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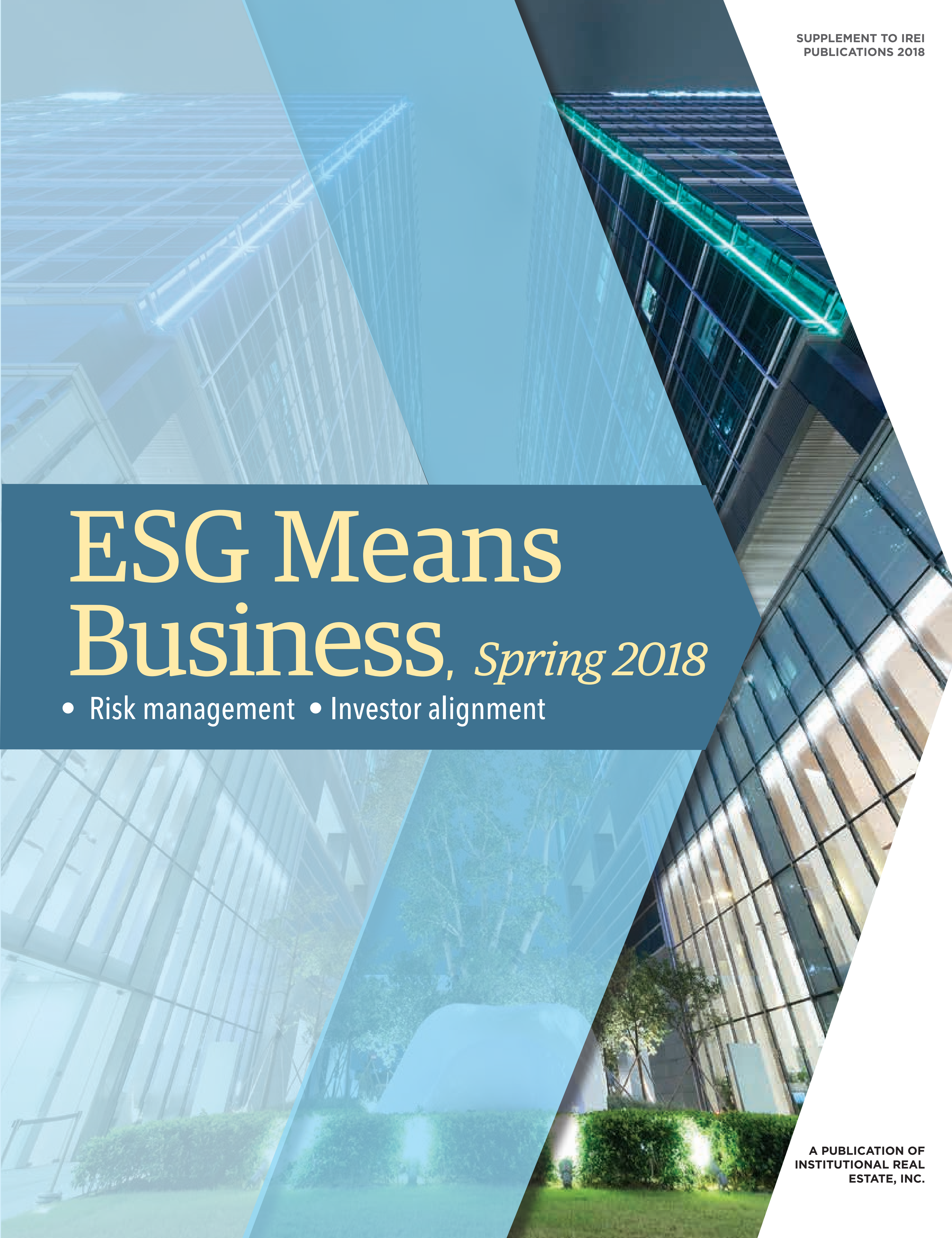

ESG Means Business, *Spring 2018*

- Risk management
- Investor alignment

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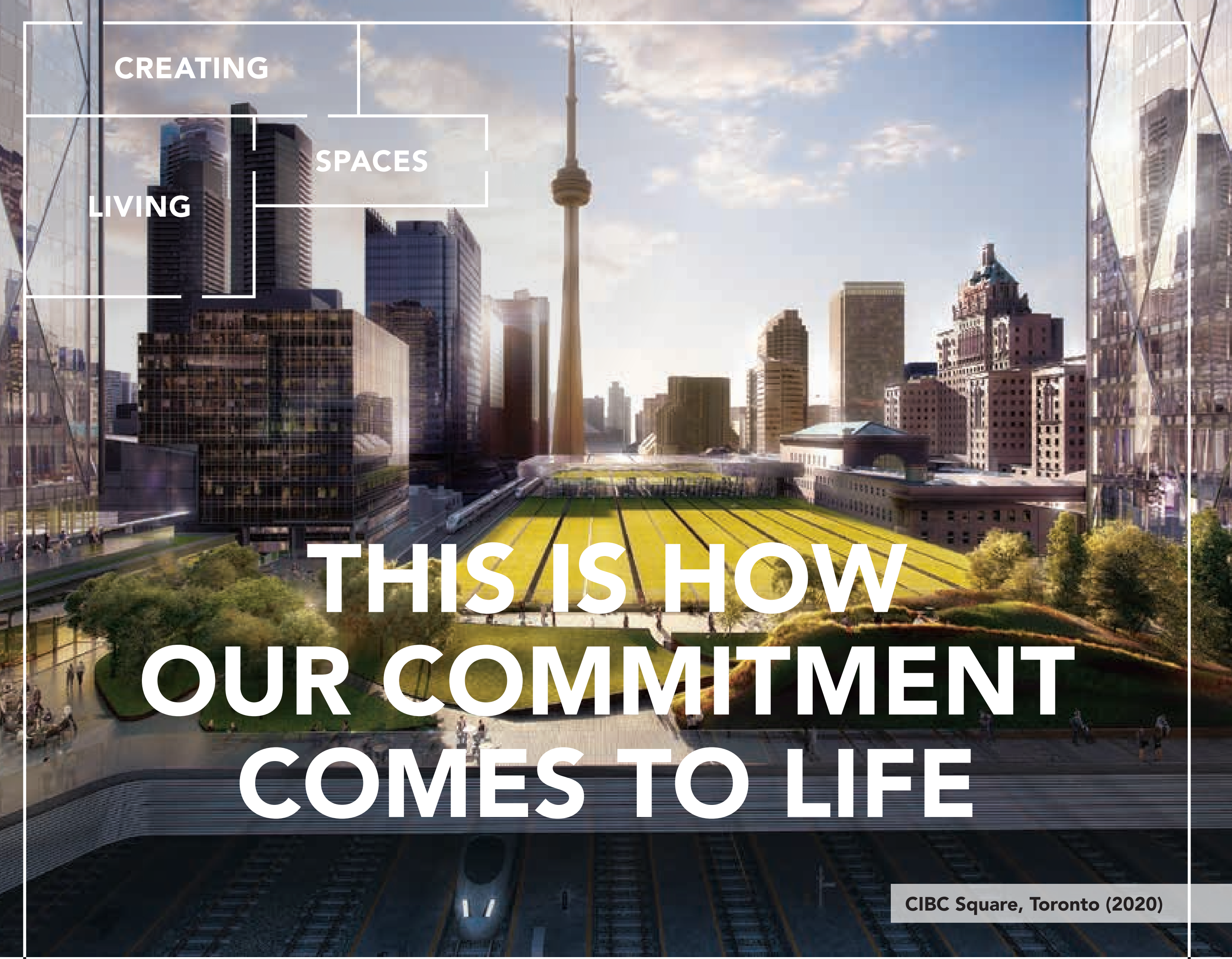

CIBC Square, Toronto (2020)

Institutional property ESG investing: the next stage

by Benjamin Cole

ESG Means Business, Spring 2018 *is a follow-up to* ESG Means Business, *a special report published by Institutional Real Estate, Inc. and GRESB in April 2017. The original report discusses how investors across the globe are implementing ESG principles as part of their overall investment approach and covers the merits of adopting ESG principles, implementing a process, benchmarking and future trends. This new report focuses on the accelerating acceptance and maturing best practices of ESG investing. Both reports are available as PDFs at irei.com/store.*

In the developed world, the pioneering stage of environmental, social and governance (ESG) techniques to institutional real estate investing is rapidly maturing. Fund managers and property operators are applying more sophisticated, far-reaching and even more-promising ESG initiatives, a movement that perhaps could be collectively called "ESG 2.0."

To be sure, a solid ESG-ified property portfolio still requires energy- and water-efficiency and applicable metrics, acceptable indoor environments, access to mass transit when feasible, proper integration with surrounding streets and properties, and often other appropriate amenities, such as child-care centers.

The virtues of efficiently operated buildings and pleasant, clean interiors appeal to better-quality tenants, while rigorous institutionalized ESG programs often expose building or structural hazards, and thus reduce risk for investors — translating into better risk-adjusted returns. Moreover, a well-operated, well-documented building is easier to sell, easing liquidation events and exit strategies and helping to obtain top dollar for assets.

So, as the millennium unfolds, huge strides have been made for ESG and property investors. Yet in recent years, leading institutional real estate portfolio managers are migrating to even more-inclusive forms of ESG with longer-term outlooks, such as gearing up to face climate change, deep-thinking office and

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workplace health issues, engaging in regional cooperation, evaluating advanced building-management technologies, and moving from passive to proactive in the development of ESG-worthy properties.

The forward-looking approach requires not just upgrading a portfolio to meet certain environmental or governance standards, but thinking out over the horizon to events and demands that may be made in coming years and decades — which makes sense for institutional property investors. Unlike stock and bond buyers who can sell at the stoke of a keyboard, institutional property investors sit atop illiquid assets, which may be held for years, or even decades. Indeed, some institutional investors, such as pension funds, may more-or-less regard their core property portfolio as a permanent investment.

Instrumental in accelerating industrywide acceptance of maturing ESG best practices has been the Global Real Estate Sustainability Benchmarks organization, or GRESB. The investor-funded and investor-driven GRESB constantly advances ESG standards to its more than 250 members, about which 60 are pension funds and their fiduciaries with a combined $17 trillion of assets under management.

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67 GRESB Score

CORE FUND OUTPERFORMED PEER GROUP AVERAGE OF 63 AND WAS AWARDED GREEN STAR

11,107 MWh

SOLAR PRODUCED ACROSS TWELVE PROPERTIES

4,185 kW

SOLAR INSTALLATIONS ACROSS TWELVE PROPERTIES

42%

OF THE CORE FUND PORTFOLIO HAS UNDERGONE ENERGY AUDITS

175 Properties

ACTIVELY MONITORING ENERGY & WATER CONSUMPTION

The investor-driven net-zero office building becomes a reality?

In the annals of green architecture, a bonafide "net-zero," for-profit commercial office building has remained something of a unicorn. From time to time, claims of a real-world net-zero office structure have been made — that is, a building that produces as much energy as it consumes, over a year — but shriveled under passing scrutiny. There was, for example, a 415,000-square-foot California office tower, suspiciously sheathed in glass without shading or screening in a southerly climate, that touted net-zero credentials back in 2013. Well, except that office building bought and piped in natural gas to power onsite turbines that provided the electricity.

But fast forward to Hanover Page Mill, an 85,925-square-foot office structure recently opened for tenancy in Palo Alto, Calif., which generates the equivalent of its annual electricity needs onsite, through energy-efficient design and 412 kilowatts of solar panels on rooftop and adjacent carports.

The two-story Hanover Page Mill, designed by architect Form4, is a green architectural showpiece, but it is serious business, too — the tenants are premier national law firm Morgan Lewis & Bockius, and securities brokerage Morgan Stanley.

The airy building makes abundant use of natural light, but also shades, screens and special glass to let light in, but not heat. The structure's envelope is designed to provide superior insulation, the climate is mild, and the HVAC systems are state-of-the-art. The result is an elegant structure, tenanted profitably, and consuming no net energy from the grid — although certain federal tax credits and utility incentives played into the equation.

Net-zero for institutional property owners?

So the question is: Will institutional property investors be able to embrace net-zero commercial buildings soon, as a wise investment?

James Gaither Jr., general partner of developer Hanover Page Mill, suggests the day of the low-rise net-zero office building has already arrived. "In general, pursuing net zero for low-rise office buildings is a good investment," contends Gaither. "First, net zero offers a marketing advantage when it comes to entitlements, borrowing, leasing and selling. Also, if net zero is combined with a more-efficient envelope, HVAC and lighting, it creates a better work environment that will translate into higher occupancy levels, which makes the net-zero building a better investment."

The additional cost of getting to net zero for a typical low-rise office building is shrinking, at least from Gaither's perspective. "In my experience, the additional cost to go from a very efficient low-rise office building to net zero can be zero [for my building] or potentially up to the 3 percent to 5 percent range, depending upon numerous factors," he says. Tax credits and local utility benefits play a role, notes Gaither. Other builders mention additional costs in the 10 percent range or a little above to get to net zero, but all builders mention continuously declining solar-power costs.

Form4 design principal John Marx observes that improving solar power technologies are pushing more commercial buildings to the cusp of net-zero practicality. "The ability to place ultra-thin solar panels on a multitude of surfaces, including spandrel glass and solar shades, will fundamentally enhance our ability to reach net zero," comments Marx. Other advancements, such as light-emitting diode (LED) lighting, are also cutting electrical demand.

And if not net zero, then close to net zero is already being blueprinted, says Marx. "We currently have a 265,000-square-foot 'close to net zero,' LEED Platinum office project under construction, named Innovation Curve," says Marx. "We only would have to add solar panels to the surface parking to achieve net zero."

The four-building, 13.5-acre Innovation Curve campus in Palo Alto is developed by Sand Hill Property Company.

Net-zero architecture in Palo Alto probably gets a boost in that office rents are famously high in the Silicon Valley, running around $120 per square foot per year, outpacing even Manhattan.

Still, as solar power costs decline, and if new flexible solar power panels allow architects to deploy more panels per project, the business argument for net-zero buildings may become compelling in the not-so-distant future.

Moreover, Gaither of Hanover Page Mill says large institutional property portfolio managers may actually have an advantage in developing or converting buildings to net zero.

"It should be easier for a large institutional property owner with a portfolio of buildings to manage a net-zero office building," advises Gaither. "The large institutional owner can recruit an in-house engineer or outsource a good engineer to manage the building systems. The challenge for net-zero buildings is less about managing the solar array, and more about managing the computer automation and controls that are now required for lighting and HVAC."

Institutional property owners, due to largerscale and larger budgets, should be able to assemble the talent to run "smart buildings" more readily than smaller real estate owners, surmises Gaither.

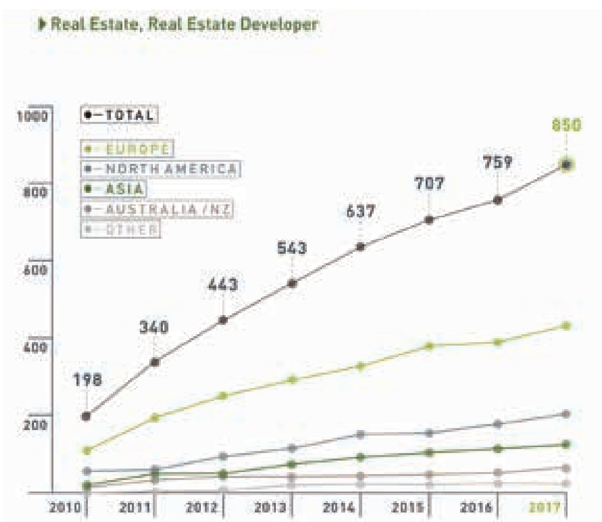
Net zero? Already doable. Indeed, perhaps the day will come when institutional property owners ask one another, "How much money did you make selling excess electricity this year?"

— Benjamin Cole

Importantly, the GRESB provides adoptable frameworks and metrics to promote ESG investing, to help members assess real estate performance, whether for a single building, a multi-billion dollar portfolio or in comparison to other large real estate fund managers. GRESB informs membership and the public of the latest evolutions in ESG.

"The GRESB has been instrumental in creating ESB benchmarks for the commercial real estate industry," says David DeVos, global director of sustainability at PGIM Real Estate. "As a fiduciary, we initiate sustainable projects that offer a positive return to our investors. We look forward to the next iteration of ESG initiatives, and embracing those that improve outcomes for investors and the public."

Response rate development



Source: GRESB

Over the horizon

London-based TH Real Estate is among the major institutional property managers who are gearing their portfolios to a longer term, more-inclusive view of ESG.

"Our approach is called Tomorrow's World and it underpins our investment process," explains Abigail Dean, head of sustainability for TH Real Estate. "We invest in Tomorrow's World for the enduring benefit of our clients and society. Our priority is to deliver outperformance for our clients and protect Tomorrow's World, by future-proofing today's investments and identifying the optimum investments for tomorrow."

Pursuant to Tomorrow's World, TH Real Estate is re-evaluating its portfolio and assessing the physical risk to its buildings presented by climate change, and also the investment risks and outcomes as governments or market forces compel transition to low-carbon business formats. "In many scenarios, inefficient assets will become obsolete," observes Dean. "Either too expensive to operate due

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As a leader in Education, Healthcare & Storage real estate investment, Harrison Street continues to strive for innovative ways to create value for our investors while simultaneously reducing our impact on the environment. Our Brightview Bel Air senior living community exemplifies the integration of a holistic energy efficient solution that targets lighting, HVAC, and plugload controls.

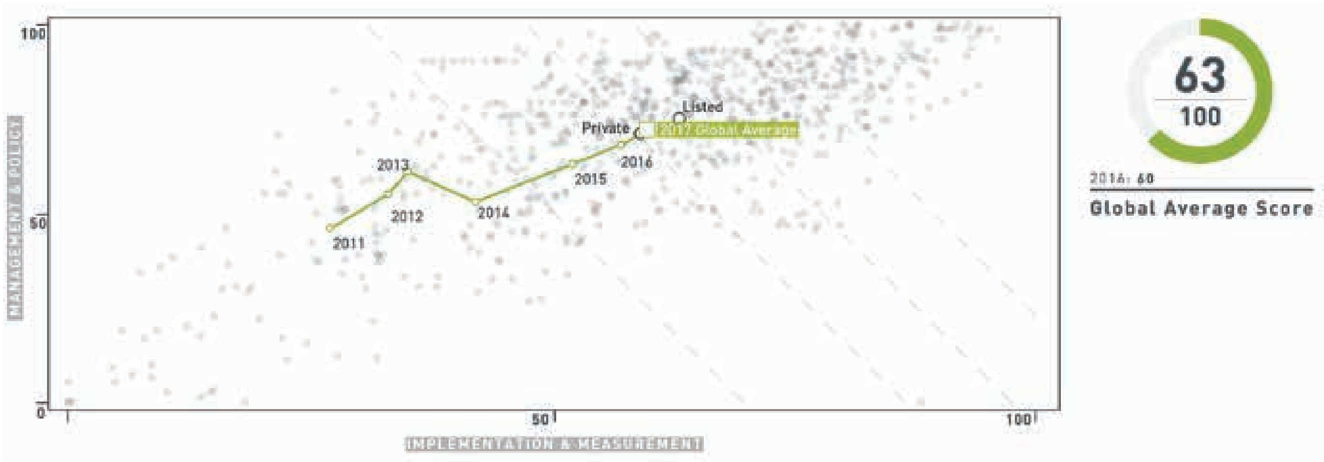
PROJECT HIGHLIGHTS

- Installation of high-efficiency LED lighting into the community's interior and exterior spaces decreasing the total lighting consumption by an estimated 15%, or 19% of total building usage
- Installation of 85 new Packed Terminal Heat Pumps in all of the resident units as well as eight new high-efficiency split system heat pumps with air handling units to condition the building's common areas. The new HVAC units are projected to reduce the building's energy consumption by 52,000 kWh per year, or 6%
- Installation of plug-load controls to wirelessly control the building's connected devices, as well as programmable thermostats to allow the residents and management team to program temperature setpoints

In order to highlight measures that significantly improve the energy efficiency and operating performance of the community, The Maryland Energy Administration awarded Brightview Bel Air more than $159,000 in grants through the EmPOWER MD Grant Program. As a result, the property has experienced improved overall operating performance as well as additional maintenance cost savings through the extended life of the measures. **Over the past 9 months, the installed systems have reduced the building's average energy consumption by 20% and resulted in nearly 116,000 kWh saved.**

SPONSORED CONTENT

Response rate development



Source: GRESB

to fossil fuel prices and carbon taxes, or possibly undesirable to tenants. And there is also the outcome of losing tenants to more-efficiently operated structures." The long-term outlook of Tomorrow's World requires assessing cost of operation not just in the present, but in potential future scenarios including the potential meteorological dystopias of hotter weather, or more-frequent hurricanes.

Even if global temperatures do not rise as some expect, many governments already require or will require greater energy carbon-output efficiency by consumers and businesses, through regulation and law, notes Dean.

Better to get ready now than scramble later, she adds. "Having a proactive approach to ESG means our portfolio is well-positioned to manage exposure to environmental legislation, such as the introduction of Minimum Energy Efficiency Standards in the U.K. and the Netherlands and the roll-out of mandatory benchmarking and reporting in Europe and the USA."

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Moreover, well before TH Real Estate adds a property to its portfolio, or begins development, it "integrates a sustainability risk and opportunity assessment to protect investors' capital," Dean says.

Also deepening its ESG outlook is Sydney-based Lendlease, the global real estate developer and investor. Even before the word "green" entered the lexicon as a synonym for sustainability, Lendlease was looking forward, anticipating responsibilities, and what government may demand. "In 1973, Lendlease's founder, Dick Dusseldorp, said 'Companies must start justifying their worth to society, with greater emphasis placed on environmental and social impact rather than straight economics,'" reports Jon Collinge, Lendlease senior sustainability manager.

Today, that same forward focus is driving ESG initiatives down the supply chain, as Lendlease works with vendors and service providers to enact best practices where feasible. After all, commercial real estate developers and owners consume a lot of goods and services, and can leverage their spending power to green ends as well.

And Lendlease, despite already cutting energy consumption by about half over its portfolio, is not done yet with making its buildings more efficient. As with other portfolio managers, they are pondering the declining costs and rising power of sensors and computers.

Building artificial intelligence

"The next interesting stage in building efficiency is 'big data,' machine-learning and live analytics," says Collinge. "There is more telemetry in a Toyota Corolla than most investment-grade buildings. As building operators, the excellent news is that we can now become increasingly aware of building performance on a minute-by-minute

Lenders use ESG to bolster risk management

The GRESB Debt Assessment continues to draw interest from major commercial real estate lenders worldwide — leading banks, private equity firms, insurance companies — who annually benchmark ESG-based management and business practices against global peers. Besides seeking refined techniques to improve default risk, these leaders use GRESB to identify and track key performance metrics that underlie corporate climate action commitments and inform internal/external stakeholders on positive impacts from real estate lending efforts.

The 2017 GRESB Debt Results and companion GRESB Debt Participant Best Practices highlight how leading lenders systematically request and analyze additional property collateral attributes alongside the borrower's broader ESG profile when pricing and approving new commercial loans.

Now in its third year, GRESB Debt continues to experience strong growth in market adoption with recent engagement by several Dutch commercial banks including ABN AMRO, ING Bank and Rabobank — these real estate lenders collectively demonstrate progressive ESG-based risk management and portfolio monitoring programs.

Emerging risk monitoring techniques identify collateral with nonconforming energy ratings, or assets with heightened climate hazard risk profiles. A growing group of private equity funds report implementing advanced underwriting checklists focused on building energy ratings, green building certifications, and proximity to multi-modal transportation linkages.

Several banks utilize an integrated ESG approach aligned with broader lending and business strategies. Advanced lenders maintain databases for tracking ESG performance indicators, then perform sophisticated analyses to uncover hidden portfolio risks. Specific techniques include capturing energy ratings, understanding on-site renewable energy generation capacity, reviewing green building certifications and forecasting capital expenditure tradeoffs.

Real estate lenders maintain acute focus on risk management and downside protection; lack of day-to-day control puts some limits on sustainability integration opportunities. Newcomers to GRESB benchmarking quickly discover that successfully embedding ESG into lending practice requires a systematic approach.

Commercial real estate loan originators report three distinctive decision points that prompt expanded ESG consideration:

1. **Loan Origination:** identify specific risk-based objectives, borrower standards, and/or asset-level loan criteria.

2. **Underwriting / Due Diligence:** include sustainability issues and KPI-driven metrics in advanced underwriting checklists and third-party report specifications.

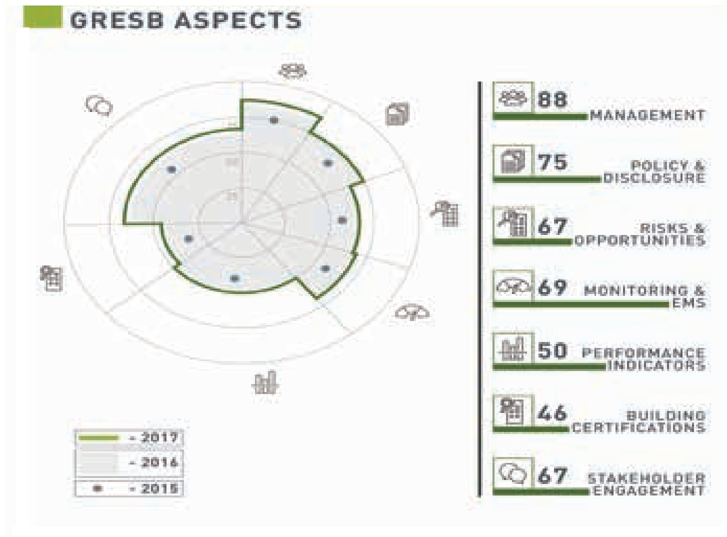
3. **Post-Close Loan Monitoring:** implement techniques to track ESG-based risk factors including energy ratings, natural hazard exposures, regulatory changes and GHG emissions.

Leading loan underwriters report enhanced ESG-oriented processes designed to uncover and analyze greater asset-level data. More granular asset basis, and fine-tune efficiency initiatives. We can identify and resolve problems faster than we ever have and this can only lead to improvements in performance."

Temperature, air-quality, motion- and light-sensors of all varieties are becoming cheaper and better, notes Collinge, meaning a building operator can better track structural hot and cold spots, occupancy, or quickly spot energy-consumption surges.

"We call it Smart Building Technology, and it is becoming an increasingly important topic," concurs DeVos of PGIM. "Demand is growing for properties that can react to the type of occupier and even down to the unique requirements of individuals within the building. The ability for a building to monitor itself on such a granular level provides numerous incremental opportunities to increase energy efficiency and wellbeing."

GRESB aspects



Source: GRESB

profiles inform market competitiveness, instruct forward estimates on capital expenses and shed daylight on location/obsolescence issues. Topping the list of ESG performance indicators are energy and water audit results, building ratings, proximity to multi-modal transit, and the ability to generate onsite energy.

2018 trends to watch

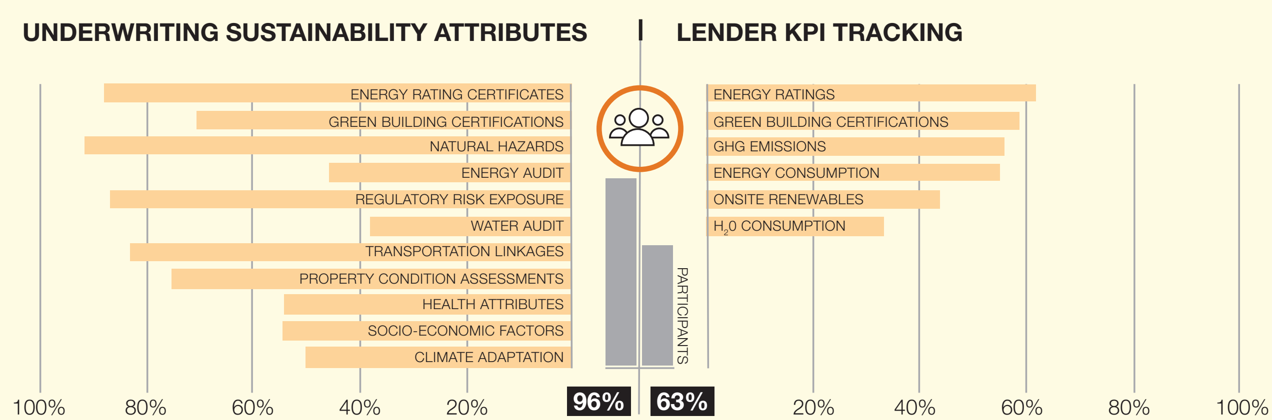
Advanced underwriting and KPI monitoring to achieve "lender impact" is a fast-growing trend among GRESB Debt participants. Nearly all of the 2017 respondents (96 percent) incorporate sustainability-related metrics into due diligence checklists. A clear majority (63 percent) collect and report sustainability KPI information derived from the current loan portfolio. A number of participants report developing financial products tailored to supporting borrower objectives, the most common being additional loan proceeds for energy efficiency upgrades and interest rate reductions for green-labeled properties (5 basis point to 35 basis points).

Leading firms like Netherlands-based Rabobank track upwards of 14 ESG KPIs that deliver business value to bank stakeholders while contributing to positive environmental and social outcomes. Rabobank's real estate portfolio has an outsized impact on the bank's ability to achieve its broader sustainability objectives, making their real estate unit a focal point of executive attention.

The 2018 GRESB Debt Assessment is open from April through July — more information can be found at gresb.com, or by emailing GRESB staff directly via info@gresb.com.

— Dan Winters, Head of Americas, GRESB

2017 GRESB debt assessment — participant results



Source: GRESB

Teaming up, regionally

Even with billions of dollars of property under management, ESG-oriented real estate owners are often thwarted by scale in any particular region or city. That is, certain ESG ideas become viable only when several million square feet of commercial space, or more, sign up for an initiative.

Some ESG initiatives require cooperation among neighborhood, city or regional building owners, and as ESG-awareness spreads through the industry, regional cooperation is yet another part of ESG 2.0.

"We are looking to collaborate with industry peers to deliver ESG outcomes that a single organization cannot deliver alone," explains Collinge of Lendlease. "Areas such as waste-industry transformation and green leasing. Collective outcomes will continue to be delivered via initiatives like the City of Sydney's Better Buildings Partnership."

For example, building managers have long known that clusters of buildings, such as college campuses, can be heated more efficiently by networks of steam pipes rather than one-by-one. "District heat offers real opportunities to reduce greenhouse gas emissions," contends Dean of TH Real Estate. Though it is little known beyond New York infrastructure-cognoscenti, there are 105 miles of steam pipe under Gotham, supplying heat to more than 2,000 buildings, the largest

Europe's value-add funds outperform GRESB 2017 benchmark by wide margin

European private equity firms continue to lead the way on ESG, with significant engagement by funds pursuing value-add strategies. Noncore funds scored in excess of 25 percent higher than GRESB 2017 global private equity fund participants (n=650). Among this cohort, Europe counts 63 value-add funds pursuing a range of ESG initiatives seeking to capture additional financial value while reducing the fund's risk profile.

The 2011 U.K. Energy Act goes into full effect on April 1, 2018. With a business cycle of advance notice, institutional fund managers in England and Wales are busy repositioning, retrofitting and upgrading assets with an eye on operational efficiency. Five of the top 10 2017 GRESB Europe value-add funds are U.K. funds, with UBS Central London Office Fund taking top honors.

Benchmarking European value-add funds against the global GRESB Value-Add Fund participant set reveals a 10-point outperformance on each of the GRESB MP and GRESB IM metrics. Heavier focus on renovation and redevelopment allows funds to implement LED lighting retrofits and mechanical plant upgrades, install advanced water metering technologies and carry out other efficiency upgrades. A full 94 percent of Europe value-add funds report to GRESB the ability to capture, track and report energy/water/waste consumption. Community engagement is one area where value-add funds excel, using investment tactics that maximize transit-oriented locations and increased neighborhood vibrancy.

A combination of higher energy/water prices, transportation costs and investor requirements drive European fund managers to leverage a range of ESG techniques within their investment programs. State Street Global reports 25 percent of institutional investment implements ESG-based strategies ($22.9 trillion) with nearly half originating from Europe. Astute fund managers seek to establish a solid ESG track record built on processes and protocol with an eye toward both current fund performance and the next capital-raising cycle.

Non-financial information informs smarter investment analysis, insights into management team quality and impact assessments. Europe's institutional investors provide a strong push, committing to efforts like the Montreal Pledge and a range of other climate actions. Last year, PGGM published a carbon footprint analysis inclusive of its real estate fund LP positions, seeking to achieve a 50 percent carbon reduction in five years. Private equity firms position themselves to support these LP's using GRESB's process for annual data gathering, benchmarking and impact reporting.

Four Twenty Seven reports the European-adopted IORP II Directive requiring European pension funds to assess climate-related risks is set to take effect in less than one year. The IORP II Directive applies to more than 14,000 EU pension plans, and explicitly allows for accounting ESG factors in investment decisions using the EU's "prudent person" rule.

European value-add managers with multiple funds benchmarked by GRESB for five-plus years running include Aberdeen, Genesta, Vasakronen, Hermes, Schroder, UBS and Rockspring.

district-heating system on the planet. The subterranean Manhattan system even powers absorption chillers for air-conditioning.

When district heating is provided by co-generation, sometimes called using "waste heat" from municipal power plants or industrial factories, the carbon footprint is much reduced, especially compared to use of single-building boilers. Additionally, some district-heat systems are partially powered by biomass, or solar power, further reducing carbon footprints.

Of course, creation of district-heating zones requires organization among building owners and a cooperative local government. "District-heating is an area where city-planners can add a lot of value, not only to the sustainability movement, but by enhancing property values," says Dean. "Lower-cost heat and cooling translates in higher-value properties and related tax revenues."

Other institutional property titans are pursuing "impact investing," by which a single new project is leveraged to encourage adjacent upgrading or synergized development. "Impact investing in real estate is an investment ethos that is starting to gain more interest among investors seeking social or environmental objectives to solidify competitive market returns," says DeVos of PGIM. "For example, a strategy that incentivizes further economic development, creates jobs, activates attractive public and civic spaces through introduction of new amenities, increases

As a collection of industry-best practices, GRESB offers participants an ESG framework to inform tactical asset management decisions over shorter hold horizons. Investing additional capital into energy- and water-efficient systems during asset retrofit can yield outsized marginal returns given three- to five-year hold horizons. When disposing fund assets, access to more granular operating data supports the asset's financial results, key to maximizing total IRR potential on exit.

The Paris Climate Agreement prompted the formation of Climate Action 100+, an investor-led consortium of over 225 pension schemes with more than $26 trillion AUM that focuses engagement on 100 of the world's largest corporate GHG emitters. These corporates collectively occupy a significant amount of institutional real estate worldwide, and they reflexively look for their global real estate portfolio to deliver Scope 2 and Scope 3 emission reductions.

Real estate value-add funds are ideally positioned to provide top corporates with solutions using green lease agreements and other methods aligning financial outcomes. Leading European value-add real estate investors who actively manage their portfolios to leverage this clear directional trend will be well-positioned to achieve superior risk-adjusted returns as funds realize their strategic objectives.

— Dan Winters, Head of Americas, GRESB

EU value-add funds vs. 2017 GRESB global value-add funds (n=130)

Source: GRESB

U.S. open-end core funds exceed 2017 GRESB benchmark

U.S. core private equity real estate funds have emerged as strong leaders on ESG, engaging sustainability efforts within their portfolios while beginning to quantify positive impacts across property types.

ESG benchmarking by leading U.S. core funds dates to 2011 when Bentall Kennedy, Invesco, JPMorgan, Morgan Stanley and UBS formed the first GRESB open-end North America core fund peer group. With more than 1,200 assets valued in excess of $85 billion, these funds carry strong market weight. By benchmarking against global peers, these fund managers continually gain valuable business intelligence into the scope and scale of the real estate sector's sustainability-based efforts.

The first year results were lean (and somewhat humbling). The original cohort averaged a 2011 GRESB score of 37, revealing multiple management gaps on ESG performance. Six years later these same five firms are peer group outperformers, delivering an average 2017 GRESB Benchmark Score of 81 while claiming several past and present GRESB Sector Leader designations.

The ability to source building-level energy/water/waste data typically separates leaders from laggards on GRESB results. Following from their initial results, these core funds worked diligently over the 2012–2017 timeframe to increase portfolio-level data coverage to gain greater insights into asset-level opportunities that improve operations and drive NOI gains.

As GRESB approaches full coverage of the NCREIF Open End Diversified Core Equity fund universe, institutional investors have insight into fund manager differences on ESG engagement and resultant management gaps. With 20 of the largest U.S. open-end core funds consistently using GRESB to benchmark their sustainability efforts, market advances are realized as firms compete on ESG performance metrics. Empirical research and strategy papers by top professionals at Bentall Kennedy, Principal and UBS are furthering investor understanding of the financial rewards offered by ESG leadership.

North American diversified core funds represent lower risk investments in stable operating properties. Core funds seek to achieve strong operating income, at reduced financial risk profiles. Superior asset management and efficient building operations are key factors in driving income returns, while simultaneously reducing portfolio volatility.

Interestingly, GRESB participants represent the full range of market behavior from ESG market leaders to sustainability-metric laggards. A handful of U.S. core fund managers are just beginning to awaken to the business value of ESG, while progressive firms utilize sophisticated underwriting checklists, implement annual energy audits, and enforce lease guidelines that incorporate ESG metrics into standard tenant engagement.

Critical to improved ESG performance is systematic access to detailed operating data — tenant satisfaction surveys, peak energy load profiles, and water consumption patterns inform operational improvement strategies.

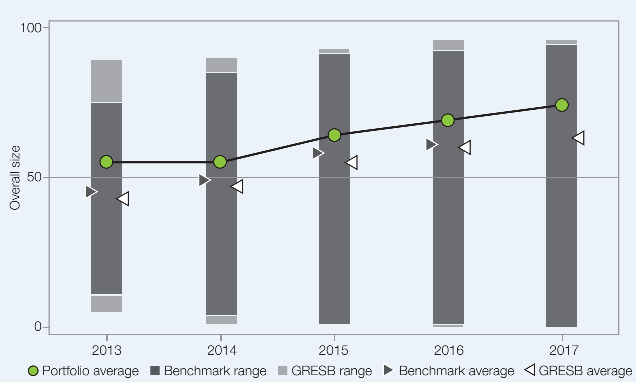
U.S. core funds continue to up their ESG engagement and performance results — energy management and efficiency efforts are a constant focus. Water has emerged as a serious financial factor as major U.S. municipalities implement rate increases on access, consumption and sewer discharge fees, making water metering a must-have for institutional-grade assets. Securing one or more green building ratings is a strong market signal of asset quality and management expertise.

Beyond the focus on securing superior risk-adjusted returns, many institutional investors are signatory to the Montreal Pledge. These LP's are committed to assessing and reducing the carbon footprints for their investments including their real estate fund holdings. By engaging the annual GRESB benchmarking process, U.S. core fund managers are well-positioned to capitalize on sustainability initiatives that support risk-adjusted return objectives while offering LP's data to inform portfolio-level impacts and GHG emission reductions.

The GRESB assessment opens April 1 and closes July 1. Last year 850 real estate private equity funds and property companies benchmarked their ESG efforts using GRESB. For 2018, all private equity funds are invited to participate. Learn more at GRESB.com.

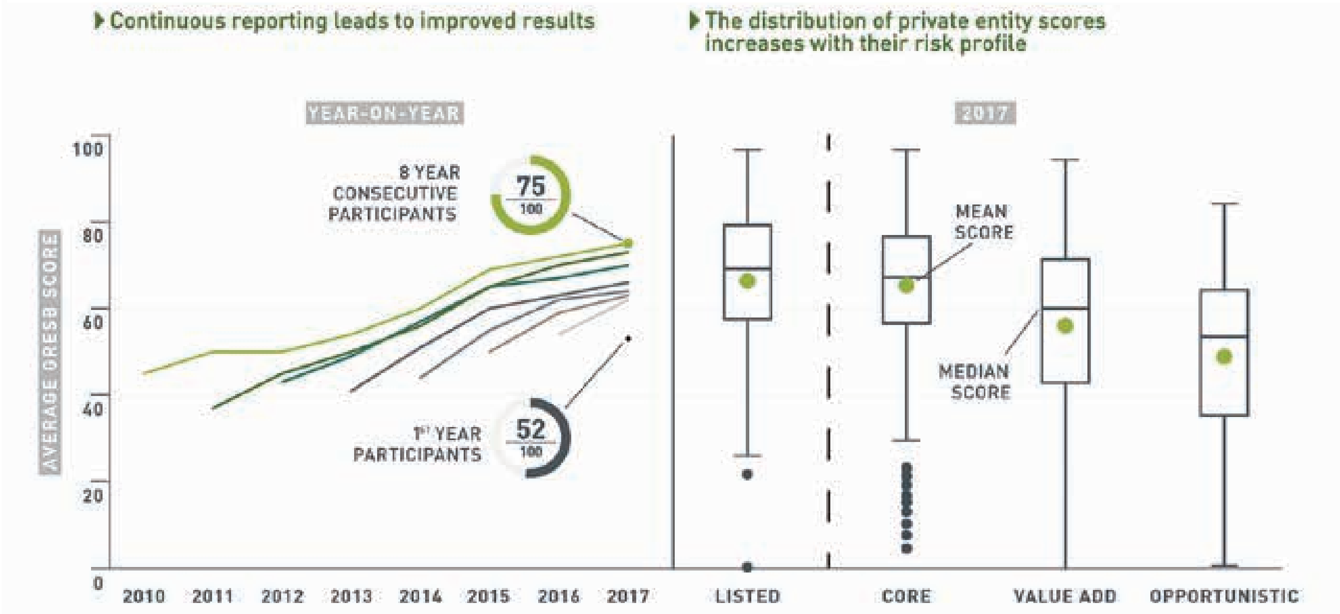
— Dan Winters, Head of Americas, GRESB

GRESB results historical rrend – U.S. core private equity funds



Source: GRESB

GRESB scores



Source: GRESB

safety and comfort of living, or creates access to affordable housing."

The values of "new urbanism" — that is, the design of mixed-use buildings that integrate into interesting and walkable streets and access to public transit — fit well into impact investing, and they are also enhanced when groups of building owners interact with themselves and with government to create attractive neighborhoods.

Office wellbeing and air quality

The health of building occupants is a charged issue and one that the legal teams of many real estate portfolio operators may wish would disappear, or at least reach a widely accepted and easily implemented regulatory solution. Off-the-record, ESG experts acknowledge that new building products off-gas considerably, as does some office equipment, and that tighter building envelopes result in less incidental fresh air introduction to work areas.

Moreover, in 2016 the *Harvard Business Review* published the article, "Air pollution makes office workers less productive," the title of which serves as a summary. Harvard also produced a 2015 study entitled, "Green office environments linked with higher cognitive function scores."

For now, the indoor air-quality issue may stay on the back-burner. But as sensors become more widely available and cheaper, building owners may have little choice to monitor and improve indoor air quality. "The day of wearable sensors, including air-quality sensors, is not that far off," said one ESG expert. "Commercial building tenants will be able to monitor and know the indoor air quality — do building owners really want to be in a reactive position when tenants bring complaints, or worse?"

The American Society of Heating, Refrigerating and Air Conditioning Engineers (ASHRAE) has an indoor air-quality guide for commercial property owners available online, in part in cooperation with the U.S. Green Building Council. Also, the U.S. Environmental Protection Agency produces The Indoor Air Quality Building Education and Assessment Model (I-BEAM), a guidance tool designed for professionals concerned with indoor air quality in commercial buildings. In future years, the issue of indoor air quality likely will find its way into the ESG lexicon.

And despite legal qualms, the topic of indoor air quality is being raised in some institutional investor circles. "Studies show indoor environmental quality can have a dramatic influence on worker productivity," says PGIM Real Estate's DeVos. "More environmental controls and improved health and wellness are important issues to manage."

Battery-powered buildings?

While battery-powered vehicles grab the headlines, the idea of battery-powered buildings is also a compelling one, and more so in at least one regard: While an automobile has to lug a battery around to use it — thus limiting the size of the battery — buildings can rest battery packs on terra firma, by the tons and tons.

Sustainability and asset resilience are key topics for Miami's economic future.

And that is exactly what Morgan Stanley Real Estate Investing envisions at its 27-story, 50-year-old One Maritime Plaza office tower in San Francisco's financial district — it is installing hundreds of Tesla Powerpacks, enough to make a 500 kilowatt/1,000 kilowatt-hour onsite battery system.

The battery packs will typically deliver electricity during "peak load" hours to the 534,000-square-foot tower, such as during hot afternoons, when local grid power-plants are firing up to meet demand. Obviously, if enough buildings in a zone are battery-supplemented, the need for peak-load generation is reduced, which is key as peak-load plants tend to be dirtier, burning fossil fuels. Additionally, utilities that enjoy flatter peak-load demands can operate existing plants at top efficiency for greater parts of the day. In the longer run, battery-powered buildings will allow for clean-power harvested during sunny and windy hours to be used throughout a 24-hour day, as needed.

At One Maritime Plaza, building peak electrical demand on the grid will be cut by as much as 20 percent, when the battery packs kick into action.

"Energy storage and batteries is a new area Morgan Stanley Real Assets is not only looking at, but one obviously we are implementing at One Maritime Plaza," said Joshua Myerberg, managing director at Morgan Stanley Real Assets. "In the future, cities or regions may deploy this technology routinely to enable greater reliance on clean but often variable power sources, such as the sun and wind."

Conclusion

ESG 2.0 is well underway, with leading institutional investors planning decades over the horizon, coordinating some activities regionally, and adopting technologies that were science fiction only decades ago — and all the while, enhancing risk-adjusted investor returns and values. Institutional property owners are concluding that efficient, well-managed buildings in pleasant neighborhoods are good investments, and they will pursue ESG initiatives for the foreseeable future.

"ESG engagement offers a number of benefits for real estate investment, both in terms of reducing risk and also the potential to increase the value of properties," asserts David Hirst, executive director, at London-based UBS Asset Management. "Those benefits appear to be increasing, not decreasing, as ESG and technologies evolve."

In future generations, city or regional networks of like-minded ESG-oriented building owners may become common, along with district-heating, battery-powered buildings, and even net-zero commercial structures.

For institutional real estate owners, the prospects are for a cleaner — and more profitable, less risky — future. ❖

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