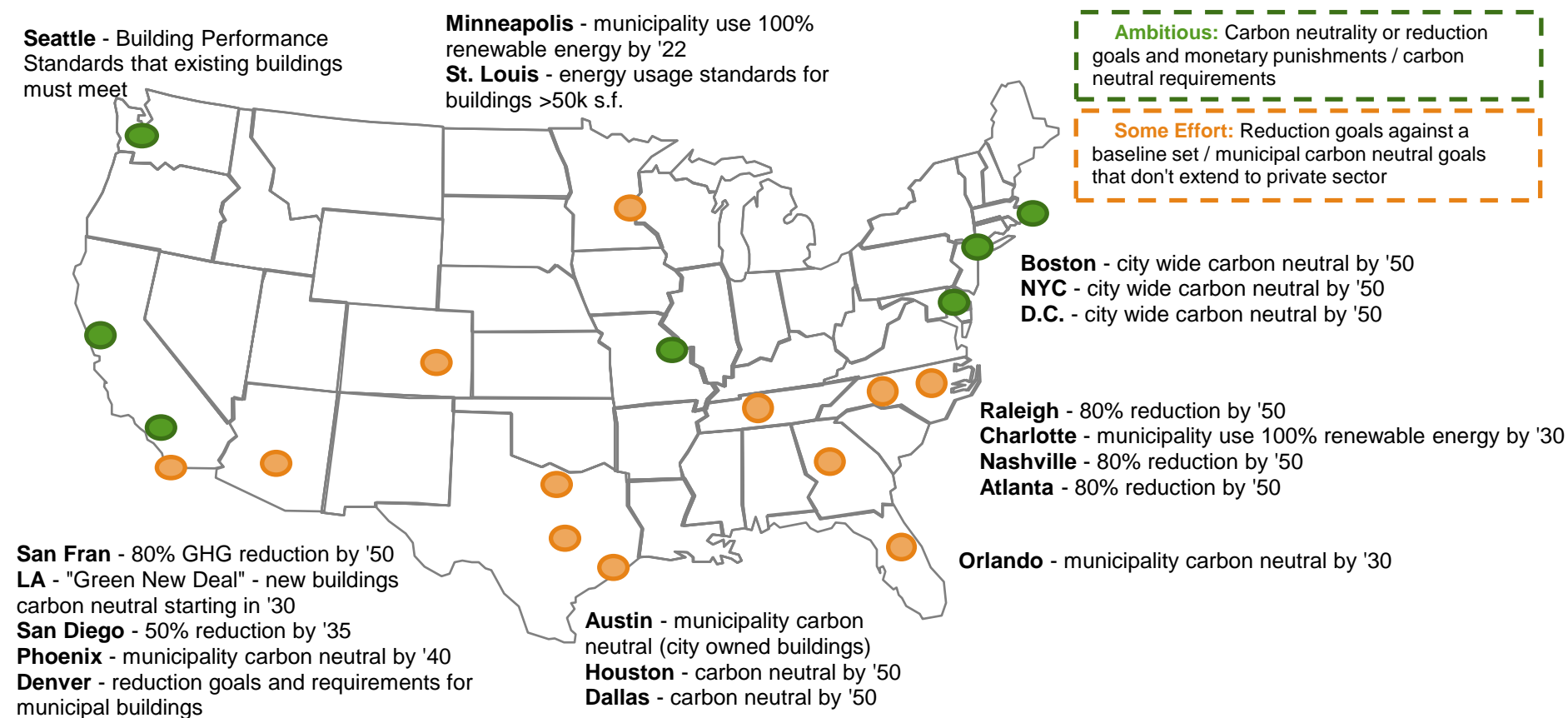


* At an exchange rate of 1 USD = 90 JPY

Source: Government of Canada, Tohshi H. Arimura & Tatsuya Abe, Green Street

Local U.S. Regulations

Small Governments, Big Goals: At both the federal and state level, politicians have been reluctant to push green mandates. However, at the local level, politicians have been willing to set lofty goals and even enact monetary punishments for offenders. **Not surprisingly, the "bluer" the city, the more likely it is to have ambitious green goals.** The map below is not an exhaustive list, but gives a feel for the current goals.



Source: ACEE, Green Street

Local Regulation Spotlight: NYC

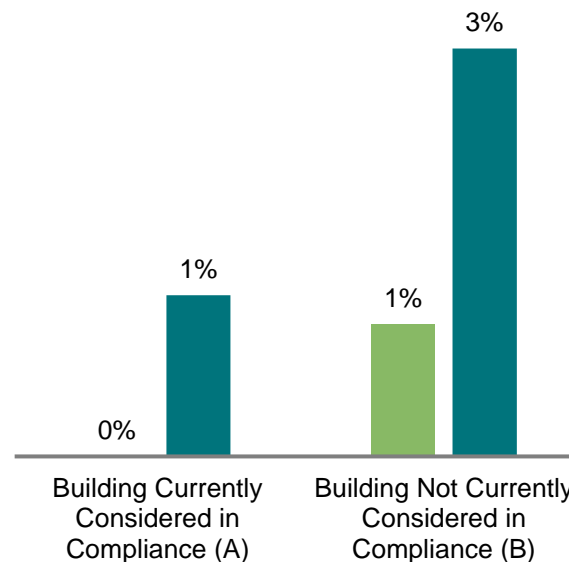
Green Deals: In 2019, the New York City Council passed a series of bills known as the Climate Mobilization Act (CMA) that aimed at reducing greenhouse gas emissions by setting carbon emission limits for commercial properties. The most important of these new bills is Local Law 97 (LL97), which set ambitious targets to reduce greenhouse gas (GHG) emissions from real estate over the next several decades. More importantly, however, it set a template for many other U.S. cities to follow.

Key Regulations

- Emission limits start in '24 and get more stringent in '30. Targets beyond '30 are not yet set.
- Target GHG reductions of 40% by '30 and by 80% by '50.
- Focus on larger buildings (>25k sf), non-city owned buildings, non-rent regulated properties, and other exemptions for religious/government-affiliated buildings.
- Enforcement mechanisms include fines for non-compliance. A fine of \$268/metric ton for being over established GHG limits begins in '24.

Hypothetical Penalties (% of NOI)

■ 2024 Penalty ■ 2030 Penalty



Assumptions

• \$90/sf rent, 60% NOI margin. Assumes no rent growth or any offsets to penalties.

• **Greenhouse gas emission assumptions:**

Building A: 7.0 kg CO₂e/sf
Building B: 10.0 kg CO₂e/sf

• **Current standards:**

2024: 8.5 kg CO₂e/sf
2030: 4.5 kg CO₂e/sf

• Penalty = \$268 x (actual output - emissions limit).

Percent of Markets with Emissions Regulations

More Than Expected: Approximately 1/3 of the total office s.f. in Green Street's Top 50 Markets are covered by some sort of emissions-related regulations. A few of the nation's largest office markets, such as New York and the D.C. Metro, make up nearly 18% of total office square footage and have *some* sort of explicit emissions-related regulation¹. A few cities, such as Raleigh, have set city wide goals but not yet enacted explicit requirements for commercial buildings. We classify these markets as unclear but likely in the near future.

Requirements	% of Top 50 Markets	Details
Explicit requirements	33%	NY - Local Law 97 D.C. ¹ - Sustainable D.C. 2.0 Plan Los Angeles - Green New Deal Boston - Local Ordinance and Zoning Code Changes Seattle - Building Performance Standards (State law HB1257, impacts the entire state of Washington) San Francisco - Climate Action Plan St. Louis - Building Energy Performance Standards
Unclear, but likely in near future	12%	Austin - Climate Equity Plan - net-zero community-wide by 2040 Raleigh - Climate Action Plan - reduce City-wide greenhouse gas (GHG) emissions 80% by 2050 Houston - Climate Action Plan - 85% compliance with new energy codes by 2030 and carbon neutral by '50 Dallas - carbon neutral by '50 goal, 100% new construction net zero energy from '30 onward
Nothing Yet	55%	All Other Top 50 Markets

1. Current regulations only impact D.C. Proper

Source: ACEEE Green Street

Emissions Results

Regional Analysis: Lumping markets by region and gateway/non-gateway designations can and does muddy this analysis. However, for a big picture framework it makes sense for several reasons: these regions generally draw from the same electrical grid (a key determinant in GHG emissions), have similar climates, may have similar politics, and can have comparable building characteristics (age, size, etc.). The results: West Coast office markets are generally less GHG-intensive than the rest of the country while Sun Belt office buildings lag in both the public and private market. See Appendix A for full market data.

Market Group	GHG Intensity (kg CO ₂ e/sf) Market-level Data*	GHG Intensity (kg CO ₂ e/sf) Public Office REITs**	Average
West Coast Gateway	3.4	3.9	3.6
West Coast Non-gateway	5.8	N/A	5.8
East Coast Gateway	7.0	5.6	6.3
East Coast Non-gateway	7.3	N/A	7.3
Sun Belt	7.4	7.9	7.7
Other Non-gateway	9.2	5.7	7.5
Office Sector Average	6.7	5.8	

Seattle's energy benchmarking data suggests a materially lower-than-average GHG emissions/sf (<1 kg CO₂e/sf). Excluding Seattle would increase the market-level West Coast GW average by 1 kg CO₂e/sf to mid-4.

Many cities/states now require public disclosure of energy efficiency from large (>25-50k sf) CRE landlords. Green Street's market-level analysis includes only ~18 markets, but is broad enough to cover every market designation. The size of this data is ~1.5B s.f., or ~40% of Green Street's office market coverage.

Per public office REIT ESG disclosure. Does not include offsets (i.e., this uses location-based emission calculations). Only includes Scope 1 and 2 emissions as Scope 3 emissions are not often reported at the REIT-level.

* Usable private market-level data was found available for the following cities/states: Boston, Chicago, Denver, Inland Empire, Kansas City, Los Angeles, Minneapolis, New York, Oakland, Orange County, Orlando, Philadelphia, Portland, Sacramento, San Diego, San Francisco, San Jose, Seattle, Washington D.C.

** Office REIT Definitions: **East Coast GW:** BXP, ESRT, JBGS, PGRE, SLG, VNO; **East Coast NGW Markets:** BDN; **Sun Belt REITs:** CUZ, HIW; **West Coast GW:** AAT, DEI, HPP, KRC; **Other NGW:** PDM.

Source: Company disclosure, public government filings, Green Street

Cost of Carbon

Dirty South: The following analysis assumes equivalent per dollar carbon-related fines across markets, which benefits the higher-rent GW markets. The cost of GHG-related penalties are likely to be more onerous in non-gateway markets given higher-than-average GHG emissions and lower-than-average rents (normalizing this analysis for differing rental rates would still lead to a bigger impact on NGW markets). This analysis importantly assumes the landlord enacts no measures (offsets, cap-ex, etc.) to reduce emissions.

Market Group	Average GHG Intensity (kg CO ₂ e/sf) ¹	Est. Ann. Cost of Net Zero Emissions (% of NOI) ²	Est. Time to Implementation (Years) ⁴	Potential Impact on Ann. NOI (Present Value)	Est. Ann. Cost of Compliance with Most Stringent U.S. Law (% of NOI)	Average Cost (% of NOI)
West Coast Gateway	3.6	2%	5	1%	0%	1%
West Coast Non-gateway	5.8	3%	5	2%	1%	2%
East Coast Gateway	6.3	3%	5	2%	2%	2%
East Coast Non-gateway	7.3	6%	9	4%	5%	6%
Sun Belt	7.7	6%	9	4%	6%	6%
Other Non-gateway	7.5	7%	9	5%	6%	6%
Office Sector Average	6.2	4%	7	3%	2%	3%

Probable Goal Posts - Net-Zero vs. Current Regulations

While some municipal goals of net-zero have been set decades away, NYC's Local Law 97 is coming into place over the next decade. It is not an unreasonable assumption to assume such legislation is replicated nationwide. **Thus, a 2-4% negative impact to office NOI is a conservative "floor" for underwriting purposes.** There is likely more upside than downside in this estimate.

¹ Based on public REIT disclosure and private market data.

² Assumes a \$100/metric ton cost of CO₂e. A framework for all property sectors was described in *An Imperfect Storm* (9/13/2021).

³ NYC's LL97 (see page 8) is arguably the most stringent CRE-related climate law in the books. See *Will Going Green Have NYC Office Owners Seeing Red?* (6/20/2019).

⁴ Most municipal regulations are providing some leeway to allow landlords to become compliant with emissions regulations. However, fines are coming in the next few years in certain gateway markets (i.e., NYC) and odds are more will follow. An educated guess for implementation is middle of this decade for GW markets and end of the decade for NGW markets.

Source: Green Street

Emissions Risk Summary

Lower Rents = Higher Risks: A carbon tax on office buildings would be a negative for all owners and all markets. **However, while the odds of emissions-related penalties are lower outside the coasts, the costs may be higher.** Unless carbon regulations and penalties adjusted for local market rents, the burden will fall disproportionately on those lower rent (and also lower quality) office buildings. The most stringent current U.S. regulations on emissions, in particular Local Law 97 in NYC, do not make such adjustments.

	Odds of Increased Emissions-related Legislation	Odds of Increased Tenant Emissions Concerns	Potential Impact on Ann. NOI (Present Value)	Total Impact	Comments
West Coast Gateway	●	●	●	●	More political will to implement "green" laws but high rents and lower-than-average emissions
West Coast Non-gateway	●	●	●	●	Lower rents than GW markets but may face higher regulatory risk given "bluer" states
East Coast Gateway	●	●	●	●	Existing laws in NYC harshest in the country, but in-line GHG emissions and above avg. rents
East Coast Non-gateway	●	●	●	●	Lower rents than GW markets but may face higher regulatory risk given "bluer" states
Sun Belt	●	●	●	●	Likely less push from regulators/tenants but higher-than-average emissions, lower rents
Other Non-gateway	●	●	●	●	An admittedly broad market definition, but one that averages close to the national avg.

Legislative Risk

Based on two factors: the current number of cities/states with existing emissions-related regulations and the likelihood of future regulations.

Tenant-related Risk

Based on the current mix of tenants in the market and their propensity to focus on environmentally friendly office buildings.

Total Impact

The math: (the odds of regulation + tenant concerns) multiplied by the total NOI impact of carbon taxes at a \$100/metric ton.

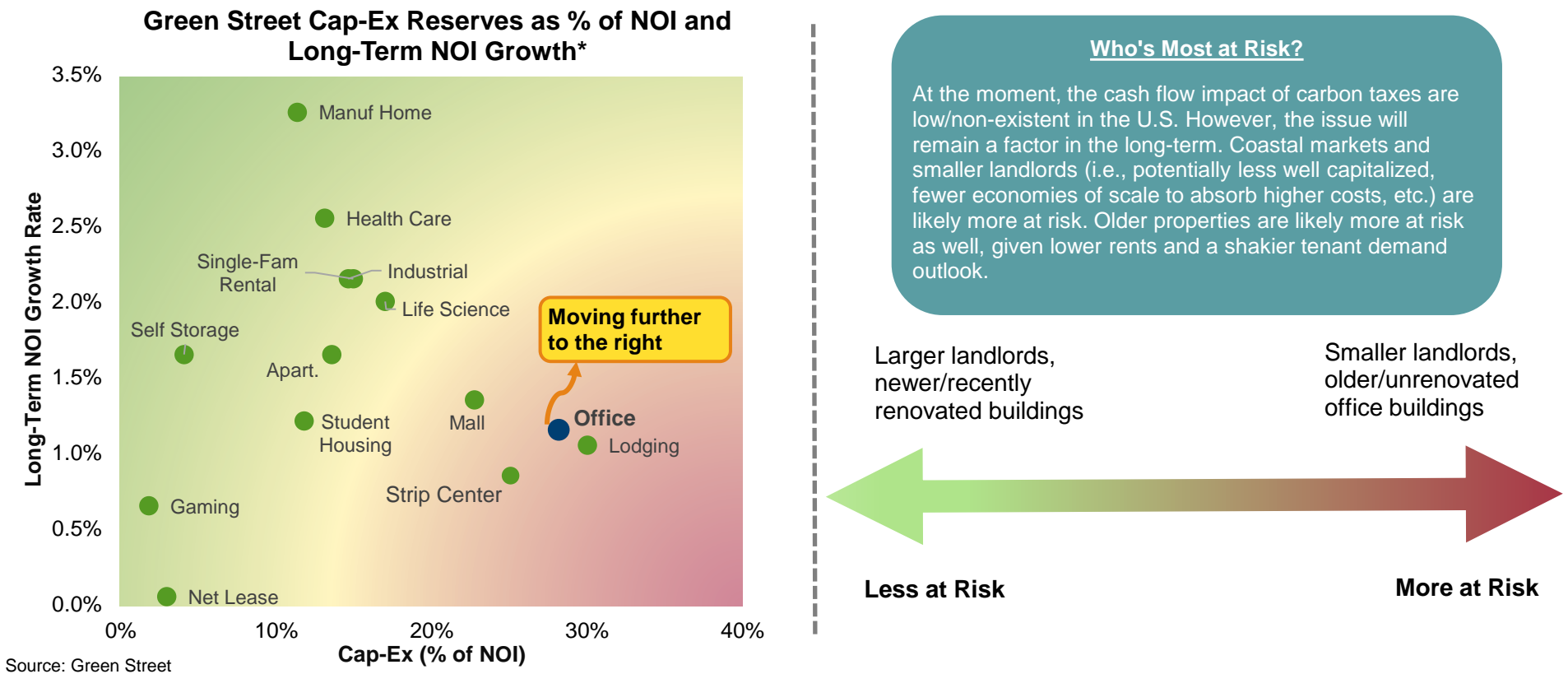
Legend

Below Average ●
Average ●
Above Average ●

Source: Green Street

Future Concerns

A New Cap-ex Line Item: New penalties/fines/taxes on GHG emissions can be seen as another straw on the back of office landlords. **Our analysis suggests that 2-4% of office NOI is potentially at risk from GHG emissions taxes/penalties based on current laws and regulations.** A near-term report will detail the necessary cap-ex by office landlords needed to meet changing GHG emission regulations as well as tenant demands. However, the direction for cap-ex in general is headed higher, though the burden will likely fall more on older and unrenovated office buildings.



Valuation Impact

Small...Now: The impact from emissions regulations will likely have a bigger impact on Class B/older office buildings than newer buildings. Changes to Green Street's underwriting includes a modestly higher cap-ex burden for the average office building (+300 bps to ~34%) and slightly higher for Class A offices (+150 bps to ~30%). These adjustments appear defensible in light of the many variables (i.e., local regulations, time to implementation, "greening" of the grid, etc.) involved. However, the direction for climate-related costs on office ownership is higher and these costs are likely to move higher in the future.

Private Market Valuation							
Category	Nominal Cap Rate	Cap Ex % of NOI	Economic Cap Rate	SS NOI Growth		Risk Adj.	Risk-Adjusted Expected Return
				'21-'25	Long-Term		
Class A Office Average**	5.3%	30%	3.7%	+2.3%	+1.3%	-0.2%	4.9%
		▲ 150 bps	▼ 10 bps				▼ 10 bps
Updated U.S. Office Average**	6.5%	34%	4.3%	+2.0%	+0.9%	0.0%	4.5%
		▲ 300 bps	▼ 20 bps				▼ 30 bps
West Coast GW	5.5%	30%	3.8%	-2.3%	+1.4%	0.0%	▼ 10 bps 4.6%
West Coast NGW	6.4%	34%	4.3%	-1.0%	+1.2%	-0.1%	▼ 30 bps 4.9%
East Coast GW	5.8%	31%	4.0%	-2.1%	+0.8%	-0.1%	▼ 10 bps 4.1%
East Coast NGW	7.9%	37%	5.0%	-1.6%	+0.6%	0.0%	▼ 30 bps 5.0%
Sun Belt	7.0%	37%	4.4%	-0.6%	+1.1%	0.0%	▼ 20 bps 5.2%
Other NGW	8.1%	39%	5.0%	-1.2%	+0.1%	0.0%	▼ 30 bps 4.6%

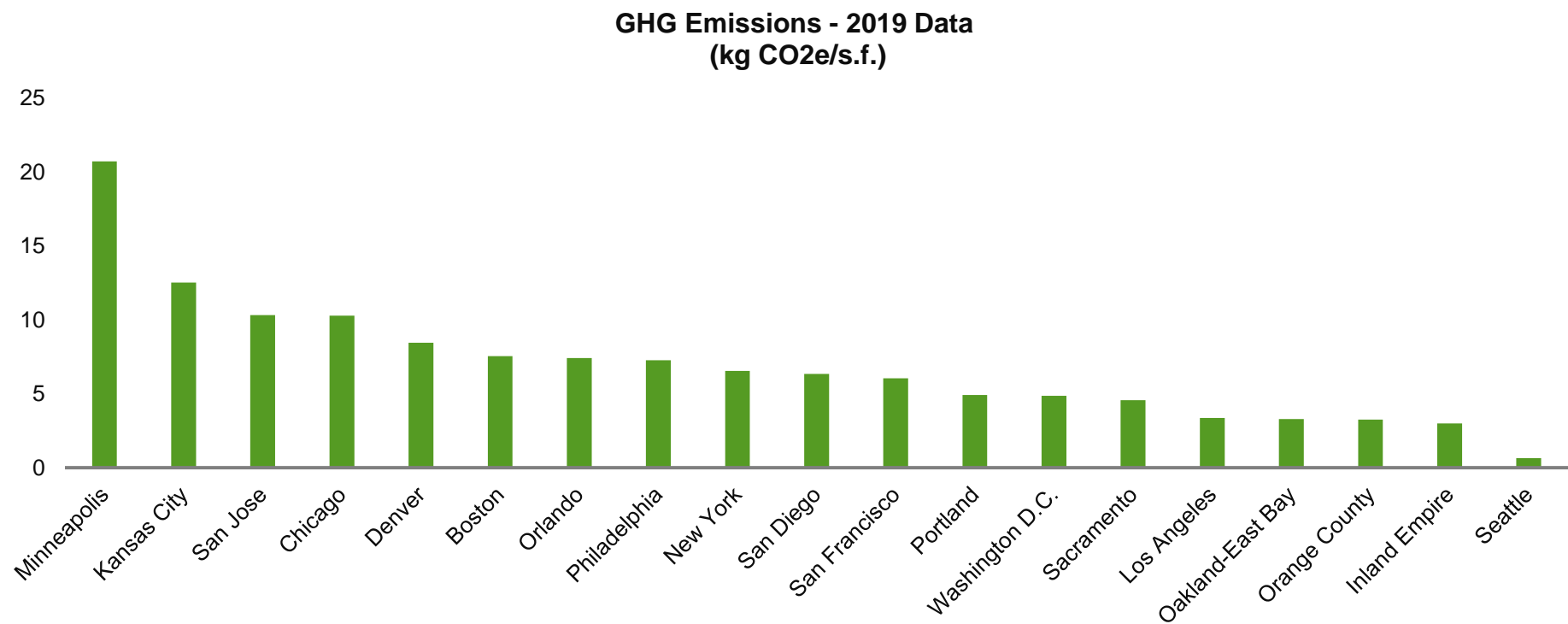
* As measured by the office REIT average under Green Street's coverage.

** As measured by Green Street's Top 50 markets under coverage. For emissions intensity, using the average of the total private market data, which likely skew results slightly more positive for Class B offices.

Source: Green Street

Appendix A: Market-level GHG Emissions

Variety of Variances: Emissions levels differ across the U.S. for a variety of reasons: differing climates, sources of energy, varying levels of energy efficiency, and methods of data disclosure.

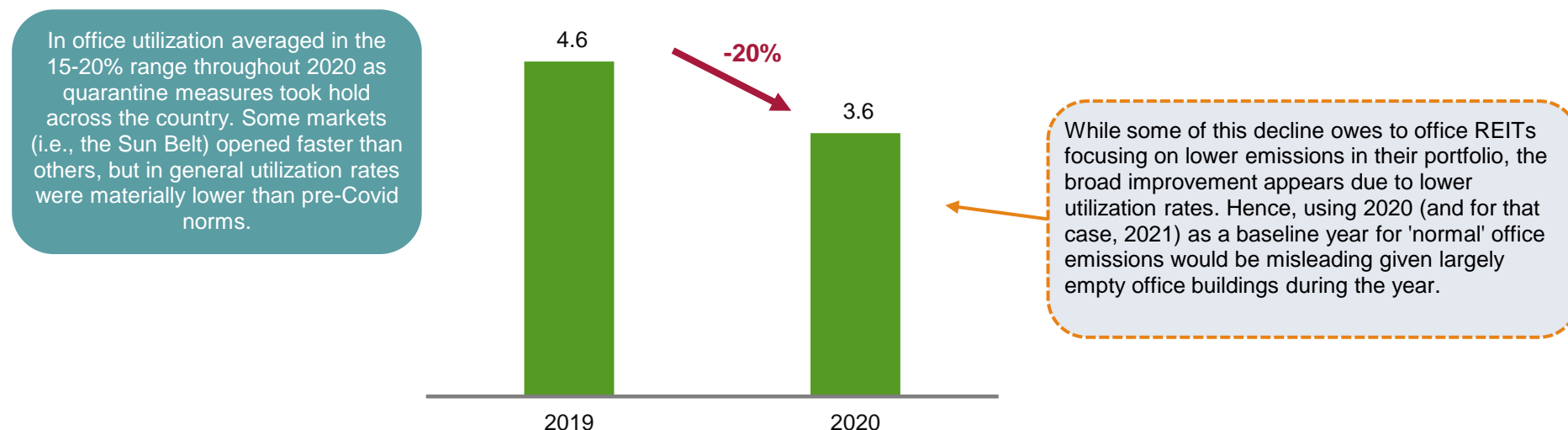


Source: City/state-level disclosures, Green Street

Appendix B: WFH and Emissions

No Occupancy = Fewer Emissions: Work from home (WFH) has been seen as a way to make the workplace more environmentally friendly. The reasoning: fewer employees commuting to work plus fewer office workers in buildings should be better for the environment. However, the answer is not as clear as these positives may be outweighed by other changes spurred from WFH: increased at-home office utilization in potentially less energy efficient settings and larger, suburban homes (i.e., a shift from apartments to single family homes for employees looking for more space) that use more energy than an urban apartment.

GHG Emissions Intensity (kgCO₂e/sf)*



* For select REITs where 2020 data is available (BXP, DEI, ESRT, HIW, and KRC).

Source: Company disclosures, Green Street

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2019	31.6%	22.4%	17.8%	24.0%
2018	-5.1%	-6.6%	-9.2%	-7.0%
2017	6.4%	0.2%	2.1%	2.6%
2016	14.9%	14.7%	13.1%	14.4%
2015	8.3%	0.9%	-1.7%	2.4%
2014	41.6%	31.5%	27.3%	33.3%
2013	4.1%	0.6%	1.7%	2.2%
2012	24.5%	24.7%	18.9%	23.0%
2011	18.9%	7.6%	-4.7%	7.6%
2010	43.3%	32.8%	26.6%	33.8%
2009	59.0%	47.7%	6.0%	37.9%
2008	-28.1%	-30.9%	-52.6%	-37.3%
2007	-6.9%	-22.4%	-27.8%	-19.7%
2006	45.8%	29.6%	19.5%	31.6%
2005	26.3%	18.5%	-1.8%	15.9%
2004	42.8%	28.7%	16.4%	29.4%
2003	43.3%	37.4%	21.8%	34.8%
2002	17.3%	2.8%	2.6%	5.4%
2001	34.9%	19.1%	13.0%	21.1%
2000	53.4%	28.9%	5.9%	29.6%
1999	12.3%	-9.0%	-20.5%	-6.9%
1998	-1.6%	-15.1%	-15.5%	-12.1%
1997	36.7%	14.8%	7.2%	18.3%
1996	47.6%	30.7%	18.9%	32.1%
1995	22.9%	13.9%	0.5%	13.5%
1994	20.8%	-0.8%	-8.7%	3.1%
1993	27.3%	4.7%	8.1%	12.1%
Cumulative Total Return	28577.8%	1575.5%	37.5%	1896.6%
Annualized	21.8%	10.3%	1.1%	11.0%

The results shown above are hypothetical; they do not represent the actual trading of securities. Actual performance will vary from the hypothetical performance shown above due to, but not limited to 1) advisory fees and other expenses that one would pay; 2) transaction costs; 3) the inability to execute trades at the last published price (the hypothetical returns assume execution at the last closing price); 4) the inability to maintain an equally-weighted portfolio in size (the returns above assume an equal weighting); and 5) market and economic factors will almost certainly cause one to invest differently than projected by the model that simulated the above returns. All returns include the reinvestment of dividends. Past performance, particularly hypothetical performance, cannot be used to predict future performance. Investing involves risk and possible loss of principal capital.

- (1) Results are for recommendations made by Green Street's North American Research Team only (includes securities in the US, Canada, and Australia). Since July 5, 2017, performance is calculated whenever a recommendation is changed using the share price at the most recent market close. Previously, performance was based on recommendations provided in Green Street's "Real Estate Securities Monthly" (RESM) and assumed no change in recommendation between RESM publications. Results from January 28, 1993 through January 4, 2016 were independently verified by an international "Big 4" accounting firm. The accounting firm did not verify the stated results subsequent to January 4, 2016. As of January 4, 2016, the annualized total return of Green Street's recommendations since January 28, 1993 was: Buy +24.0%, Hold +11.1%, Sell +0.6%, Universe +11.7%.
- (2) Beginning July 5, 2017, all companies in Green Street's North American coverage universe are included in the performance calculation. Previously, inclusion in the calculation of total return had been based on whether the companies were listed in the primary exhibit of Green Street's "Real Estate Securities Monthly" and had a rating other than "Not Rated".
- (3) From 1993 until July 3, 2017, the returns for each year cover the period following the first RESM issued in the respective year through the first RESM issued in the following year and are not based on a calendar year. Subsequent to July 5, 2017, returns are based on calendar months.

"Buy" = Most attractively valued stocks. We recommend overweight position; "Hold" = Fairly valued stocks. recommend market-weighting; "Sell" = Least attractively valued stocks. We recommend underweight position. "Not Rated" companies are covered by the firm's research department, but are not rated due to fundamental attributes related to business prospects and balance sheets that are deemed to make the securities more option-like than equity-like.

Green Street will furnish upon request available investment information regarding the recommendation

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