THE ULI BLUEPRINT FOR GREEN REAL ESTATE

Urban Land Institute Greenprint

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ABOUT ULI

The Urban Land Institute is a global, member-driven organization comprising more than 45,000 real estate and urban development professionals dedicated to advancing the Institute's mission of providing leadership in the responsible use of land and in creating and sustaining thriving communities worldwide.

ULI's interdisciplinary membership represents all aspects of the industry, including developers, property owners, investors, architects, urban planners, public officials, real estate brokers, appraisers, attorneys, engineers, financiers, and academics. Established in 1936, the Institute has a presence in the Americas, Europe, and Asia Pacific regions, with members in 80 countries.

The extraordinary impact that ULI makes on land use decision-making is based on its members sharing expertise on a variety of factors affecting the built environment, including urbanization, demographic and population changes, new economic drivers, technology advancements, and environmental concerns.

Peer-to-peer learning is achieved through the knowledge shared by members at thousands of convenings each year that reinforce ULI's position as a global authority on land use and real estate. In 2019 alone, more than 2,400 events were held in about 330 cities around the world.

Drawing on the work of its members, the Institute recognizes and shares best practices in urban design and development for the benefit of communities around the globe.

More information is available at uli.org. Follow ULI on Twitter, Facebook, LinkedIn, and Instagram.

ABOUT ULI GREENPRINT

The ULI Greenprint Center for Building Performance is a worldwide alliance of leading real estate owners, investors, and strategic partners committed to improving the environmental performance of the global real estate industry. Through measurement, benchmarking, knowledge sharing, and implementation of best practices, Greenprint and its members strive to reduce greenhouse gas emissions by 50 percent by 2030 and an additional collective goal of net-zero carbon emissions by 2050. On an ongoing basis, Greenprint also endeavors to demonstrate the correlation between environmental performance and enhanced property value. Learn more at uli.org/greenprint.

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ULI Greenprint wishes to thank the following members for sharing their expertise to develop and review the content of this report. After 10 consecutive years of consistent emission reductions, Greenprint members have a wealth of knowledge to share with the larger real estate industry, and we thank them for contributing their best practices and successful case studies to this report.

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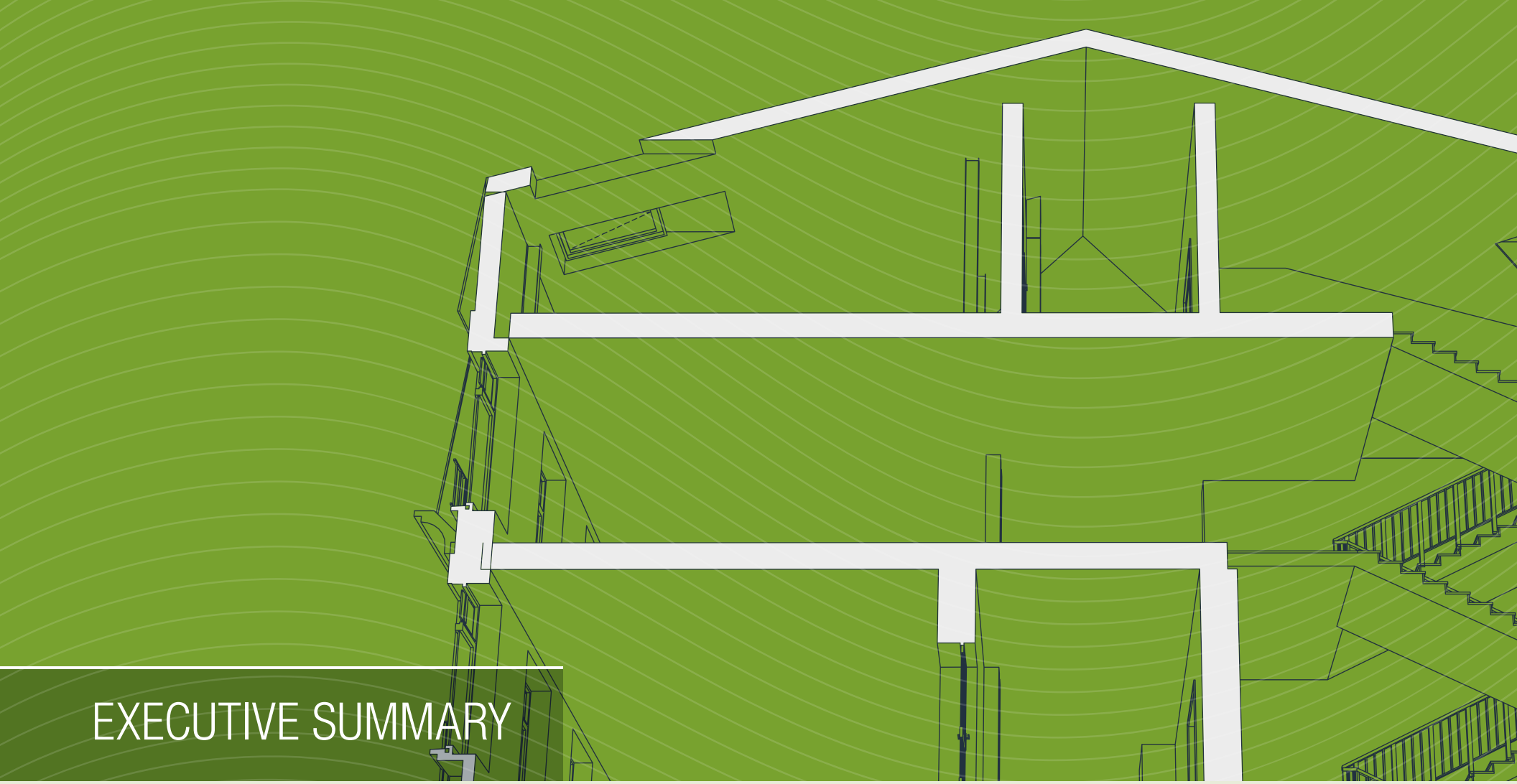
INTRODUCTION

With the increasing public focus on climate change and its impacts, new policies affecting building energy performance, and pressure from investors, real estate organizations recognize the strong business case for incorporating environmental, social, and governance (ESG) factors into their normal business operations. In addition, strong returns from utility savings, tenant demand, new opportunities to access capital, and other value-creation opportunities are spurring investment in sustainability and energy efficiency.

Building on the leading sustainability work that Greenprint member organizations have been implementing since 2009, **this Blueprint is for real estate owners and investors looking to develop or accelerate a sustainability program, and developers looking for ways to integrate sustainability into their overall development strategy.**

Although the role of a real estate sustainability program is much broader than it once was, now encompassing topics like resilience, health and wellness, and social equity, the Blueprint is focused on addressing four core environmental impacts: energy, water, waste, and greenhouse gas (GHG) emissions. The Blueprint is laid out to support a firm's new sustainability lead in building a holistic program from the ground up, starting with data collection and building a team, to addressing topics like climate adaptation and resilience, health and wellness, and social impacts.

In alignment with ULI Greenprint's goal of a 50 percent reduction in GHG emissions by 2030 and beyond, this report aims to shift real estate portfolios toward net-zero energy, water, and waste in a way that creates both short- and long-term financial value.



EXECUTIVE SUMMARY

Building a sustainability program for a real estate portfolio from the ground up is no simple task; it takes thoughtful and thorough work across, technical, financial, and market-facing elements to achieve success. That is why this Blueprint is so long: it spans the setting of the foundation to the evolution of sustainability programs. The following outline provides a high-level overview to orient readers and to help identify areas for program development.

1

BUILDING THE FOUNDATION OF A SUSTAINABILITY PROGRAM

The first step in creating a sustainability program is to develop an initial vision of what the program will do for the company, the stakeholders, and the planet.

MAKE SUSTAINABILITY SOMEONE'S JOB

Whether 10 percent or 100 percent of someone's time, a sustainability lead should have passion for the job and be empowered to assess and implement a portfolio-wide sustainability program. Strong executive buy-in will ensure that the program can be operationalized and that the sustainability lead has adequate funding for both projects and staff support.

GET THE LAY OF THE LAND

Effective sustainability leads engage across the entire company, and it is important that they understand the organization's overall structure as well as its financial priorities. To develop this knowledge and build internal support, the sustainability lead should know the basics of real estate and the key performance and financial metrics of each department to determine how sustainability can align with and help achieve those goals.

COLLECT PERFORMANCE DATA, SET A BASELINE, THEN BENCHMARK

An accurate and comprehensive collection of energy, emissions, water, and waste data for each asset within a portfolio helps sustainability leads understand and improve a building's performance. While full building data are often difficult to collect, green leases, tenant engagement, and submetering technologies can all help expand data coverage. After collecting data, the sustainability lead should then set a baseline and benchmark the performance of individual buildings against peer buildings, both within the portfolio and across external groups.

SET GOALS

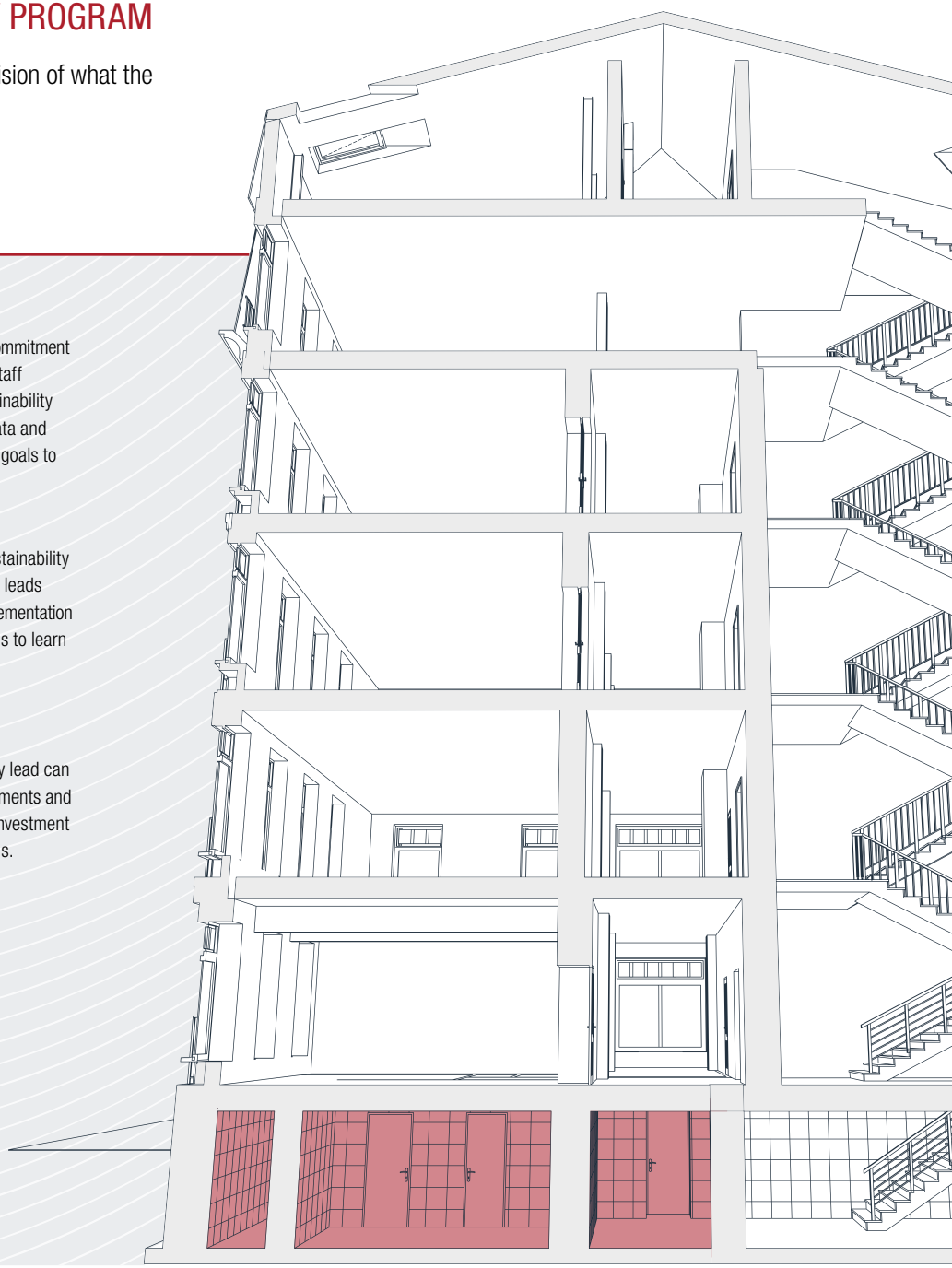
Strategic goal selection showcases an organization's commitment to sustainability and sets a target to ensure that all staff members are working toward a common goal. Sustainability leads should select goals on the basis of available data and feasibility and should consider aligning with external goals to standardize metrics and stay competitive with peers.

STAY ON TOP OF TRENDS

New policies and incentives regularly change the sustainability landscape but can be difficult to track. Sustainability leads should engage with cities in the development and implementation of new climate policies and join industry organizations to learn from peers.

INTEGRATE SUSTAINABILITY ACROSS THE ORGANIZATION

As part of its sustainability strategy, the sustainability lead can begin setting company-wide policies for new developments and major renovations, sustainable building operations, investment and due diligence, and reporting and communications.



2

BEST PRACTICES IN NEW CONSTRUCTION

Integrating sustainability at the start of a new development maximizes cost-effectiveness and ensures that portfolios remain on track for achieving climate goals.

START EARLY WITH INITIAL BUILDING DESIGN

Making sure that the development team understands an organization's sustainability goals at the start of a project is key. Sustainability leads can lean on internal design standards or third-party green building certifications to provide a performance baseline. Then, additional features can be added to ensure that each building remains relevant for the future needs of its specific market, including upcoming regulations and tenant demands.

IMPLEMENT SUSTAINABLE CONSTRUCTION STRATEGIES

Investments made in sustainable construction can reduce waste and optimize the efficiency of the final product. The sustainability lead should create a plan to maximize the diversion of construction waste and should be familiar with the sustainability benefits of innovative practices, like modular construction or augmented reality. The sustainability lead can also help quantify and mitigate material impacts by suggesting low-carbon building materials, which often come with no cost premium and can provide other benefits, like a faster development schedule.

REUSE AND REDEVELOP

The redevelopment of existing buildings can provide significant environmental benefits, reducing embodied carbon and material waste, while also promoting placemaking. However, there are also challenges, as adding new technologies to an older structure can be costly. Sustainability leads should work to balance design aesthetics with sustainability goals and should consider green building certification standards to set a baseline for performance.

3

QUICK WINS IN EXISTING BUILDINGS

From the single-building level to portfolio-wide, opportunities exist to achieve low-cost, high-value successes in existing properties. Sustainability leads should find and implement these opportunities to create an internal track record of success on which to build.

IDENTIFY AND QUALIFY OPPORTUNITIES

Each building type has a different menu of options to maximize cost savings, and efficiency can be assessed in multiple ways—from a systems and equipment inventory to third-party audits. Sustainability leads should work across the portfolio and with key building stakeholders, like property management, to improve the environmental performance of a building.

IMPLEMENT LOW-COST, HIGH-VALUE SUSTAINABILITY OPPORTUNITIES

Best practices for energy, water, and waste help building owners reduce consumption, improve system efficiency, and reuse resources. From installing lighting upgrades and regularly checking for leaks to encouraging tenants to use reusable materials, sustainability leads should implement no-cost operational changes and look for utility incentives to finance other upgrades.

ESTABLISH TENANT ENGAGEMENT PROGRAMS

Fifty percent or more of energy use in a building comes from tenant spaces, and occupant engagement programs can yield consistent savings over time. Sustainability leads should employ green leases to align owner and tenant goals, as well as provide guidelines for sustainable tenant fit-outs to maximize the efficiency of tenant spaces. Ongoing communications across all building types can help educate tenants and ensure an ongoing commitment to sustainable behaviors.

4

FINANCING AND IMPLEMENTING CAPITAL PROJECTS

Retrofits that result in deep emission reductions and savings also require large upfront capital investments and engineering support. Sustainability leads should assess opportunities for capital investments, either during acquisition due diligence, through audits, or to replace major mechanical equipment at the end of its useful life.

BUILD THE FINANCIAL BUSINESS CASE FOR THE INVESTMENT

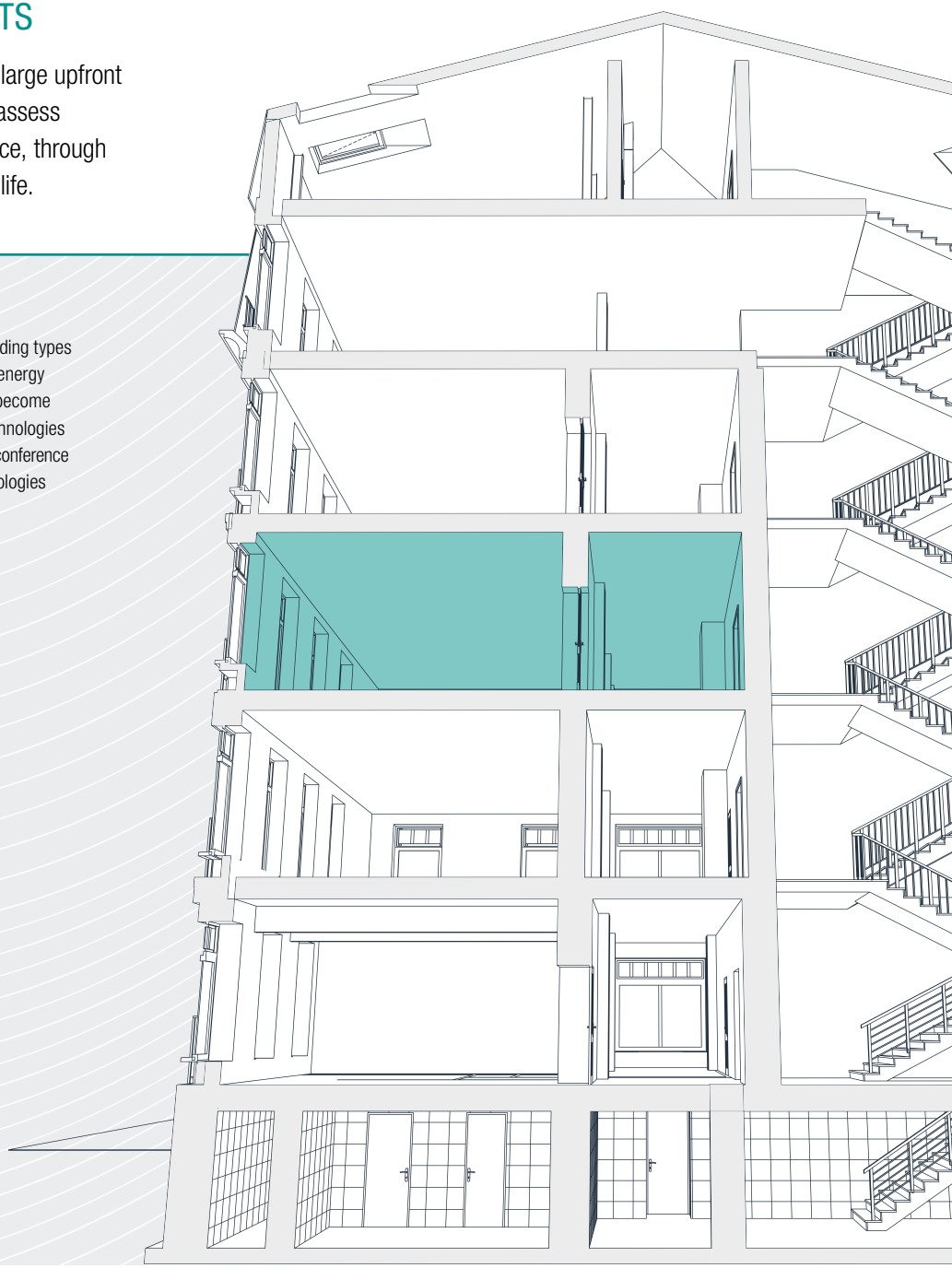
The business case for capital investments will vary by project and a company's investment return threshold. Sustainability leads should work to understand and calculate the value of large sustainability investments, considering the project payback, opportunities to improve the financials by bundling projects, and the source of capital.

EVALUATE FINANCING OPTIONS FOR BIG-TICKET INVESTMENTS

A wide range of financing opportunities exists for sustainable investments, from green loans that lower interest rates for sustainable investments to energy service performance contracts that require no upfront costs and are paid back over time with the operational cost savings. If no internal capital is available to finance large investments, sustainability leads should identify the right type of financing for their organization.

TAKE ADVANTAGE OF NEW TECHNOLOGY

New "proptech" opportunities are available for all building types to improve tenant comfort or to lower costs through energy efficiency. While sustainability leads do not need to become technology experts, they should learn about new technologies through utility partnerships, existing relationships, and conference trade shows and assess the potential of these technologies in their portfolio.



5

INTEGRATING SUSTAINABILITY ACROSS THE REAL ESTATE VALUE CHAIN

Real estate operations encompass an ever-changing set of properties and key stakeholders. Sustainability leads should integrate sustainability beyond traditional building construction and operations.

ENGAGE THE SUPPLY CHAIN

From building materials to cleaning supplies and pest management, the supply chain can have a substantial impact on a building's environmental footprint. Sustainability leads should proactively engage top suppliers and begin setting expectations for ESG performance to drive demand and create a market for sustainable suppliers.

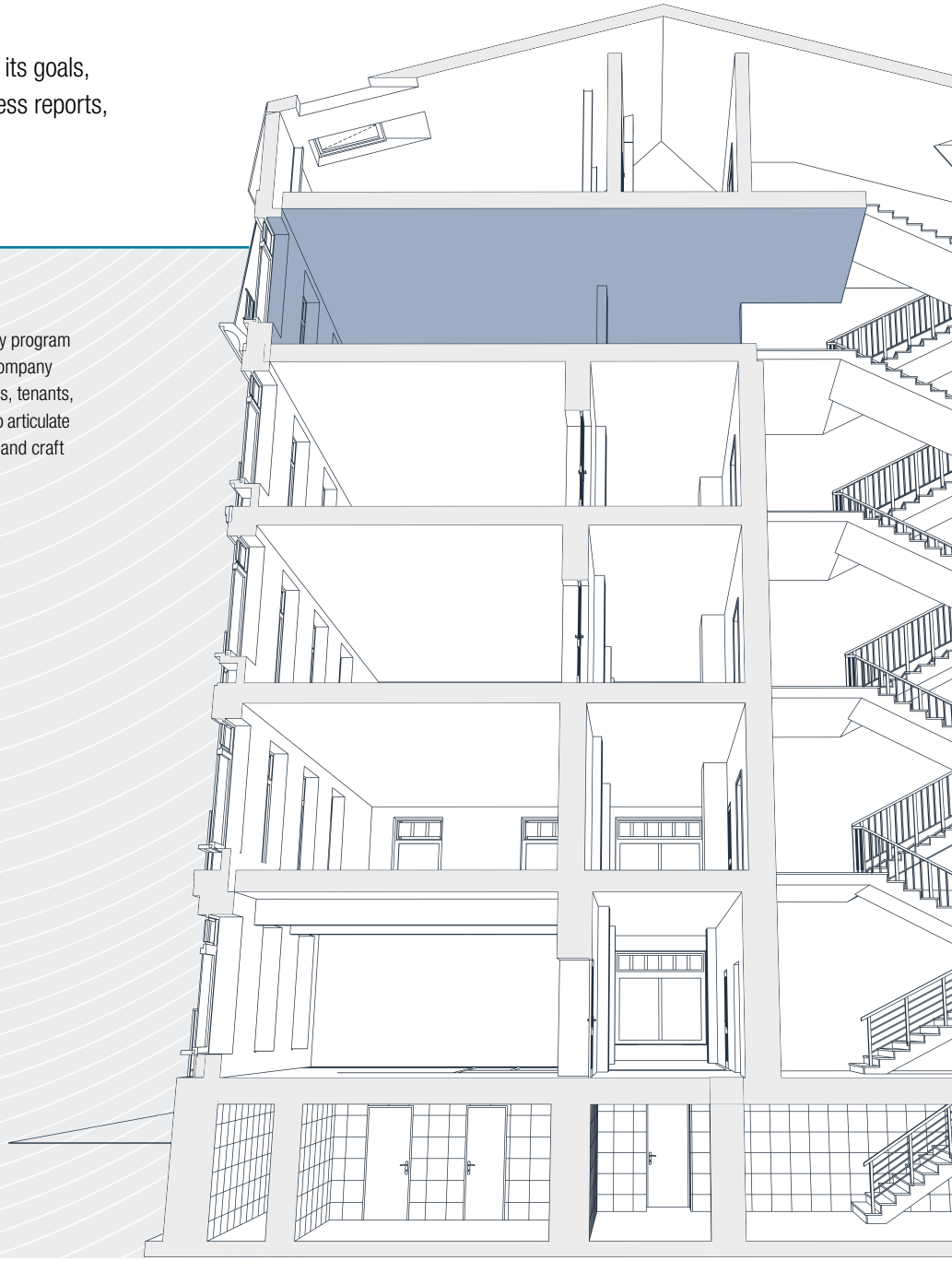
INTEGRATE SUSTAINABILITY INTO THE INVESTMENT CYCLE

Understanding the added value of sustainability during a real estate transaction increases the overall market uptake of green buildings. Sustainability leads should understand the sustainability potential of each possible acquisition, make investments during the hold period to maximize value, and accurately market and price these features during disposition.

6

TRACKING, REPORTING, AND COMMUNICATIONS

As the sustainability program achieves successes and progresses toward its goals, sustainability leads should continue tracking performance, creating progress reports, and communicating results to stakeholders.



TRACK PERFORMANCE

The portfolio's environmental performance data can help drive progress or identify areas for improvement. After setting up data collection procedures, sustainability leads should regularly track performance against goals and consider publishing results.

ESTABLISH SUSTAINABILITY REPORTING

Organizations that use standard frameworks and external disclosure initiatives create industry-wide alignment of metrics and goals. The sustainability lead should identify such reporting initiatives, including the possibility of releasing a corporate sustainability report that provides standard metrics and shares relevant ESG information with stakeholders.

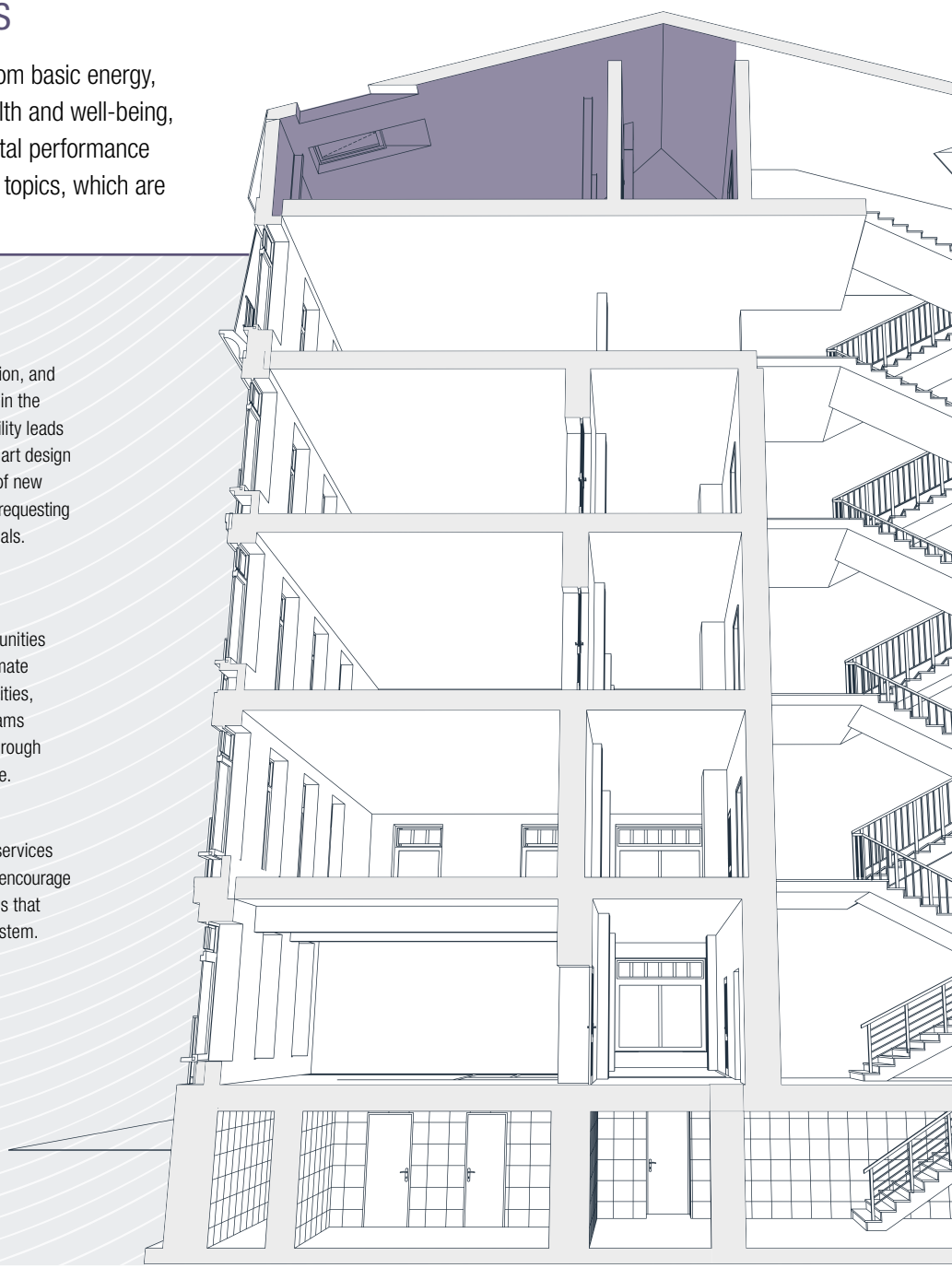
COMMUNICATE PROGRAM RESULTS

Properly communicating the results of a sustainability program maximizes value for an organization. From internal company updates to build momentum to engagement of brokers, tenants, and investors, sustainability leads should be prepared to articulate the value of sustainability to each stakeholder group and craft complementary communications materials.

7

THE EVOLUTION OF "SUSTAINABILITY" PROGRAMS

The sustainability lead's role continues to change over time, expanding from basic energy, water, and waste considerations to climate adaptation and resilience, health and well-being, social and racial equity, and embodied carbon. Improving the environmental performance of a real estate portfolio can have significant cobenefits for each of these topics, which are likely to be integrated into future ESG goals.



SET A PATHWAY TO NET ZERO.

Meeting the goals of the Paris Climate Accord requires the real estate industry to achieve net-zero carbon by 2050. This will be achieved in new and existing buildings through investments in energy efficiency, renewable energy, electrification, and storage. Sustainability leads should understand their portfolio's current performance and begin assessing a pathway to achieve net zero.

MAKE RENEWABLE ENERGY WORK

Installing on-site renewables or procuring off-site renewables can make energy costs more consistent but can also come with contract risks and technology challenges. Sustainability leads should assess opportunities for on-site renewable energy throughout their portfolio, from solar power to geothermal heating and cooling. After on-site renewables are exhausted, sustainability leads should consider off-site deals.

BUILD FOR CLIMATE ADAPTATION AND RESILIENCE

Adapting to climate risks requires the implementation of resilient design strategies at the building and community scale. Sustainability leads should review assets for resilience risks and develop capital investment and emergency response plans. Although multiple frameworks can assess climate risk, sustainability leads should consider long-term financial risks, including insurance costs and tenant demand.

CONSIDER HEALTH AND WELL-BEING

Across all asset types, tenants increasingly demand healthy building features. To address tenant concerns and add building value, sustainability leads can consider applying one of the many healthy building certifications, including WELL, Fitwel, and RESET.

ADDRESS EMBODIED CARBON AND THE CIRCULAR ECONOMY

Embodied carbon from the manufacture, transportation, and disposal of building materials plays a significant role in the environmental footprint of a development. Sustainability leads should encourage development teams to consider smart design choices and low-carbon materials by staying aware of new regulations that mandate low-impact materials and by requesting data on the environmental impacts of building materials.

CONSIDER SOCIAL EQUITY, COMMUNITY, AND WORKFORCE DEVELOPMENT

All asset types can play a positive role in their communities and address the "S" of ESG. Negative impacts of climate change disproportionately affect vulnerable communities, and sustainability leads can encourage developer teams and building operators to incorporate social equity through projects and programs, building community resilience.

INCORPORATE BIODIVERSITY

Degrading biodiversity reduces valuable ecosystem services for the real estate industry. Sustainability leads should encourage development teams to consider new design strategies that better integrate buildings into the larger urban ecosystem.

THE BUSINESS CASE FOR SUSTAINABILITY

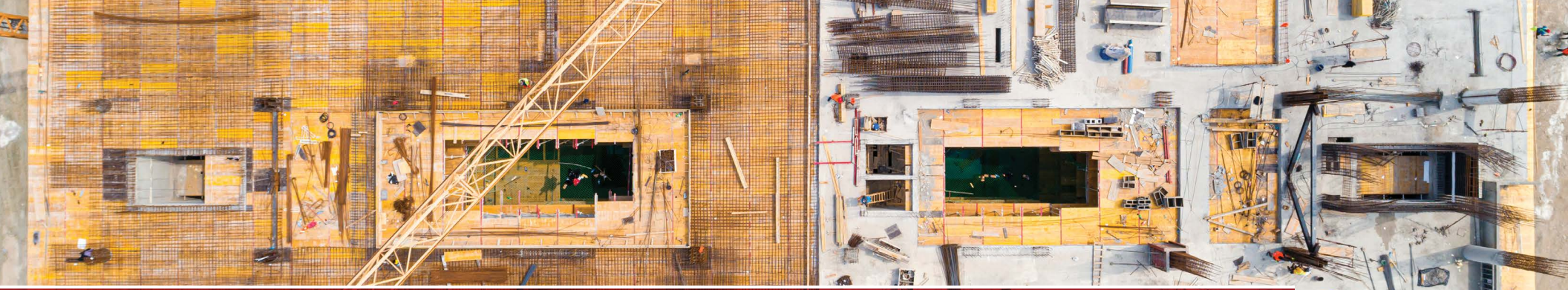
A well-developed and comprehensive sustainability program can help real estate organizations add value to their bottom lines by reducing operating expenses, by satisfying key stakeholders who care about sustainability (including tenants, investors, and the communities in which they operate), and possibly even by improving internal employee satisfaction—all while working to address the world's most pressing environmental issues. Many real estate owners see the value in investing in sustainability and climate mitigation; however, others have made little to no progress in reducing their resource consumption or emissions.

Buildings contribute nearly 40 percent of global emissions; therefore, to keep global warming below 1.5 degrees Celsius, buildings will need to reduce emissions by 50 percent by 2030 and essentially be carbon neutral by 2050. Reaching carbon neutrality and lessening the overall impact of real estate on the environment will require substantial investment in building design, management, and operations.

This document aims to build the business case and outline a basic strategy for all organizations to invest in sustainability, while also providing additional resources to reference and leverage. Real estate's potential for creating positive value for the owners' own bottom lines as well as for the environment is immense and the time to start is now.

"Climate change has become a defining factor in companies' long-term prospects. Last September, when millions of people took to the streets to demand action on climate change, many of them emphasized the significant and lasting impact that it will have on economic growth and prosperity—a risk that markets to date have been slower to reflect. But awareness is rapidly changing, and I believe we are on the edge of a fundamental reshaping of finance."

LARRY FINK, CHAIRMAN AND CEO, BLACKROCK, IN ANNUAL LETTER TO CEOS, JANUARY 2020



BUILDING THE FOUNDATION OF A SUSTAINABILITY PROGRAM

An important first step in creating a sustainability program is to develop an initial vision of what the program will do for the company, the stakeholders, and the planet. Whether this vision is modest (keep up with the market average for energy efficiency and green building strategy) or more ambitious (achieve net-zero energy, water, waste, and carbon in 10 years), it will help determine the initial investment necessary to put into the foundation of a program, and the directive of the person within the organization who will be charged with developing the sustainability program. However, it is important to remember that ESG is a large and changing topic.

A company that does the bare minimum for a few years may later be faced with new regulations that require more active participation and necessitate a long-term vision. As the sustainability lead sets a baseline for the organization and benchmarks against peers and market leaders, the organization will have the opportunity to refine this vision and add more specific goals to the sustainability strategy.

MAKE SUSTAINABILITY SOMEONE'S JOB

To get started on the pathway to a sustainability program, the first step is to make sustainability part of someone's job, from 10 percent to 100 percent of his or her time. Ideally, this person will have a passion for sustainability that will help set the tone for the rest of the organization. The sustainability lead should be empowered to assess the current state of sustainability at the company and to implement the program from the building level to the portfolio level and fund level. The lead should also work to integrate sustainability across the real estate value chain, from property managers, asset managers, tenants, and consultants to architects, engineers, and construction managers.

A sustainability lead helps assess and mitigate long-term risk and makes incremental improvements to the net operating income (NOI) by reducing operating expenses. If possible, the sustainability lead should report directly to the C-suite—or to a committee that includes members of the C-suite—to gain key buy-in from leadership so that the initiative can have an impact across the organization.

Determining the Funding Source for Sustainability Program (Staff and Projects)

Another key consideration for this step is to determine how to structure this program financially, including how to fund projects. Having funding in place helps determine the internal staffing capacity. In some organizations, the sustainability team functions as an internal consultant for different teams, helping with projects on an ad hoc basis, and in others are a part of a larger team like development or asset management. Some sustainability teams have their own project budget to deploy across a real estate portfolio, whereas others work through already-defined budget parameters in development, or a capital plan for existing assets.

However, a lot of projects are possible without a dedicated sustainability budget. Asset managers can be empowered to implement projects at the property level without corporate funding, by ensuring that they can identify the most sustainable and efficient option when there is an opportunity.

Ensuring Executive Buy-In

One of the most important ways to ensure that sustainability integrates throughout the entire business is to obtain buy-in from senior leadership, including all key departments and senior executives. Buy-in is important for obtaining both overall support and direction, as well as funding for the organization's overall sustainability program and specific projects. To obtain this buy-in, the most important things for a sustainability lead to consider are the different opportunities for each department or executive

where sustainability can add value to their work or avoid risk. A sustainability lead should become familiar with those drivers and be able to speak to each of them, whether that is through cost savings, marketing advantage, or legislative risk from new climate policies. To ensure that senior leadership remains focused on operationalizing sustainability across the business, some companies tie environmental performance metrics to their executive's bonus structure.

"Sustainability is an integral part of our corporate DNA and values at NEO. Executive leadership is critical for sustainability to effectively and consistently permeate our corporate culture, physical projects, operational protocols, and tenant-engagement campaigns. The actions, attitude, and passion of our senior leadership have proven to be the driving force within our organization to advocate for greener and healthier buildings not just within our portfolio but throughout our local real estate industry."

RAYMOND RUFINO, CHIEF EXECUTIVE OFFICER, NEO

Bringing in Extra Help

For some organizations, it may make sense to start with an external sustainability consultant who understands sustainability in the context of real estate and has worked with other organizations to develop and refine their programs. Consultants can provide template policies and programs that can be customized to fit a company's specific needs. This professional support can kick-start a sustainability program, helping a company new to sustainability understand industry best practices, set goals for future improvement, develop policies and programs to help it achieve those goals, and assist in executing those programs.

For specific-sustainability projects, vendors can also play a strong role in educating staff members and achieving goals. However, even if a company relies on a consultant for its sustainability strategy, it is important that the consultant reports to an internal leader to support decision-making and to ensure that sustainability is institutionalized across the company. Without an internal leader to drive the program, it risks becoming a project that is ultimately not operationalized by the company.

GET THE LAY OF THE LAND

Whomever a company selects as sustainability "lead" will likely not have had organization-wide visibility before assuming this role, or will have come from another organization. Either way, the most important thing the new sustainability lead can do is understand how all departments function across the organization, and for those without a real estate background, how real estate sustainability differs from other industries. An effective sustainability program will engage with multiple departments—from marketing to investor relations—but will be most closely connected to the property management, development, asset management, and core real estate function teams associated with building and managing the real estate portfolio to maximize opportunities for impact.

At global organizations, the sustainability lead for the entire company often has dedicated sustainability liaisons in each global region. These liaisons are the boots on the ground who support the sustainability lead by collecting data and engaging stakeholders.

Understanding Your Company

Before doing anything else, the sustainability lead needs to learn how the organization works. Understanding the basics provides structure for what should be done. For example, financial priorities vary: a real estate investment trust (REIT) may be more focused on its quarterly or annual dividends, whereas a small-scale developer may focus on completing projects early and under budget. And market priorities also vary: a developer in Australia will have to hit a high bar on sustainability to remain competitive with the market, while a developer in a smaller U.S. city could be a market leader by delivering some of the first certified green buildings in its market.

"In order to develop a sustainability plan that fits the goals of the entire organization, the sustainability team must be able to step back and assess every aspect of the business. Because each business unit has their own focus areas and key performance indicators, it can be difficult to align with the holistic approach. My role as vice president of sustainability at JBG Smith is to look from the outside in to ensure each business unit has the knowledge and tools they need to bring our overarching sustainability vision to fruition."

KIM PEXTON, VICE PRESIDENT OF SUSTAINABILITY, JBG SMITH

To develop this knowledge, in the first few months in the role, the sustainability lead will need to learn the basics of real estate, including how buildings get financed, constructed, leased, managed, and eventually sold. The lead also needs to understand the company, including how success is measured and financial and nonfinancial key performance indicators (KPIs) for the senior leadership team, as metrics used in real estate—like funds from operations, net operating income (NOI), and

net present value (NPV)—can vary from other industries, such as profit margins; earnings before interest, taxes, depreciation, and amortization; earnings per share; and others.

Sustainability leads are often required to make requests from individuals who are not direct reports. Consequently, it is important to talk to colleagues in their language to build confidence in sustainability initiatives. Further, even if people are convinced to participate in a sustainability project, it is not always top of mind. So it is up to the sustainability lead to keep pushing forward. Key information to learn to achieve this goal include how different departments are evaluated, what success looks like for these teams, what their specific challenges are, and what systems they execute where sustainability could be integrated. Understanding the responsibility of each team ensures that all initiatives are communicated in a way that clearly lays out responsibilities, while minimizing pain points. It also helps identify how sustainability can add value to their work.

KEY KNOWLEDGE TO ACQUIRE BEFORE GETTING STARTED

THE BASICS

1. **The company**
   - Is it public or private?
   - What are the asset classes?
   - What is the mix of existing buildings vs. new developments?
   - Who are the stakeholders, including investors?
2. **Operational and financial control**
   - Is the organization vertically integrated (i.e., are property managers, brokers, and asset managers part of your company or a third party?)
   - Is the building owned outright, or is it a debt or equity investment? Are any joint ventures involved?
3. **Key performance indicators**
   - What are the different types of goals and metrics for the success of key departments?
   - What are some of the pain points and challenges faced in the pursuit of those goals?

Understanding Financial Metrics in Real Estate

The business of real estate differs from other industries; it uses distinct metrics for evaluating investment decisions. Spending time with key members of the investment committee can help a sustainability lead understand how budgets are set, how investment decisions are made, and what opportunities can integrate sustainability into this strategy. For example, investments in existing buildings are often evaluated by their impact on NOI. NOI measures revenue from the property, minus all reasonably necessary operating expenses—essentially the profit from real estate operations.

Others focus on return on investment (ROI); to calculate the ROI of a particular project, an owner will look at the impact of the investment on NOI over time and calculate the NPV of that investment by dividing it by the capitalization rate. The cap rate is calculated by dividing a building's NOI by the purchase price, and average cap rates can vary by market or property type. Cap rates can help determine the expected return over time on a real estate investment, like a sustainable retrofit. If the investment generates enough long-term value for the property, chances are the investment will be approved.

Other key investment metrics may be familiar from other industries, as some in real estate will use a simple ROI calculation or look at the internal rate of return (IRR) and simple payback period to make investment decisions. On the debt side, sustainability investments that increase the value of the building can also decrease the total loan-to-value ratio, which can lower interest rates.

However, not all investment decisions are based solely on a cap rate valuation or IRR. Some sustainable investments have value that is harder to quantify, yet they still add to the bottom line. For example, an on-site wastewater treatment facility may not pencil out using traditional ROI calculations but can be highly valuable in water-stressed areas to ensure an adequate water supply to the building. These additional calculations can still add value by reducing risk.

USING A CAP RATE TO DETERMINE AN INVESTMENT'S LONG-TERM VALUE

Sample project	LED lighting retrofit	On-site wastewater treatment
Total investment	$60,000	$1,000,000
Annual cost savings	$30,000	$40,000
Example market cap rate for office buildings	5%	5%
Added value of project	$600,000 ($30,000/0.05)	$800,000 ($40,000/0.05)
Does the simple investment calculation pencil out?	Yes, value > investment	No, investment > value

COLLECT PERFORMANCE DATA, SET A BASELINE, THEN BENCHMARK

A common saying in the sustainability industry is "You can't manage what you don't measure." Sustainability leads should collect energy, emissions, water, and waste data for each asset in the portfolio to understand how a building portfolio is performing and to help identify areas for improvement.

Collecting this information accurately is increasingly important, with many reporting standards requiring aggregate environmental performance data, and many investors asking for these data. Further, many cities, states, and countries have passed energy benchmarking or disclosure ordinances that require buildings to collect and submit annual energy data, with many more likely to require that information in the future.

Data collection is difficult in real estate. In many cases, building owners see only the bills they pay, not net-metered tenant utility data. Because of lease structures in asset classes like industrial, multifamily, and retail, it can be hard to get a clear picture of a building's actual energy, water, and waste consumption. To overcome this barrier and support benchmarking and energy disclosure ordinances, some municipalities require the local utility to provide whole-building data directly to the building owner in aggregate form. Other landlords leverage submetering or green leases to support the collection and sharing of tenant energy consumption data.

Data collection and management are an iterative process, starting with what already exists or is easy to find and building from there to get more complete and better information as the sustainability program advances. With a large portfolio, responsibility for data collection falls to the property manager or building engineer as the on-site expert who pays the bills and is most likely to recognize abnormal usage or billing amounts; however, the sustainability lead can also collect this information.

This information can be collected in several ways, but most companies start by manually reviewing utility bills for consumption and cost data. This does not scale easily. So as portfolios grow, real estate firms leverage one of the many available data management systems to help building owners collect their energy performance data and support investor reporting. A good place to start in the United States and Canada is Energy Star Portfolio Manager, a free platform to collect this information that connects to multiple other energy management platforms for more detailed analyses.

ENERGY STAR PORTFOLIO MANAGER

The Energy Star Portfolio Manager is a free online tool from the U.S. Environmental Protection Agency (EPA) that measures, tracks, and normalizes building-level energy, water, and waste, as well as greenhouse gas emissions. Properties in the platform are also benchmarked against a baseline to provide an overview of performance.

Some utilities provide energy data directly to the Portfolio Manager platform on a regular basis through the Green Button tool; Energy Star provides a full list of participating utilities on its website.

Calculate a Baseline

A baseline can be set with a year's worth of accurate and complete data. A baseline of performance from a starting year is helpful when setting and tracking performance against goals, and monitoring savings after implementing energy efficiency projects.

Most sustainability directors start by tracking energy, water, and waste data as they are the most material environmental impacts of a building. Cost-effectively reducing that consumption can be used to build a business case for sustainability projects.

A baseline can be calculated using multiple approaches; here is one simple methodology:

1. Define the boundary of what is included in the total (usually real estate assets for which you have operational control, financial control, or both).
2. Choose a baseline year (usually the first year in the past for which you have reasonably complete data).
3. Decide on the energy intensity denominator for each building (usually square footage).
4. Gather data inventory on energy, water, and waste consumption and units of output for each building:
   - Energy: electricity, natural gas, fuel oil, district steam, and any other energy sources
   - Water consumption: internal (restrooms; kitchens; laundry; heating, ventilation, and air conditioning (HVAC); and external (irrigation)
   - Waste generation and diversion (recycling and composting) rates
5. Calculate energy, water, and waste intensity of the baseline year for each building.

Ultimately, a baseline creates a starting point to measure against when implementing a well-designed sustainability program. After setting a baseline, each year's environmental impact and long-term operating expenses can be compared. A baseline also allows you to start developing interim and long-term goals for performance improvement in a data-driven way.

Benchmark Performance

Once a baseline is established, performance can be benchmarked on an ongoing basis. By benchmarking within a portfolio, asset managers and sustainability leads can identify both higher-performing buildings (to learn from their success) and lower-performing buildings (to prioritize investment dollars and strategies for these properties). The majority of buildings are benchmarked by their energy use intensity (EUI), a calculation of total energy use in a building divided by building area.

When benchmarking, the best results come from comparing buildings of similar type, size, location, and uses. While two office buildings of similar size may seem easy to compare, if one is located in San Francisco and the other in London, different weather conditions (i.e., colder winters in London) or standard local technologies (i.e., office buildings in either city may not have air conditioning) must

be taken into account. Even comparing two similarly sized office buildings in one city can be difficult; if one building houses a law firm with low occupant density, it will naturally have a much lower EUI than an office building with a trading firm with higher density and more computers.

CALCULATING ENERGY USE INTENSITY

EUI measures building energy use per unit of area.

Sample calculation	
Energy use	4,615,684 kilowatt-hours (kWh)
Building area	÷ 255,000 square feet
EUI	= 18.1 kWh per square foot

Comparing against External Benchmarks

External benchmarking initiatives are available to determine how a property's performance compares against the broader market. Some examples of benchmarks for individual properties include Energy Star Portfolio Manager, Building Owners and Managers Association's Experience Exchange Report, and the annual ULI *Greenprint Performance Report,* while others like the Global Real Estate Sustainability Benchmark (GRESB) provide a portfolio-wide comparison. With these external benchmarks, property owners can compare how their properties perform against competitors and identify whether they are above or below average by property type, region, or other factors.

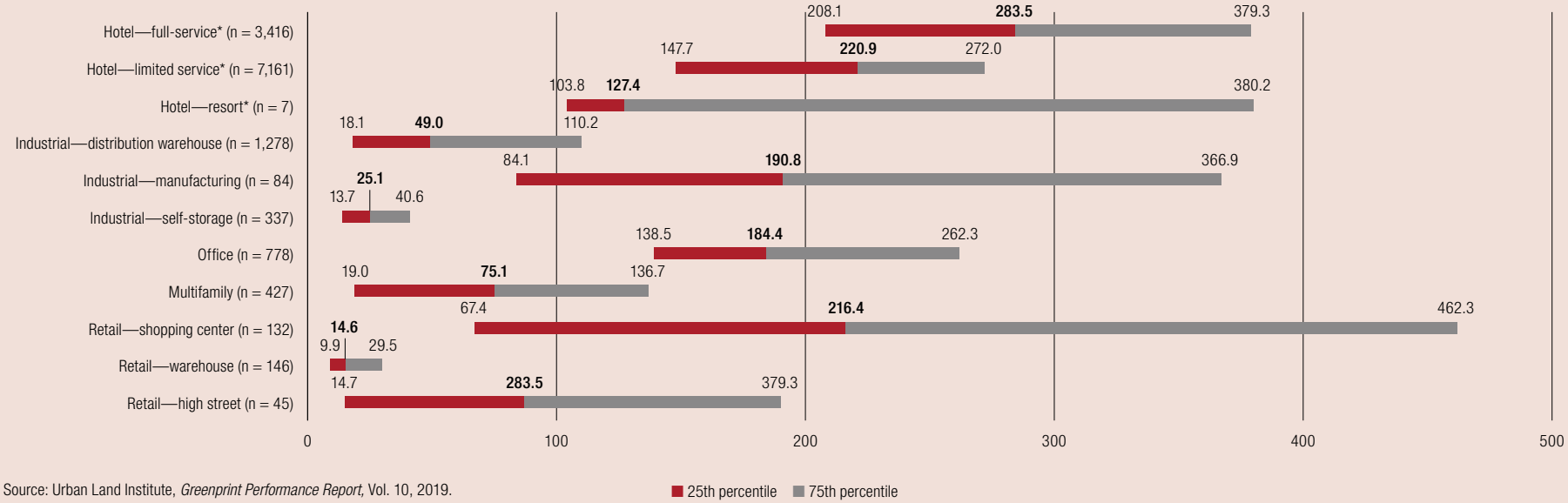
Learning from Your Internal Benchmark

While external benchmarks help building owners understand what is possible based on building type, geography, and other factors, an internal benchmark of buildings across an organization's portfolio can also inform sustainability goals and strategy.

THE VALUE OF IMPROVING ENERGY PERFORMANCE

An office building in the top 25 percent for energy performance will save owners and tenants $0.50 per square foot per year compared with an "average" building; a building in the bottom 25 percent for energy performance will cost owners and tenants an extra $0.30 per square foot or more per year.

2018 ANNUAL ENERGY USE INTENSITY, BY BUILDING TYPE (kWh/sq m)

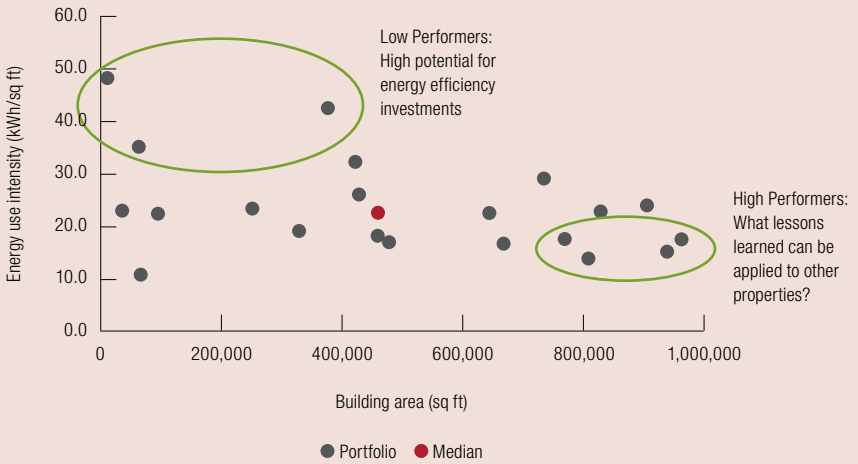


Source: Urban Land Institute, *Greenprint Performance Report,* Vol. 10, 2019.

*Hotel data are from 2017. For ULI Greenprint benchmarking from past years, see the ULI *Greenprint Performance Report,* uli.org/greenprintperformance.

Energy, water, and waste intensity benchmarks can identify buildings in a portfolio that offer the greatest potential for impact. Using energy, water, and waste cost benchmarks can identify buildings with the greatest ROI from efficiency investments and can help identify high and low performers (figure 1). And looking at the performance spread between the best and worst performers can help calculate the overall value of closing the "performance gap" and can determine possible levels of efficiency by learning from portfolio leaders.

FIGURE 1 **LESSONS FROM INTERNAL BENCHMARKS**



SET GOALS

Many leaders in the real estate industry have taken the initiative to set (and in many cases, publicly announce) sustainability goals to showcase their commitment to sustainability to their tenants, investors, and the cities in which they operate. By setting goals, owners can strategically invest capital and ensure that staff members across the organization are working toward a common goal. Then, measuring performance against a goal also allows the sustainability lead to adjust the plan and resource allocations as necessary over time.

It may take a few years of data collection beyond the baseline to be comfortable with the data quality from which to set achievable goals. And to get started, it is helpful to set a goal using language that allows the company to customize by region, property type, or investment strategy. For example, hotels may find it easier to achieve certain goals than other property types because they control all utility meters, whereas multifamily owners do not have this same opportunity; a company with a long hold period may find it easier to achieve certain goals than one with a value-add short-hold strategy.

Choosing Goals

A sustainability lead can choose from multiple types of goals when looking to improve the environmental performance of a portfolio, and can select goals on the basis of the available data and what is feasible for the organization. These targets can either be consistent across all locations or adjusted to local conditions. There are three types of targets:

- **Absolute targets** are not normalized by business activity or total portfolio size and instead seek to reduce emissions by a set percentage using a baseline year and a targeted completion year.
- **Relative targets** are quantifiable but can be normalized and do not always require a baseline. Relative target examples include increasing renewable energy by a set percentage, reducing emissions per building unit, or reducing emissions by a set amount based on an organization's total contribution to gross domestic product.
- **Programmatic targets** are committed to a specific activity, like conducting an energy and water audit at 100 percent of properties. These targets can help companies prepare for future quantitative targets.

In addition, some companies choose to set sustainability goals based on their own internal calculations and objectives, whereas others align their goals with existing industry coalition/initiative goals. Committing to external programs can help outline the parameters of a goal and ensure that a company stays competitive with peers.

EXAMPLE INDUSTRY COALITION/INITIATIVE GOALS

- The **2030 Challenge** commitment from Architecture 2030 requires all new buildings, developments, and major renovations to be carbon neutral by 2030.
- The **Better Buildings Challenge** from the U.S. Department of Energy commits participants to improving the energy efficiency of a portfolio of buildings by at least 20 percent over 10 years and to share their strategies and results.
- The **Better Buildings Partnership Climate Change Commitment** from the United Kingdom's Better Buildings Partnership commits participants to achieving net-zero portfolios by 2050; publishing a net-zero carbon pathway, including operational and embodied carbon, by 2020; and annually disclosing progress.
- The **Net-Zero Asset Owner Alliance,** launched by the United Nations Environment Programme's Finance Initiative, is committed to transitioning investment portfolios to net-zero GHG emissions by 2050.
- **RE100,** led by the Climate Group in partnership with the Carbon Disclosure Project (CDP), is committed to 100 percent renewable power.
- **Science-based targets** commit companies to setting GHG emission reduction targets and a reduction pathway in line with climate science.
- **ULI Greenprint** has a portfolio-wide goal of 50 percent emission reduction by 2030 with a 2009 baseline.
- The **United Nations Global Compact** commitment is to set science-based targets aligned with limiting global temperature rise to 1.5 degrees Celsius.
- The **United Nations Sustainable Development Goals** are an interconnected set of goals that address global challenges, including those related to poverty, inequality, climate change, environmental degradation, peace, and justice.
- **We Are Still In** is an American coalition of local government, education, business, and religious leaders and investors who are committed to helping the United States meet its commitments under the Paris Climate Accord.

After setting the goal, the next steps are to find a pathway to achieve those goals, implement programs based on what is controlled, and communicate the results. When an early goal is achieved, organizations have the momentum to work toward more ambitious ones, like net-zero energy.

Basing Goals on Carbon vs. Energy

Although calculating carbon emissions is more complicated than calculating energy use, the metrics for tracking and measuring vary according to the goal. If a sustainability lead sets a carbon emission reduction goal, progress should be tracked in total GHG emissions; if it is an energy efficiency or energy reduction goal, progress should be tracked by energy in kilowatt-hours.

"The establishment of public energy, emissions, water, and waste goals was a key milestone in our sustainability journey. In 2015, we began building consensus around announcing goals by establishing a base year (2008), measuring historical performance improvement, and generating reasonable projections. After hitting our first round of energy, emissions and water goals early, in 2017 we reset our targets based on a detailed asset-by-asset assessment of performance improvement potential. Earlier this year, we aligned with the Science Based Targets initiative (SBTi) and committed publicly to an approved science-based emissions reduction target that is in line with a 1.5°C trajectory, currently the most ambitious designation available. The cooperative process of setting, tracking, and achieving goals has required the attention and expertise of many individuals across the company. As a result, our goals have concentrated and focused our efforts in planning and implementing resource conservation measures."

BEN MYERS, VICE PRESIDENT OF SUSTAINABILITY, BOSTON PROPERTIES

CALCULATING CARBON EMISSIONS

GHG emissions are calculated by taking the total amount of energy (kWh, therms, etc.) used and multiplying it by an emissions factor. For electricity, the emissions factor takes into account the local power generation mix. Cleaner energy grids, with more renewables, will generate fewer emissions than an energy grid with more coal-fired plants. Multiple scopes help clarify where energy is used:

- **Scope 1.** Direct emissions from sources owned or controlled by the organization that physically occur within the owned portfolio/asset, such as an on-site natural gas boiler.
- **Scope 2.** Indirect emissions from purchased electricity, heat, steam, or cooling. These energy sources are consumed by the building but are generated off site.
- **Scope 3**. Additional indirect emissions from activities not under the direct management of the portfolio/building but occur because of business operations, including business travel, purchased materials, employee travel, and operations waste.

Using Intensity vs. Absolute Reductions

Some organization's carbon goals focus on absolute carbon reductions; however, calculating emission intensity impacts is more material to how well your program is performing. Many real estate portfolios change each year according to the number of buildings and total square footage, which can make absolute emissions over time a less accurate depiction of the total environmental impact. Intensity metrics will normalize for changes in building count and square footage. If the energy, water, and waste intensity improves every year, the portfolio becomes more efficient and reduces its impact proportional to growth.

STAY ON TOP OF TRENDS

To be a leader in sustainable real estate, it is important to stay on top of new policies and incentives driving the market forward, to follow trends driving innovation, and to learn best practices from peers.

Learn from Leaders

In addition to industry organization presentations and case studies from market leaders, individual company sustainability reports provide insight into a peer organization's structure and example projects. Learning from peers can also help a company determine the unique niche of its business and what it can own to make more of a splash. If a leading peer was able to accomplish a new type of project this year, perhaps it is something to consider for the future. And as a bonus, if a competitor has done an innovative project or set a new goal, that helps motivate leadership to move faster and follow suit.

ORGANIZATIONS THAT CONVENE INDUSTRY LEADERS TO DISCUSS BEST PRACTICES IN SUSTAINABLE REAL ESTATE

Property/facility managers	Standard setters and engineers	Cross-disciplinary real estate leaders	Green building experts	Owners and investors
International Facility Management Association (IFMA)	American Institute of Architects (AIA)	Building Owners and Managers Association (BOMA)	2030 Districts Network	National Association of Real Estate Investment Managers (NAREIM)
Institute of Real Estate Management (IREM)	American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE)	CoreNet	New Buildings Institute (NBI)	National Association of Real Estate Investment Trusts (NAREIT)
	Association of Chartered Certified Accountants (ACCA)	International Council of Shopping Centers (ICSC)	Sydney Better Buildings Partnership (BBP)	NAIOP
	International Code Council (ICC)	National Apartment Association (NAA)	U.K. Better Buildings Partnership (BBP)	Pension Real Estate Association (PREA)
		National Multifamily Housing Council (NMHC)	U.S. Green Building Council (USGBC)	
		Retail Industry Leaders Association (RILA)	U.S. Department of Energy Better Buildings Alliance	
		Urban Land Institute (ULI)	Global Alliance for Buildings and Construction (GABC)	
			OID (Green Building Observatory)	

Tracking Policies and Regulations

Staying on top of current green building policies and where they might be headed is an important role for a sustainability lead. Commitments to sustainable buildings are taking place at multiple scales, from city to national levels. Because the buildings sector currently contributes nearly 40 percent of carbon emissions globally and upward of 70 percent in many urban areas, leading cities are passing aggressive climate action plans with policies specifically addressing both new and existing buildings. Yet many in the real estate industry are just now beginning to think seriously about how to achieve those new targets.

A wide range of policies have been implemented to achieve local and national targets for emission reductions, including energy codes, mandatory energy benchmarking, required emission targets, and financing for new technologies. These policies aim to improve building efficiency, reduce air pollution, and reduce climate risk. It is important to be aware of sustainability regulations that apply to a building portfolio, both current and potential. For example, if a new innovative policy is passed in Europe that affects real estate, it could very well make its way to the United States. Developing and operating buildings to the most stringent market standards can help the entire portfolio proactively get ahead of the curve.

Any government policy can affect a real estate portfolio's success and bottom line; however, a well-designed and implemented climate policy can enhance the business case and accelerate sustainability programs. The real estate community has a role to play in engaging the city throughout the process, from policy proposal to implementation and compliance. Ultimately, real estate benefits from staying aware of and engaged in the development of new local climate policies by not being surprised by future penalties for noncompliance.

IMT BENCHMARKING POLICY MAP

U.S. CITY AND COUNTY POLICIES FOR EXISTING BUILDINGS: BENCHMARKING, TRANSPARENCY, AND BEYOND

Source: Institute for Market Transformation (IMT), 2020.

Locating Local Incentives

Cities often use incentives to drive market uptake of sustainable development. Sustainability leads should search out opportunities to identify local incentives that can help finance new technologies and make certain investments pencil out. For example, in Columbus, Ohio, a Commercial Property Assessed Clean Energy (C-PACE) program allows local owners to obtain upfront funds for energy/climate resilience improvement projects that are paid back through a long-term tax assessment of 20 to 30 years. In Chicago, Illinois, the Green Permit Program provides an expedited permit process for environmentally conscious design elements, including green roofs.

Available city incentives are always changing. Knowing when a financially appealing incentive opportunity exists from the federal government, state, county, city, or utility can have a big impact on the timing of a project and economics of an investment. To stay on top of these offerings, sustainability leads should regularly check with cities and utilities where the company owns properties to learn about incentive programs. Energy consultants and other vendors within an area can also be resources here.

INTEGRATE SUSTAINABILITY ACROSS THE ORGANIZATION

Following the development of a sustainability strategy and understanding the other business lines' priorities and processes, as well as measuring a baseline and setting goals, the next step is to integrate sustainable practices across the business. Setting company-wide policies that align with the firm's overall sustainability goal helps an organization ensure that sustainability practices are implemented rigorously and consistently in real estate operations.

- **New development/major renovations.** Set building design standards and performance targets for all new construction and major renovations, and set expectations for all building stakeholders, including architects, construction contracts, and requests for proposals (RFPs).
- **Sustainable building operations.** Set policies that inform property management to drive energy, water, and waste efficiency, to ensure both sustainable operations and sustainable equipment. Ensure that property managers receive sustainability guidelines and develop a tenant engagement plan that includes both sustainability in tenant fit-outs and ongoing communications. Create capital investment policies that support investing in projects that add both financial and environmental value to a property.
- **Investment and due diligence.** Standardize sustainability considerations across the investment life cycle, including acquisition due diligence, underwriting and the development of a capital plan for acquisition, and identification of sustainability opportunities through property disposition.
- **Reporting and communications.** Based on the level of reporting required, identify the key metrics that will be reported out, and collaborate with the relevant divisions to communicate those data.

"At CenterPoint, we're experts in acquiring, developing, and operating industrial facilities. But while we work hard to make strides in the marketplace, we also govern our company in a way that benefits our communities and our world. We believe properly managed real estate can help protect the environment, revitalize local economies, and improve the lives of workers. That's why sustainability, community involvement, and equitable business practices are ingrained in our operations."

ELENA DANIEL, VICE PRESIDENT OF ESG AND CORPORATE AFFAIRS, CENTERPOINT PROPERTIES

RESOURCES

Get the Lay of the Land

- *Speaking the CFO's Language: The Case for Energy Efficiency,* U.S. Department of Energy Better Buildings: https://betterbuildingssolutioncenter.energy.gov/videos/speaking-cfos-language-case-energy-efficiency

Collect Performance Data, Baseline, Then Benchmark

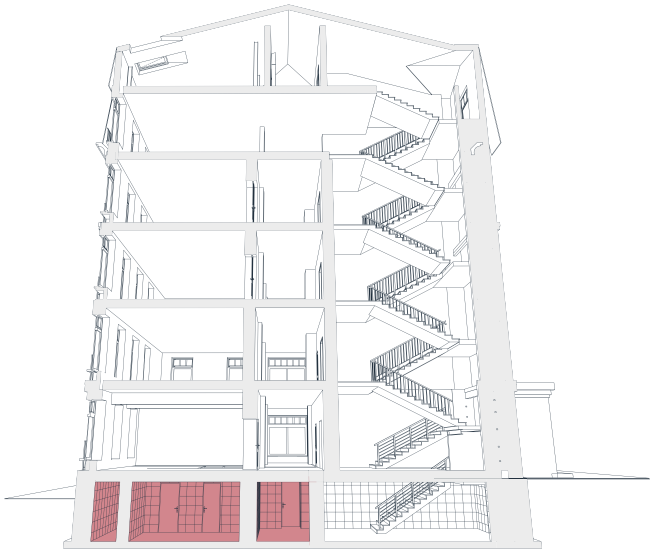
- Annual *Greenprint Performance Report,* Urban Land Institute: uli.org/greenprintperformance
- *Benchmarking Starter Kit for Portfolio Manager,* U.S. Environmental Protection Agency (EPA): www.energystar.gov/buildings/facility-owners-and-managers/existing-buildings/use-portfolio-manager/get-started-benchmarking
- *Energy Performance Indicator Tool,* U.S. Department of Energy: www.energy.gov/eere/amo/articles/energy-performance-indicator-tool
- *NABERS Fact Sheets,* NABERS: www.nabers.gov.au/publications/nabers-fact-sheets
- *A Primer on Organizational Use of Energy Management and Information Systems (EMIS),* U.S. Department of Energy Better Buildings: https://betterbuildingssolutioncenter.energy.gov/sites/default/files/attachments/A_Primer_on_Organizational_Use_of_EMIS_V1.1.pdf
- *Real Estate Environmental Benchmark,* U.K. Better Buildings Partnership: www.betterbuildingspartnership.co.uk/node/129
- *Sustainability Metrics: Translation and Impact on Property Investment and Management,* United Nations Environment Programme Finance Initiative: www.unepfi.org/fileadmin/documents/UNEPFI_SustainabilityMetrics_Web.pdf

Set Goals

- *Science Based Targets: The Next Level of Carbon Reduction and Sustainability Goals in Real Estate,* Urban Land Institute: https://americas.uli.org/wp-content/uploads/2019/09/Science-Based-Targets-layout-final-1.pdf
- *Strategies for Setting Effective Energy Performance Goals,* Energy Star: www.energystar.gov/sites/default/files/asset/document/Strategies%20for%20Effective%20Performance%20Goals_May2020.pdf

Stay on Top of Trends

- *BuildingRating,* Institute for Market Transformation: www.buildingrating.org
- Decarbonizing the Built Environment: 10 Principles for Climate Mitigation Policies, Urban Land Institute: https://knowledge.uli.org/reports/research-reports/2020/decarbonizing-the-built-environment
- *Energy Performance Certificates in Europe—Assessing Their Status and Potential,* Buildings Performance Institute Europe: http://bpie.eu/publication/energy-performance-certificates-in-europe-assessing-their-status-and-potential/
- *GlobalABC Roadmap for Buildings and Construction:* 2020–2050, Global Alliance for Buildings and Construction: https://globalabc.org/sites/default/files/inline-files/GlobalABC_Roadmap_for_Buildings_and_Construction_2020-2050_3.pdf
- *Mandatory Building Performance Standards: A Key Policy for Achieving Climate Goals,* American Council for an Energy-Efficient Economy: www.aceee.org/sites/default/files/pdfs/buildings_standards_6.22.2020_0.pdf
- *MURE,* ADEME, Agency for Ecological Transition: www.measures.odyssee-mure.eu/
- *State and Local Policy Database,* American Council for an Energy-Efficient Economy: https://database.aceee.org/
- *Stranding Risk and Carbon: Science-Based Decarbonizing of the EU Real Estate Sector,* Carbon Risk Real Estate Monitor: www.crrem.eu/wp-content/uploads/2019/09/CRREM-Stranding-Risk-Carbon-Science-based-decarbonising-of-the-EU-commercial-real-estate-sector.pdf



BEST PRACTICES IN NEW CONSTRUCTION

New construction provides a blank slate on which to integrate the most efficient, sustainable, and innovative technologies and solutions available. When setting up a sustainability program, new development can be a difficult place to start: because the window to make an impact is in the earliest stages of a project, the results remain mostly unseen until the end of the project, which can be several years later. Nevertheless, incorporating efficiency into a new development is often more cost-effective than retrofitting existing buildings, although both are necessary for real estate to meet climate goals. If adequately planned for, new construction properties can be the most sustainable assets in a portfolio.

Ideally, the sustainability lead will be involved in the development process from the initial stage of a project by creating sustainability specifications that require the development team to contact the sustainability lead or by ensuring that the investment committee for the project knows to engage them. Unfortunately, that is not always the case. And as such, they need to understand the current stage of the project when first brought on, to determine which sustainability features can still be implemented.

The overall goals and drivers of a project—both sustainability specific and more general—are necessary to understand before getting started. Knowing these details is important to determine the level of sustainability adopted in the development, to educate internal stakeholders, and to gain internal buy-in. And if the sustainability lead is not involved at the start, and these considerations have not been discussed, it can often be too late to incorporate green features into the development.

KEY CONSIDERATIONS FOR DETERMINING A PROJECT'S SUSTAINABILITY GOALS

- Type of investment, including the assigned fund's goals
- Anticipated hold period for the property
- Market expectations on sustainability and green certifications
- City incentives for developing beyond green code requirements
- Specific tenant being targeted and its sustainability expectations
- Reporting responsibility to investors or external benchmarks

INTERNAL DESIGN STANDARDS

BROOKFIELD PROPERTIES' development group, a real estate operating company within Brookfield Asset Management, integrates ESG principles throughout all new mixed-use developments. To guide the design process, Brookfield created a set of design standards that assist all project teams in identifying best practices in sustainability, health and well-being, technology, design, and procurement. Although these standards represent a baseline for quality that all Brookfield assets are expected to attain, there is also room for innovation within individual projects and evolution as technologies and market expectations change. These standards leverage lessons learned and cover a wide range of categories:

Certification standards	Sets target of LEED Gold certification for office (BD+C or CS) and Silver (NC or Homes) for multifamily; requires consideration of WELL or Fitwel certification
Energy	Establishes EUI goal, targeted reduction for emissions below a baseline, and evaluates battery and solar opportunities
Water	Sets indoor and outdoor potable water consumption reduction targets below baseline
Smart buildings	Uses metering strategy to enable data collection for performance monitoring and regular retrocommissioning
Materials	Sets a 75% construction and demolition waste diversion target and requires procurement of set number of materials with EPDs or LCAs

OUTCOMES

- Leads to fewer costly changes in the latter phases of design, ensuring the delivery of healthier, higher-quality, and more efficient properties.
- By integrating this framework from early in conceptual design through the asset turnover to operations, ensures that the project development team engages the proper functional expertise at each design phase and project milestone while maintaining a minimum standard of quality.
- Creates consistency across our projects, which facilitates KPI tracking and ESG reporting, and bolsters our reputation as a best-in-class developer.

Rendering from Brookfield's 5M development in San Francisco. *(Brookfield Properties)*

"Our design standards set an expectation of quality for everything we put into our buildings. Not only do they ensure high-performing assets, they save our design teams time, so we can focus our efforts on providing unique, best-in-class mixed-use developments that meet the needs of our stakeholders."

JILL ZIEGLER, DIRECTOR, SUSTAINABILITY, BROOKFIELD PROPERTIES

START EARLY WITH INITIAL BUILDING DESIGN

Key sustainability considerations should be part of the first design team meeting for the development, and the sustainability lead should always have a seat at the table. As part of those conversations, it is important to discuss the organization's broader goals for new development; for example, if all buildings must meet a certain green building standard. It is also necessary to know how this specific project fits into (and helps achieve) the organization's broader sustainability goals, such as a net-zero goal. In addition, it is important to consider the incremental costs and benefits of sustainability features in the development and to make the business case for them based on the financial thresholds of the overall project. Incorporating these pieces upfront will ensure that the new project will meet current and evolving sustainability goals in the most cost-effective way possible.

With all the technology options available in the marketplace, energy modeling can help a project determine the correct balance of equipment and technology to optimize both cost and resource efficiency within a building. While basic energy modeling can be completed by a sustainability lead, many developers hire external consultants to conduct advanced and specialized modeling.

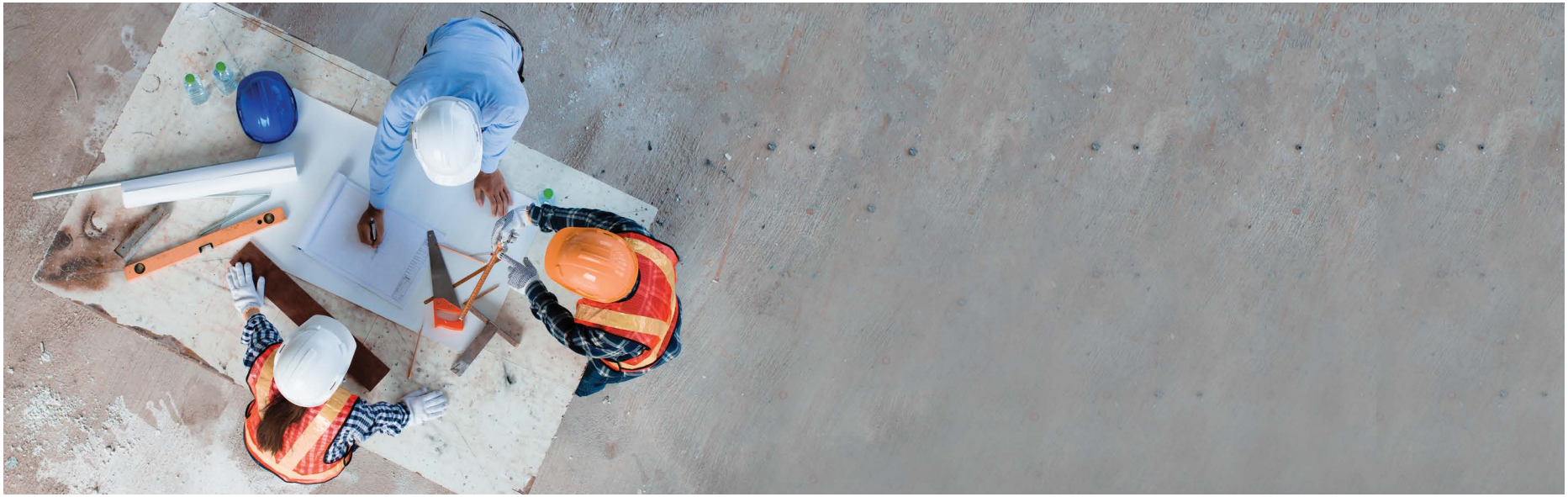
After the project is complete, the building should undergo commissioning so that building technology and equipment installed during the project are running properly and that sustainable measures are set up for success.

TRIPLE-BOTTOM-LINE ANALYSIS

The "triple bottom line" approach is one way to account for the broader benefits of a project, from its impact on (a) people, (b) the planet, and (c) profit. Integrating this concept into a development project compares the benefits and costs of design choices on the community, environment, and building occupants. To fully assess the triple-bottom-line value of a design choice, many models and software tools are available for building owners.

Lean on Green Building Certifications

The use of a third-party green building standard can drive and streamline design decisions by outlining a list of sustainability requirements from which to choose in order to reach a targeted number of points toward certification. This is one way to ensure that sustainability features are not value-engineered out of a design, as they are required to achieve the certification. It also sets the stage for a building to operate successfully.



INCORPORATING SUSTAINABILITY INTO BUILDING DESIGN

CRESCENT COMMUNITIES—a real estate investor, developer, and operator of mixed-use communities in the United States—designs all commercial properties with a focus on individual tenants and their health and happiness. To ensure that sustainability and wellness standards are incorporated into all new building designs and to optimize the building design process by providing architects and engineers with clear guidelines, Crescent Communities seeks green building certifications for its properties.

Crescent Communities' core design values are reflected in Ally Charlotte Center, a mixed-use office building in Charlotte, North Carolina, that is pursuing Leadership in Energy and Environmental Design (LEED) Silver and WELL certifications. To achieve these goals, an integrative design process is used to support high-performance, cost-effective project outcomes through an early analysis of the interrelationships among systems. At the beginning of the project, the full team—including owner, architect, and engineers—reviews the applicable LEED checklist to assess opportunities and goals, and to establish targets. From predesign through design, the team aims to achieve synergies across disciplines and building systems, using a number of different analyses, including energy models, to inform the owner's project requirements, basis of design, design documents, and construction documents. Using this strategy, the project team incorporated specific sustainable design elements:

- Remediated and redeveloped urban infill brownfield site, located within a half-mile walking distance of at least 10 diverse building use types.
- Reduced indoor water consumption by 40 percent.
- Optimized energy performance with a 15 percent projected total energy savings without using chlorofluorocarbon-based refrigerants. Enhanced commissioning will be pursued to verify that the systems perform as designed.
- Enhanced indoor air quality strategies, including enhanced filtration, ventilation, and entryway systems; the use of low-emitting materials; and a construction indoor air quality management plan.

OUTCOMES

- On track to achieve both LEED and WELL certification standards
- Achieved Gold WiredScore certification

Ally Charlotte Center in Charlotte, North Carolina. *(Crescent Communities)*

"The average American spends 90 percent of each day indoors; therefore, the environment of the buildings in which we work is essential. For example, improved air quality—through measures such as reducing airborne pollution and increasing fresh air ventilation—increases employee productivity and reduces sick leave. Recognizing that 90 percent of corporate expenses are tied to salary and benefits, the return on investment of building features resulting in healthier and happier employees also extends to the bottom line. Therefore, incorporating wellness and sustainability features early in the design process differentiates our properties and makes them more valuable to tenants."

AMY BEZANSON, DIRECTOR OF DESIGN, CRESCENT COMMUNITIES

DESIGNING TO GREEN BUILDING CERTIFICATION STANDARDS

GERDING EDLEN—a real estate investment, development, and asset and property management firm—pursues green certifications for each asset in its portfolio, aiming to achieve LEED Gold certification or higher for all new developments.

Completed in fall 2020, 5 MLK is a 17-story mixed-use building with 220 apartment units, 120,000 square feet of office space, and 15,000 square feet of retail space in Portland, Oregon. Certified LEED Gold, 5 MLK incorporates an efficient building facade with high-performance windows; water-cooled, variable refrigerant flow units (commercial space); water source heat pumps (apartments); ducted ventilation to each apartment; and ventilation heat recovery systems. The building is also the first mixed-use property to receive Fitwel certification with both the office and residential sections earning a 1-Star rating for building features and policies that support healthy indoor environments, access to healthy foods, access to the outdoors, and biophilic design. The building also received Salmon-Safe certification, which seeks to preserve watersheds through responsible site development.

OUTCOMES

- The project was designed to use approximately 28 percent less energy than a typical building.
- 61 percent of Fitwel strategies increase physical activity, and 68 percent promote occupant safety.
- 100 percent of stormwater is mitigated through green infrastructure.

5 MLK in Portland, Oregon. *(Gerding Edlen)*

"Designing 5 MLK to achieve LEED Gold, Fitwel, and Salmon-Safe certifications required early prioritization of sustainability, wellness, and stormwater strategies. Each certification aligns with our commitment to environmental responsibility and helps tenants see the connections between the space they occupy, their environmental impacts, and their personal well-being."

RENEE LOVELAND, DIRECTOR OF SUSTAINABILITY, GERDING EDLEN

These certifications are becoming common in many global real estate markets, in large part due to local code/regulations, tenant demand, and investor demand. Many U.S. cities require or incentivize green building certification for new developments. Occupants of all building types also see value in green buildings, because they align with tenant sustainability goals or recognize the possible cost savings and potential for additional productivity in an energy-efficient building. Seeing these benefits, tenants are often willing to pay more or to stay longer in a green-certified space, making it a valuable investment for building owners. Investors are also looking for ways to track a fund manager's commitment to sustainability, and the total green-certified square footage within a portfolio is a commonly requested metric.

Each green building standard has a different set of requirements to achieve certification, though all require the implementation of best practices in energy, water, waste, indoor air quality, tenant comfort, material selection, or some combination thereof. In addition, certification can be specific to building type, building (or tenant space) design, or building operations. Certifications for design directly drive a project's initial design and construction, but if the organization's goal is to also achieve an operational certification, the project leads need to plan ahead and consider design strategies that support efficient operations as well. For example, operational certifications generally require reporting a full 12 months of environmental performance data. Initial investments in technology and equipment should make operational data collection a simple process.

Although green building certifications serve as key guidelines, it is important that sustainability investments should design for overall high performance, and not be limited to a desired number of points.

COMMON GREEN BUILDING CERTIFICATION STANDARDS

Title	Certifying body	Description	Score	Design or operational	U.S. or international
BOMA 360	Building Owners and Managers Association (BOMA)	Buildings must follow industry best practices in 6 major areas of building operation	Certified	Operational	International
BOMA BEST	BOMA Canada	Assesses environmental performance across 10 key areas, from energy to purchasing to comfort	5 levels, certified Platinum	Operational	Canada
Building Research Establishment Environmental Assessment Method (BREEAM)	Building Research Establishment	Third-party certification of the sustainability performance of individual buildings, communities, and infrastructure projects	6 levels, Acceptable to Outstanding	Both	International
Comprehensive Assessment System for Built Environment Efficiency (CASBEE)	Institute for Building Environment and Energy Conservation	Assesses the life cycle of the building, including indoor environmental quality and energy load	Superior (S), Very Good (A), Good (B+), Slightly Poor (B-), and Poor (C)	Both	Japan
DGNB	German Sustainable Building Council	Assesses three factors: life-cycle assessment, holistic approach, and building performance	Silver, Gold, and Platinum	Both	Germany/Europe
Energy Star	U.S. Environmental Protection Agency	Buildings that earn an Energy Star score of 75 or higher and verify performance annually	Certified	Operational	United States
Green Globes	Green Building Initiative	Online green building rating and certification tool	1–5 Green Globes	Both	United States and Canada
BCA Green Mark	Singapore Building and Construction Authority	Evaluates a building for environmental impact and performance, from energy and water efficiency to building health and wellness features	Certified Gold, Gold Plus, Platinum	Both	Singapore

(continued on next page)

COMMON GREEN BUILDING CERTIFICATION STANDARDS (continued)

Title	Certifying body	Description	Score	Design or operational	U.S. or international
HQE	Cerway	Building-scale life-cycle analysis of the impacts of a project on health, personal comfort, and the indoor environment	0–4 stars	Both	France/Europe
IREM Certified Sustainable	Institute of Real Estate Management	Recognition program for existing office properties, multifamily communities, and shopping centers	Certified	Operational	United States
Leadership in Energy and Environmental Design (LEED)	U.S. Green Building Council	Rating system for all building types and building phases	4 levels, certified Platinum	Both	International
Living Building Challenge	International Living Future Institute	Holistic assessment against high-performance energy and ecological goals	Petal certifications	Both	International
NABERS	Government of Australia	Compares annual building performance to similar buildings in the same location with ratings for energy, water, indoor environment, and waste	1–6 stars	Operational	Australia
National Green Building Standard (NGBS)	Home Innovation Research Labs	Home or multifamily rating that measures energy efficiency, water efficiency, lot development, and indoor environmental quality	Bronze, Silver, Gold, Emerald	Design	United States
Passive House	Passive House Institute	Building energy efficiency standard that lowers energy needed to heat or cool a space	Classic, Plus, Premium	Design	International

Sustainability leads and other team members can also obtain individual accreditation through some of these green building certification standards. With this background knowledge, even if a specific project is not certified, best practices from the certification standard can still be integrated into project design.

Planning for Submeters

The developer/building owner often has operational control only over the base building, while the tenant spaces are constructed and operated to the tenant standards (unless the property is developed on spec without a tenant lined up). To separate the owner's energy consumption from the tenant's, it is helpful to meter the spaces separately so that both can take responsibility for their own use. Having base building metrics can also help with comparisons of similar buildings across a portfolio, as tenant type and use can have a significant impact on a whole-building energy use. After creating a separately metered and efficient base building, owners can then focus on guiding tenants toward the optimization of their own spaces.

Building for Future Needs

As technology becomes more cost-effective and market uptake increases, tenants may begin to use spaces differently, so buildings constructed to last for the next 50 or more years need to be able to accommodate those changes.

Some design teams are thinking ahead by designing "solar-ready" rooftops with HVAC systems laid out with optimized spacing for future photovoltaic (PV) panels in mind, and "EV-ready" parking structures with the piping already in the concrete for simpler future charging station installations, so that the building is ready when the owner decides to install those technologies.

Other developers are watching local policy requirements on buildings (like New York City's submeter Local Law 88), and are proactively incorporating those technologies into their new construction projects so that their buildings are ready to comply when the ordinance eventually comes to their market. Planning for future local climate policies—including building energy performance standards, all-electric building requirements, and renewable energy requirements—helps future-proof the asset and protect it from potential penalties.

Further, the need for traditional parking spaces may decrease over time with an increase in sustainable transportation options, including ride sharing, electric vehicles, biking, and other public transit–oriented design. To accommodate this potential shift, some real estate firms are lowering the number of available parking spaces or are creating parking structures with larger floor slabs that can later be converted to tenant spaces. Designing for flexibility—through dissembling walls, high ceilings, passive comfort like natural ventilation in case of emergency, and easily accessible technology—allows for future adaptability and continued usefulness of a building.

IMPLEMENT SUSTAINABLE CONSTRUCTION STRATEGIES

As construction begins, it is important to implement sustainable practices and ensure that sustainable features are not value-engineered out of the project. Setting construction standards for material selection and waste diversion at the start of a project lowers material purchasing and removal costs.

Sustainable Innovations in Construction

Innovative and sustainable construction strategies and materials are increasingly common in the real estate industry, as they can help lower costs while also reducing emissions and waste from construction.

Modular construction uses prefabricated and identical modules, built off site in a controlled environment, and then brought to the construction site to form the unified structure. This technique helps developers reduce construction time, minimize waste, and standardize quality across assets. This form of construction uses far less energy and reduces construction waste, and the modules are often recyclable.

Virtual and augmented reality technology can help developers create virtual mock-ups of projects, supporting easy design changes before construction and instantly testing new design options, including floor, wall, or facade materials. This easy testing capability minimizes the need for change orders, speeding up the construction process and saving construction costs. It also supports sustainability by helping evaluate material selections, including low-carbon building materials.

Low-Carbon Building Materials

New building materials that emit less embodied carbon—the emissions created during manufacture of building materials and their transport for construction—are also being used for both environmental and aesthetic purposes. Often, these materials have a small or no cost premium. When looking for low-embodied-carbon materials, it is important to keep in mind the "worst offender" materials. These materials tend to have high levels of embodied carbon, such as concrete, steel, and insulation. Now more sustainable materials can be used (figure 2); however, it is important to compare the total environmental impact of different materials, as transporting a sustainable option from overseas may emit more carbon than a locally manufactured traditional material.

FIGURE 2 **BUILDING MATERIALS WITH REDUCED EMBODIED CARBON**

Traditional material	Good replacement
Concrete	Green concrete that increases the recycled content of the cement mix
Steel	Recycled steel and cross-laminated timber
Synthetic insulation	Low-carbon insulation (mineral wool batt and fiberglass batt) or bioinsulation (cork, straw bale, sheep's wool)

QUANTIFYING MATERIAL IMPACTS

1. Environmental product declarations (EPDs) are documents provided by the manufacturer as an assessment of the environmental impact of a specific product, including emission assessments of everything from mining and extraction to transport and factory processes.
   - Example tool: The Embodied Carbon in Construction Calculator (EC3) helps developers compare the carbon impact of materials based on EPDs.
2. Life-cycle assessments (LCAs) track and benchmark the environmental impact of a whole building over the course of its useful life using information provided by the building design and databases of EPDs to consolidate and quantify total impact.
   - Example tools: One Click LCA, Athena Impact Estimator for Buildings, and Tally all help conduct a comprehensive building LCA.

To quantify the impacts of specific materials, many embodied carbon calculators can help developers make informed decisions. Similar to energy modeling, these calculators identify embodied carbon hot spots and areas where low-carbon material selections would make a significant improvement.

Construction Waste and Diversion

The buildings and construction industry is the largest global consumer of raw materials, and demand for those materials is only increasing. The EPA estimates that in 2015, 584 million tons of waste was generated during building construction and demolition, more than twice the amount of generated municipal solid waste. Without strong internal policies in place, much of that waste can end up in landfills.

During the planning phase, the design team should work to specify materials that are recyclable and can be replaced without creating waste. Main contractors should also remove waste from the site and return it to the original manufacturers or a site that manufactures it into new material. For waste management after construction is complete, all developments should have adequate space for waste compaction and storage. Developments that include food amenities, like shopping centers or hotels, should consider anaerobic digestion technology to reduce the amount of food waste sent to landfills.

To track their progress, developers are starting to set construction waste diversion targets and measure success through the percentage of construction waste recycled, percentage of construction waste diverted, and total volume of construction waste (with a goal of generating less overall waste over time). This practice is often required to obtain a green building certification for the development.

REUSE AND REDEVELOP

Major redevelopment projects require similar strategies to new builds, including setting goals early and integrating sustainability throughout the entire project. However, reuse of a building frame can create unique challenges and opportunities for sustainability.

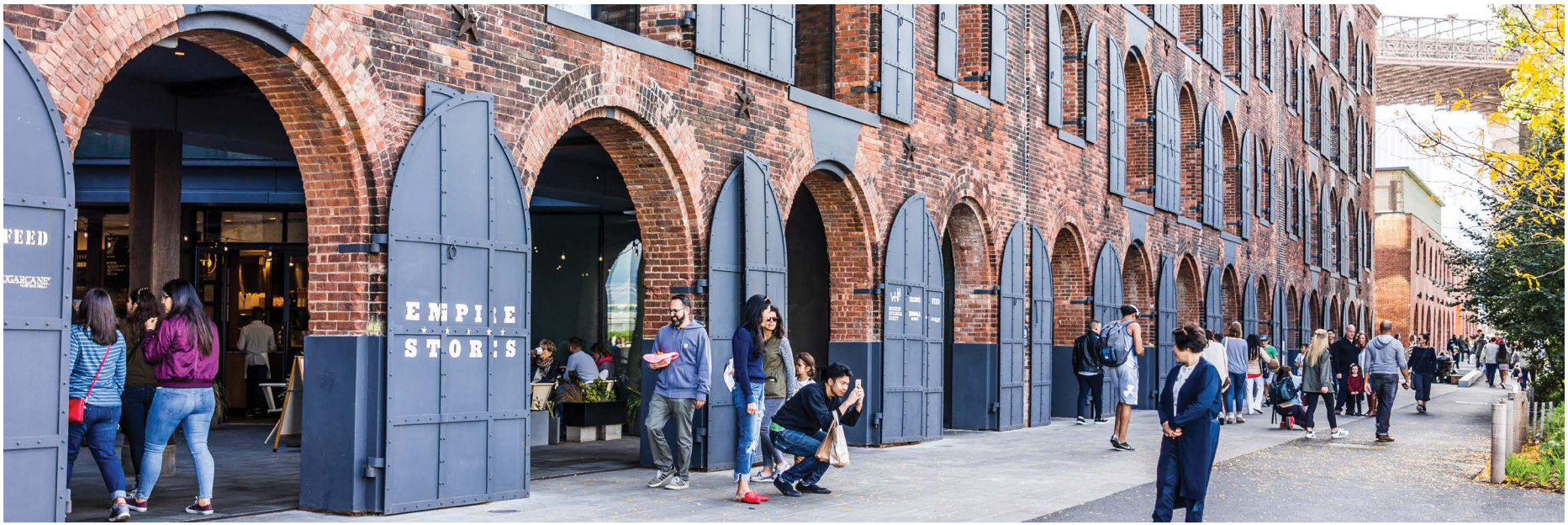
First, the design team needs to determine minimum sustainability standards for redevelopment projects and to identify unique opportunities for specialized projects, such as on-site material reuse. Reuse of the materials and overall building shell is one of the best ways to reduce a project's embodied carbon and ensure that materials are not going to waste.

Next, the design should use the building structure in the most efficient manner possible. Older buildings tend to have smaller windows and more masonry, which better regulate temperature. Installing operable windows, fixing roofs, and plugging wall cracks also help the building function as originally intended. Then, when adding new elements to the building, the most effective interventions can be prioritized, such as the incorporation of thicker windows or shading.

Not only is material and building frame reuse sustainable, it also promotes placemaking: the preservation of historic assets creates a sense of authenticity and ties a building to the community. This practice is greatly beneficial for marketing purposes, but a strong design element of authentic redevelopment may lead to design choices that value aesthetics over sustainability. While LED lighting is now standard in new developments, a designer may specify a more historic-looking bulb instead of a more efficient one. Efficiency and design need to be balanced to create an asset that is both market competitive and sustainable.

Many developers and cities now have green-certified properties as the new development standard; however, redevelopment projects are often more complicated since preserving and upgrading existing infrastructure can be costly and challenging compared with starting from scratch. While it should still be considered in the project road map, the decision to get a certification will depend on such factors as the team's schedule, project financials, and sustainability goals.

The Empire Stores urban marketplace in the Brooklyn, New York, waterfront neighborhood of Dumbo. *(Shutterstock)*



CONSTRUCTION WASTE DIVERSION

At **LENDLEASE,** an international property and infrastructure group, sustainability is integrated across all lines of business. The company's approach is guided by its Sustainability Framework and measured against sustainability performance targets. When Lendlease operates as a construction contractor, one key area of opportunity is to prevent, reduce, and ultimately aim to eliminate construction waste at job sites.

The Lendlease Turner (LLT) joint venture is leading the expansion of the Javits Center in New York City, expanding exhibit spaces and meeting rooms. To reduce construction and demolition waste sent to landfills, the project implements on-site source separation of drywall scrap material, partnering with the hauler and manufacturer to take back waste material and use it for new gypsum products. LLT then closes the loop by purchasing gypsum made from the material salvaged at the site for reinstallation on the project.

This initiative comes on the heels of a closed-loop wallboard recycling pilot at another New York City project site in 2015. Lendlease leveraged the existing relationships established within the local supply chain, including the waste hauler and scrap processing facility, and coordinated the feedstock delivery back to the manufacturer for creation of new product.

OUTCOMES

- Diverted over 60 tons of gypsum from the landfill to date, with more to come as construction progresses
- Avoided 8.09 metric tons of carbon dioxide equivalent otherwise attributed to hydrogen sulfide accumulation that occurs as the gypsum material decomposes at the landfill
- Contributes to the circular economy by installing product containing sorted scrap recycled content generated from the project site

On-site source separation of drywall scrap material. *(Lendlease)*

"The Javits Center expansion project showcases how Lendlease's sustainable construction practices are conserving materials and resources to promote sustainable economic growth. Other Lendlease projects throughout gateway cities in the United States continue to explore opportunities to implement best practices in closed-loop recycling and the circular economy."

ELENI REED, HEAD OF SUSTAINABILITY, AMERICAS, LENDLEASE

REDEVELOPING TO GREEN STANDARDS

JAMESTOWN is a design-focused real estate investment and management company that specializes in adaptive reuse, with a mission to transform spaces into innovation hubs and community centers. Jamestown's Ponce City Market is a result of the transformation of a former Sears, Roebuck & Co. building, originally constructed in 1926, into a mixed-use community hub with office space, retail space, restaurants, and 259 multifamily residential units. The project, which opened in 2015, highlights the impact that building reuse has on a project's ability to reduce material waste and increase authentic placemaking.

Sustainability was made a priority from the beginning of the Ponce City Market redevelopment. Through a focused sustainability design charrette, the cross-department development team was able to set strategic sustainability goals, including earning LEED Gold certification for the building's Core and Shell and for the residential units. Using LEED as a road map, the project team was able to employ a clearly defined process and documentation requirements to be shared with all stakeholders.

To support energy and water efficiency in the tenant spaces, the team used green leasing provisions and design standards in all lease agreements. By setting these requirements upfront and using the results of an energy model, which quantified the impacts of design decisions, the project was able to make energy and water assumptions during the pre-leasing phase.

Finally, the project team considered how sustainable operations could be prioritized once the project was open to the public, improving local infrastructure by activating the adjacent Atlanta BeltLine and helping fund bike lanes in addition to on-site activations and community engagement.

OUTCOMES

- Diverted 98 percent of construction waste from the landfill
- Reused 99.5 percent of the original maple hardwood flooring (over 400,000 square feet)
- Reused the building's original windows after completing an energy model that showed replacing them would result in a less than 1 percent improvement in energy efficiency
- Installed LED streetlights and energy recovery units to lower energy costs
- Installed water-efficient toilets, saving 6.5 million gallons of water annually
- Installed three rooftop honeybee hives that support an urban pollinator corridor and provide educational opportunities

Ponce City Market in Atlanta. *(Jamestown Properties)*

"Sustainability and resiliency are key components for all of Jamestown's work. At Ponce City Market we proved that best-in-class sustainability practices can be successfully implemented when rehabilitating historic and existing buildings."

MATT BRONFMAN, PRINCIPAL AND CEO, JAMESTOWN PROPERTIES

RESOURCES

Start Early with Initial Building Design

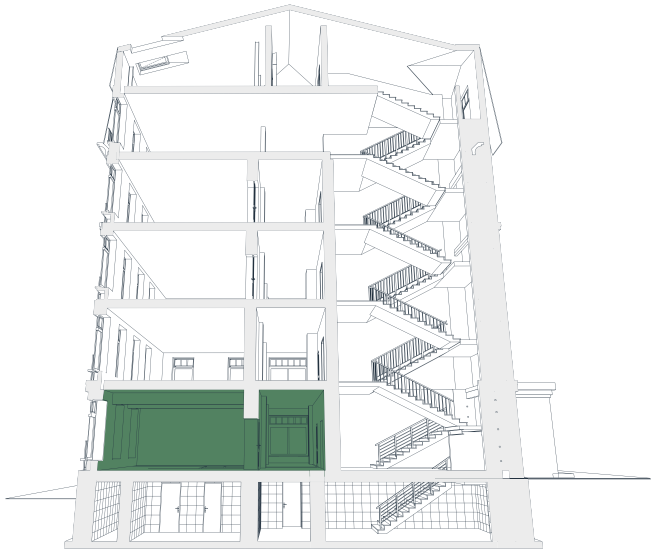
- *Advanced Energy Design Guides,* ASHRAE: www.ashrae.org/technical-resources/aedgs
- *Design Commercial Buildings,* Energy Star: www.energystar.gov/buildings/service-providers/design
- *Designing for Change,* American Institute of Architects: www.aia.org/showcases/6082660-designing-for-change--
- *Design for Performance,* U.K. Better Buildings Partnership: www.betterbuildingspartnership.co.uk/node/360

Implement Sustainable Construction Strategies

- *Best Practices for Reducing, Reusing, and Recycling Construction and Demolition Materials,* U.S. EPA: www.epa.gov/smm/best-practices-reducing-reusing-and-recycling-construction-and-demolition-materials
- *Carbon Smart Materials Palette, Architecture* 2030: https://materialspalette.org/
- Clean Construction Policy Explorer, C40: www.c40knowledgehub.org/s/article/Clean-Construction-Policy-Explorer?language=en_US

Reuse and Redevelop

- *Future-Proof Buildings for All Europeans—A Guide to Implement the Energy Performance of Buildings Directive,* Buildings Performance Institute Europe: http://bpie.eu/publication/a-guide-to-implementing-the-energy-performance-of-buildings-directive/
- *Renovate, Retrofit, Reuse: Uncovering the Hidden Value in America's Existing Building Stock,* American Institute of Architects: http://content.aia.org/sites/default/files/2019-07/RES19_227853_Retrofitting_Existing_Buildings_Report_Guide_V3.pdf
- *Partnership for Building Reuse,* National Trust for Historic Preservation, Preservation Leadership Forum: https://forum.savingplaces.org/act/research-policy-lab/pbr



QUICK WINS IN EXISTING BUILDINGS

Many common strategies can help sustainability leads achieve quick wins, or low-cost, high-value successes, in their existing building stock. These strategies for energy, water, and waste can be implemented on individual assets or portfolio-wide and are a strong foundation for an organization's sustainability program. Quick wins not only drive value and sustainability progress, but also garner buy-in from leadership and drive momentum in company culture. Achieving these small wins shows that sustainability can add value and will have long-term success. It also ensures that if a property team starts an independent sustainability project, team members recognize the sustainability lead as a helpful resource early in the process.

IDENTIFY AND QUALIFY OPPORTUNITIES

Individual properties can be assessed in multiple ways (see figure 3). The value of each depends on the current performance and goals of the sustainability team.

With the passage of new city sustainability policies, some large U.S. cities now require properties to conduct regular audits, tune-ups, or retrocommissioning. This requirement can become an opportunity to standardize portfolio-wide assessments for energy efficiency opportunities and ultimately lead to more energy and cost savings.

Different Opportunities for Different Property Types

Not all property types have the exact same opportunities or business case calculations. While all properties benefit from investments like LED lighting retrofits, the payback can vary because of typical lease structures used in different property types. Some building types also have higher energy or water intensities than others because of the building use, so the opportunities to optimize cost savings will vary. The following are nuances by building type:

- **Office.** Energy and water use is correlated to the number and type of tenants, but primarily consumed in the tenant spaces. However, some buildings have a central HVAC plant and controls, so the owner or manager may have substantial control over tenant HVAC use, while tenants control lighting and plug loads in their spaces. There are multiple lease structures,

TYPES OF ENERGY AUDITS

- ASHRAE Level 1. This walk-through audit identifies energy efficiency measures for improvement and focuses on low- and no-cost measures.
- ASHRAE Level 2. This audit includes a more detailed assessment of facility equipment, including data on expected energy and cost savings from recommended energy efficiency measures, and includes a recommended measurement and verification plan for each measure.
- ASHRAE Level 3. Also known as an investment-grade audit, Level 3 provides additional engineering calculations on recommended measures, especially for suggested capital projects. To reduce risk, more detailed data are used to create cost estimates and life-cycle cost assessments. This type of audit can also include information for future contractors to implement these recommendations.

FIGURE 3 **HOW TO IDENTIFY OPPORTUNITIES FOR EFFICIENCY**

	What is it?	Why is it important?	Additional notes
Systems and equipment inventory	Inventory of major building systems (heating, cooling, lighting, ventilation, roof), and rollout of portfolio upgrades based on age and efficiency of current equipment.	Identifies and schedules any out-of-date or out-of-warranty equipment for retrofit or upgrade without needing an audit or treasure hunt. Also helps achieve scale quickly.	Helpful to fast-track facilities upgrading large equipment like HVAC for an audit at the same time to reduce other energy loads and possibly get a smaller/more efficient unit.
Treasure hunts and building tune-ups	Searches by teams that walk around a facility looking for quick ways to save energy. (They should also walk around during the evening to identify equipment that should be turned off.)	Quickly conducts regular reviews without cost, based on changes in the weather (may change set points) and leases (startup and shutdown times will change by tenant).	*Energy Star Treasure Hunt Guide* is available from the U.S. EPA. Building retuning training is available from the U.S. Department of Energy.
Audits	Reviews of building's equipment and use. Multiple types of audits are available.	Identifies areas for improvement, as well as anticipated costs and savings.	Check the local utility's website to see whether it provides funding for energy audits.
Energy management/monitoring software	Software that tracks energy use at individual building in real time.	Quickly identifies anomalies and low-cost solutions.	Requires technology to be installed but an inexpensive way to create persistent savings.
Commissioning/retrocommissioning	Thorough verification and adjustment of building equipment.	Ensures that building equipment functions properly, reducing maintenance needs and energy waste.	Installing advanced controls and software can offer "continuous commissioning," identifying opportunities and providing quick alerts.

and tenants often pay for their energy costs, a portion of the building's total energy costs, or a prorated amount of operating costs based on a base year (as in gross modified leases). Common efficiency projects include common-area lighting retrofits, submetering, HVAC upgrades, demand response programs, and optimization of building operations (set points, start times, etc.).

- **Industrial warehouses and distribution centers.** Often, energy use intensity is low because of a large square footage and limited workforce, unless a warehouse is refrigerated, which spikes intensity. Such buildings are often operated on a triple net lease, so owners primarily control and pay for external irrigation and parking lot lighting. Common efficiency projects include parking lot lighting retrofits. Warehouses with large roof areas are also good options for solar projects or cool roofs.
- **Retail.** Energy use intensity varies by subtype with enclosed shopping centers much more energy intensive than unenclosed shopping centers or high street shops. They often have lower water intensity than many other types but have a large amount of waste from packaging or food amenities. Frequently, leases are triple net, so the owner has limited control over tenant energy use. However, the owner can instead focus on common-area management and parking lot efficiency opportunities. Common efficiency projects include parking lot, common space, or "back of house" lighting retrofits, cool roofs, roof insulation, high-efficiency irrigation, and waste diversion through recycling or composting.
- **Hotel.** Hotels have high energy and water use intensity. Assets are often owned and financed by an investor group and managed by a brand, with guests not paying energy costs. All savings from sustainable investments go directly to the building owner. Common efficiency projects include whole-building lighting retrofits, water-efficient bathroom fixtures (shower, sink, and toilet), HVAC upgrades, building automation or management system upgrades, and linen reuse programs.
- **Multifamily.** Buildings have high energy and water use intensity. Tenants pay either their own utilities or a portion of operating costs. However, more energy and water are used in the common spaces (lounges, pools, etc.) for properties with such amenities. Common efficiency projects include whole-building lighting retrofits, energy-efficient appliances, water-efficient bathroom fixtures (shower, sink, and toilet), and tenant engagement through events like Earth Day.

Property Management

Property managers play a key role in identifying opportunities for improvement and rolling out sustainability strategies at the building level. Some real estate organizations are vertically integrated with property management as part of their business, and others hire external property management companies. For those with third-party property managers, corporate goals should be communicated to property management, and gaps in alignment at an asset level should be identified and included in planning for the asset during the hold period. Some organizations formally include sustainability metrics in performance agreements and require that property managers meet certain performance and reporting standards.

To support property managers, sustainability leads should provide guidelines that lay out expectations and can help property managers gain recognition for their work in achieving sustainability goals. The following are some key items to include:

- How to track and report out key metrics for energy, water, and waste consumption and cost data, including a data collection time line.
- A menu of operational/efficiency projects by type and cost ranges, including energy efficiency, waste recycling, sustainable purchasing, green cleaning, water conservation, tenant improvements, and transportation. Property managers can execute a basic sustainability "treasure hunt," either on their own or with the help of a building engineer or maintenance technician.
- Property sustainability plan to identify efficiency measures for the next calendar year in conjunction with the property budget.
- Spreadsheets that calculate project financials for common efficiency upgrades.
- Common sources of rebates and other incentives (i.e., utilities) for efficiency projects.
- Tenant engagement guidelines and ideas, such as Earth Day messaging and floor-by-floor energy competitions.
- Case studies of successful projects.
- Sustainability training opportunities, offered company-wide or through third-party partners.

In a small portfolio, annual site visits to review sustainability plans and assess the building in person with the property manager can provide an additional touchpoint and build relationships. If conducted ahead of the budget-planning process, investment opportunities can be built into the annual budget.

Besides the property manager, an array of other building staff members influences the environmental performance of a property and should be engaged on the topic of sustainability:

- **Facility manager** (or a larger facility management team). Has detailed knowledge of building mechanical systems, directly implements cost-saving measures, and can work with asset management to identify upgrades.
- **Property leasing/brokers.** Market property features, including operational efficiency, to current and prospective tenants and execute leases.
- **Cleaning staff.** Is responsible for property upkeep, ensures a clean and healthy environment for both staff and tenants, can identify leaks or energy waste, and supports waste and recycling efforts.
- **Security personnel.** Maintain a consistent presence on property, can help identify the optimal hours of operations and leaks/energy waste, and are a key tenant engagement touchpoint.
- **Accounting/tax teams.** Analyze the financials of energy projects.
- **Legal team.** Supports the implementation of green leasing and sustainability-related vendor contracts.
- **Construction personnel.** Manage and enforce green leasing requirements during tenant buildouts and engage sustainability lead to identify efficient lighting and appliances for tenant space retrofits.

ESG ALIGNMENT WITH THIRD-PARTY PROPERTY MANAGERS USING IREM CERTIFIED SUSTAINABLE PROPERTY—VOLUME PATHWAY

HEITMAN invests today with a focus on the future, believing environmental, social, and governance excellence leads to a better tomorrow. In 2017, Heitman certified 26 properties under the Institute of Real Estate Management's (IREM) Certified Sustainable Property (CSP) volume certification and two years later, in 2019, Heitman certified 35 properties under IREM's CSP.

Through the use of IREM's CSP volume certification program, Heitman is able to holistically view and standardize the assessment of ESG across office, multifamily, and retail properties. The IREM volume certification framework scales ESG integration, alignment, and recognition across the fund. To earn the certification, a property must first meet key baseline requirements, and then earn necessary points across energy, water, health, recycling, and purchasing categories.

Heitman engages and collaborates with property managers to assess property-specific performance and opportunities for improvements in the IREM CSP certification process. The tailored checklist by property type advances ESG goals by providing property managers with operational best practices, identifying gaps, and outlining a road map for improvement at properties, including how ESG items can be cost-effectively built into the business plan. Heitman's continuous engagement strategy enables firmwide ESG goals to effectively integrate into property management goals and successfully scale ESG achievements across the fund.

28 State Street in Boston. *(Heitman)*

OUTCOMES

- Standardizes ESG goals across the portfolio and creates the road map for each property type
- Strengthens relationships and knowledge sharing with property managers across properties
- Identifies asset-level successes and opportunities for improvement
- Aggregates portfolio ESG performance and achievements
- Encourages ESG transparency and communication

"Actively managing and improving asset-level sustainability performance is at the forefront of Heitman's ESG strategy. Our active ESG engagement approach creates synergies between the ESG team, asset management, and property management that yield progressive and meaningful enhancement to investment value."

LAURA CRAFT, HEAD OF GLOBAL ESG STRATEGY, HEITMAN

BUILDING STAFF INFLUENCING ENVIRONMENTAL PERFORMANCE

LASALLE INVESTMENT MANAGEMENT, a global real estate investment manager, is committed to reducing the environmental impact of its business and collaborating with stakeholders to sustainably manage properties. LaSalle's sustainability team relies on property managers and building staff to support and implement sustainable operations. LaSalle's Sustainability Management Program engages these teams by conducting property-specific outreach on a quarterly basis and providing all properties with training, tools, and resources, such as its *GreenGuide,* which highlights 10 best practices, from energy efficiency to staff education strategies.

While reviewing 2019 building performance data, the mixed-use T3 office building in Minneapolis, Minnesota, indicated an above-average reduction in natural gas and carbon emissions versus 2018. According to the building engineer, these reductions were a result of operational changes to the outside air handler of the dedicated outdoor air system (DOAS). In typical operation, the DOAS uses a preheat glycol coil that is heated by the boilers, causing the boiler to cycle all day from a 10 to 15 percent load before the preheat valve opens up to a 60 to 90 percent load when the glycol returns.

The engineer reprogrammed the building management system to use an energy recovery heat exchanger wheel that captures energy from exhaust air through a recovery wheel in order to preheat the intake air. This method preheated the supply air tremendously to meet the temperature set point without having to use the glycol coil, thereby eliminating the boiler load cycling and reducing a significant amount of gas use.

OUTCOMES

- 48.8 percent reduction in natural gas use (50.6 percent weather-normalized reduction)
- 13 percent or about $24,000 decrease in total utility spend
- 17 percent reduction in building's carbon footprint, equivalent to planting over 3,000 trees

T3 in Minneapolis. *(LaSalle Investment Management)*

"It's pretty unusual to identify this level of savings through operational efficiencies in such a new building. The level of reduction achieved at T3 indicates the important role that well-trained operations staff play in sustainable property operations."

ERIC DUCHON, GLOBAL SUSTAINABILITY OFFICER, LASALLE INVESTMENT MANAGEMENT

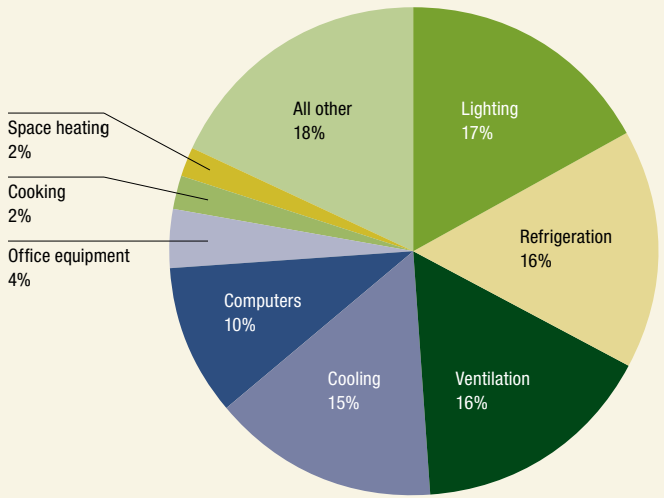
IMPLEMENT LOW-COST, HIGH-VALUE SUSTAINABILITY OPPORTUNITIES

"Quick win" sustainability opportunities with a low cost and high value can be conducted at an individual asset or scaled across a larger portfolio. Often, utility or other incentive programs are available to help finance energy and water efficiency measures like LED lighting or high-efficiency water fixtures, which help fund the project through a property's operating budget as opposed to getting funding approved through the more difficult capital budget process.

Energy

Electricity is the most expensive utility for real estate and is often the focus of early sustainability initiatives. During implementation of energy efficiency upgrades, project goals can include reducing operating costs, maintaining occupant comfort, and reducing emissions. With lighting and HVAC making up the majority of nontenant space energy use in a building (see figure 4), many low- to no-cost opportunities are available that a building can implement to reduce those loads (see figure 5).

FIGURE 4 **ENERGY USE IN U.S. COMMERCIAL BUILDINGS BY MAJOR END USES**



2012 data

Source: U.S. Energy Information Administration, 2012 Commercial Buildings Energy Consumption Survey.

UTILITY INCENTIVES

Often, utilities offer incentives and rebates for conducting energy audits, installing energy-efficient equipment, and proving energy savings performance. Utility incentives can also be leveraged so that technologies like battery storage and demand management programs make financial sense, or they can help pilot new efficiency technologies. Because utility incentives and what they cover change regularly, it is important for the sustainability lead to stay up-to-date on local incentive programs and to maintain strong connections with utility representatives.

A major driver of utility incentives is to manage their energy load as more buildings are added to the grid and to avoid building expensive new power plants and other energy infrastructure.

FIGURE 5 **ENERGY EFFICIENCY MEASURES**

	Lighting	
	Reduce energy use	**Improve system efficiency**
No cost	Provide tenants with signage and regular communications to turn lights off when spaces are not in use.	Maximize daylighting in a space to reduce the need for lighting.
Low cost	Replace all lighting to high-efficiency LEDs, which use less energy and require less maintenance. Utility incentives are often available to help fund these replacements.	Install occupancy, daylight harvesting, or vacancy sensors to program lighting to turn on only when necessary.
	HVAC	
	Reduce energy use	**Improve system efficiency**
No cost	Make minor changes to temperature set points for various HVAC equipment, lowering costs without altering comfort.	Review building startup and shutdown times to make sure spaces are not unnecessarily heated or cooled.
Low cost	Install programmable thermostats to adjust the temperature of a space only when needed.	Schedule regular maintenance and replace HVAC parts to ensure that equipment functions properly (cleaning coils and changing filters, fixing leaks, operating at positive pressure, managing fresh air intake, etc.)

UPGRADING LIGHTING FIXTURES YIELDS STRONG RETURNS

When making energy efficiency upgrades in multifamily properties, **CLARION PARTNERS,** a U.S. real estate investment manager, focuses on both common areas and tenant spaces. Many properties have conducted lighting retrofits that updated outdoor and corridor lighting, with over 75 percent using exterior lighting fixtures controlled by daylighting photosensors.

44 Berry is a 47,296-square-foot residential property in Brooklyn, New York. A 2019 lighting upgrade added occupancy sensors in hallways, utility closets, mechanical rooms, trash rooms, and restrooms, as well as upgraded all fixtures and bulbs to LEDs. The property also upgraded exterior lighting and staircases to include photosensors and motion sensors. With a total investment of $32,000, the project is expected to save $5,950 per year for a payback of 5.37 years.

OUTCOMES

- $25,000 investment in interior occupancy sensors saves $5,000 per year.
- $5,000 investment in LED fixtures saves $700 per year.
- $2,000 investment in exterior and stairwell lighting sensors saves $250 per year.

"Studies have shown that LED lighting uses up to 80 percent less energy than incandescent bulbs and can last up to 25 percent longer, reducing costs as well as waste. Given the typically low project cost and high savings potential, lighting upgrades are an easy energy win for all property types and should be one of the first steps in the journey to a sustainable and efficient property."

KATIE VAZ, MANAGING DIRECTOR, PORTFOLIO MANAGEMENT, CLARION PARTNERS

44 Berry in Brooklyn, New York. *(Clarion Partners)*

PORTFOLIO-WIDE ENERGY REDUCTION

LBA—a real estate investment and management company with an office and industrial/logistics portfolio—is committed to driving a business case approach to environmental responsibility. LBA has partnered with Yardi to implement smart building systems throughout the office portfolio, where viable. The Yardi Pulse program provides real-time building electrical meter monitoring and analytics, as well as HVAC system fault detection and diagnostics. The goal of this program is to provide actionable building information and to use automated intelligence to make adjustments for buildings to perform at their optimal potential.

LBA has 11 office buildings, totaling 5.9 million square feet, in the Pulse platform. To ensure that LBA incurred no upfront expenses, it selected buildings that were automation and control network ready. The process starts with the installation of the Pulse Hub, an integration device that gathers data from the building management system and building master meter to send to Pulse every 30 minutes; in most cases, no additional sensors are needed. The energy savings from Pulse then come from energy automation and energy intelligence.

With energy automation, the system enables system-wide optimization by automatically optimizing equipment, such as HVAC set points. Energy intelligence uses analytics, fault detection diagnostics, and load profiling of building electrical meter and HVAC systems so the LBA engineering team and Yardi consulting services can identify hidden performance issues, such as extended run time, overlap in HVAC mode conditions (simultaneous heating and cooling), and inefficient sequence of operation. Together, these approaches reduce energy use and improve tenant comfort at scale across the portfolio.

OUTCOMES

- Portfolio-wide savings of 10.7 million kWh, 8,400 tons of carbon dioxide equivalent, and $1.3 million in energy costs in 2019
- Annual savings of 338,000 kWh and $42,200 in electrical costs at one office property in Irvine, California

Park Place in Irvine, California. *(LBA)*

"Implementing Yardi Pulse across a portfolio of office buildings provides insight to the building management and engineering teams that assist the LBA team in maximizing lessons learned and energy savings while enhancing tenant satisfaction"

MICHELLE GERMAN, DIRECTOR OF OPERATIONS AND SUSTAINABILITY, LBA REALTY AND LBA LOGISTICS

Water

Water prices are increasing at a rate higher than inflation and are rising faster than other utilities because of infrastructure costs and water scarcity or drought. To mitigate these rising costs and improve the efficiency of their buildings, building owners and managers should develop water management plans that address the three primary areas for savings: (a) reducing water loss from leaks; (b) reducing overall water use through occupant education and improving the water efficiency of fixtures and cooling towers, HVAC equipment, landscaping, and irrigation systems; and (c) reusing on-site water (see figure 6). While changing equipment can be a more permanent fix, changing the behavior of occupants can be a fast and inexpensive method to conserve water use.

FIGURE 6 **WATER EFFICIENCY MEASURES**

Domestic plumbing: toilets, urinals, faucets, showerheads			
	Reduce water use/loss	**Improve system efficiency**	**Reuse on-site water**
No cost	On average, leaks account for up to 6% of water use. Identify all water-using fixtures and **regularly check for leaks.** Also, develop a system for reporting leaks and communicate the importance of reporting to all building occupants.	Review water bills for at least one to two years to **determine a water use baseline.** Read water bills regularly to locate discrepancies.	On-site water reuse systems like purple pipes for reclaimed water and graywater or blackwater systems require a high cost to retrofit an existing building.
Low cost	Adding **aerators** to lavatory faucets reduces splashing and limits the amount of water that flows out of the faucet. Aerators are a particularly inexpensive fix, with fixtures costing less than $10 and a payback period of less than one year.	Develop an occupancy **education and outreach plan** that provides water efficiency tips and updates on progress. Use a variety of communication methods to spread the word, and be sure to integrate water efficiency updates into other programs and events.	
Cooling and heating			
	Reduce water use/loss	**Improve system efficiency**	**Reuse on-site water**
No cost	Review the operating hours of the cooling system to **reduce use during off-peak times.** Also be sure to check water temperature and flow rate within fixtures to ensure that they are within the manufacturer's optimum range.	Contact your local water utility to see if it offers free **water audits or incentives** for fixture upgrades.	
Low cost	**Properly insulate** all piping and installed storage tanks, and **regularly maintain your cooling tower, chillers, and boilers** by cleaning the equipment to reduce buildup of scale, biological growth, or sediment.	**Maximize cycles of concentration in cooling towers.** Many systems operate at two to four cycles of concentration, but by increasing it to three to six, cooling tower makeup water can be reduced by 20% and blowdown by 50%. One way to do this is to select a water treatment vendor who specializes in water efficiency and can treat the water to control for scaling and chemical buildup.	

(continued on next page)

FIGURE 6 **WATER EFFICIENCY MEASURES** (continued)

Landscaping and irrigation			
	Reduce water use/loss	**Improve system efficiency**	**Reuse on-site water**
No cost	**Adjust sprinklers** so that they water only plants, and not sidewalks or streets. Reduce water loss from evaporation by watering early in the morning.	**Allow grass to grow longer,** as the roots will grow deeper and become more drought resistant.	**Xeriscape plants** during landscaping, with drought-tolerant plants in an outer ring, a middle transition ring, and an inner oasis ring. By placing high-water-use plants in shady areas where water will likely collect naturally, high-water-use plants can be incorporated into high-visibility areas without increasing irrigation.
Low cost	Ensure a **healthy soil** through aeration, which allows water to penetrate deeper into the soil, and the application of mulch, which reduces water loss from evaporation. Consider **drip irrigation,** which slowly and more directly releases water.	Select **regionally appropriate plants** that are water efficient, saving over 50% in supplemental watering.	**Rainwater stored in on-site tanks** requires little treatment for reuse in irrigation and can be collected from the roof at a rate of 0.62 gal/sq ft.

Waste

For real estate owners, waste can come from construction, operations, tenants, and restaurants. The first step in managing the waste flow and increasing the diversion rate is to gain a clear understanding of a property's waste stream from generation to disposal by conducting a waste audit. The audit helps building owners and managers identify inefficiencies and opportunities for both waste reduction and recycling.

Obtaining accurate data for waste can be a challenge because some waste contracts require the hauler to provide only the number of pickups rather than an exact weight or volume. Further, it is difficult to determine how much of the recycle hauler's load is recycled versus going to a landfill after all.

To improve the accuracy of waste data and inform management strategies (see figure 7), the sustainability lead should work with the company's waste collectors to improve data collection processes or to develop a sufficient method for estimating the amount of waste hauled. Waste audits can also help create a baseline understanding of which materials are commonly discarded and create an inventory of necessary infrastructure. This information can be collected in-house to modify waste container sizes and frequency-of-pickup schedules to lower costs and allow for more accurate reporting.

ESTIMATING WASTE

Although actual waste data are ideal, they can be difficult to collect at each property in a large portfolio. Estimation can help building owners get a sense of the overall diversion rate and total waste disposed.

Energy Star Portfolio Manager estimates waste using the following calculation:

> Volume of bin × Number of bins × Pickup frequency (per week) × Percentage full estimation × 4.33 (weeks in a month) = Estimated volume of material produced per month

PORTFOLIO-WIDE WATER CONSERVATION EFFORTS

At **FPA MULTIFAMILY,** sustainability is an ongoing practice that constantly evolves as technology advances. FPA Multifamily's ESG initiatives are driven by the Green Team, which is involved in the beginning stages of any acquisition, ordering an ASHRAE-level energy audit for all properties to determine the best investment projects; oversees project rollout and implementation; and tracks savings. As a multifamily real estate company, FPA Multifamily has substantial opportunities for water conservation projects, achieving savings by replacing toilets, showerheads, faucets, and water-intensive landscaping.

To date, FPA Multifamily has completed water retrofit projects at 261 properties, installing 40,852 low-flow toilets, 58,622 low-flow showerheads, and 83,317 low-flow faucet aerators, saving a total of 954,789,380 gallons of water.

OUTCOMES

- Four FPA Multifamily properties implemented new low-flow toilets, showerheads, and faucet aerators in all units. The table below shows water use and water cost/savings that can be achieved with water-saving devices.

Property name	Total project investment ($)	Total savings (gal)	% change	Total savings ($)	% change
4580 Dunwoody	63,216	176,250	–33.8	542.85	–31.9
Arrive Mission Valley	76,917	117,017	–13.1	770.13	–9.8
The Preserve at Woodfield	195,651	2,666,076	–57.6	34,439.39	–57.7
The Windham Apartments	11,650	24,312	–37.8	262.80	–36.4

Arrive Mission Valley in San Diego, California. *(FPA Multifamily)*

"For FPA Multifamily, we believe that properties that go green will be preferred and will outperform others, making sustainability an integral part of our investment strategy. By enforcing environmentally responsible practices, such as the water retrofit strategy at our properties, we are able to maximize value, increase tenant satisfaction, and create stable long-term returns."

FPA MULTIFAMILY GREEN TEAM

FIGURE 7 **WASTE EFFICIENCY MEASURES**

Operational waste			
	Reduce	**Reuse**	**Recycle**
No cost	Integrate waste into overall **tenant engagement** programs to educate tenants on programs to reduce waste in the building. **Remove desk-side waste baskets** and only allow common-area trash.	Encourage **reusable materials in tenant spaces,** such as durable utensils or coffee mugs.	Provide tenants with **well-organized receptacles** for specific waste types to ensure that all waste goes into the correct stream (trash, recycle, compost).
Low cost	**Leverage technology** like balers or compressors to streamline waste management processes and **rightsize dumpsters** to reduce the total number of waste pickups and associated hauling costs.	**Donate** excess materials or food to others, providing a community service and reducing disposal costs.	**Create signage** to guide tenants to the correct waste receptacle and ensure that they are **properly sized.** Bring in **specialty recyclers** to host recycling drives for other materials, like textiles and e-waste, or even set up a composting program.

ESTABLISH TENANT ENGAGEMENT

Tenants can account for over 50 percent of the energy consumed in buildings. As such, tenant engagement and education programs help building owners achieve significant reductions with minimal investments.

In most traditional leases, tenants pay their own utility bills (either directly or indirectly). This arrangement provides little incentive for the owner to invest in large building upgrades to improve efficiency, as most savings would directly benefit the tenant. On the flip side, tenants are often unlikely or unable to invest in energy efficiency for their own space that pays back during the lifetime of their lease. This factor creates a split incentive.

Leveraging Leases

One of the best opportunities to drive energy efficiency and sustainability across all building types is when a tenant lease is negotiated. After a lease is signed, owners have less financial incentive to make energy, water, or health and wellness upgrades, and there is less flexibility to set building roles for owners and tenants that lock in a commitment to energy efficient and environmentally responsible operations.

"Green" leases, also known as energy-aligned leases, have clauses inserted in the standard lease form that allow owners to overcome the split incentive by aligning costs and benefits of energy and water efficiency investments. They also set expectations for tenants, helping them understand what is required with regard to data collection and building operations. The leasing process also provides a chance to guide tenants on opportunities to build out and manage their spaces in an energy- and cost-efficient manner.

With tenants increasingly interested in sustainability, a green lease can help landlords and tenants work together to continuously identify and finance opportunities to improve performance throughout the lease term with new technology, new rebates, or new certifications—hopefully leading to a tenant that ultimately re-signs the lease and to adequate payback for both parties. Green leases can also set standards for landlords, particularly those addressing health and wellness, by requiring green cleaning, materials containing low volatile organic compounds (VOCs), or regular indoor air quality testing.

Here are some key green lease clauses or addenda to consider:

- Permission to access tenant utility usage data, including transparency on energy, water, and waste
- Operational parameters under which tenants must use their space (e.g., HVAC set point/landlord override, occupancy sensors, auxiliary HVAC hours, no use of VOC paints or sealants, etc.)
- The ability to pass through the cost of energy and water efficiency upgrades to the tenants on a prorated basis over the term of their leases
- Requirement to identify a sustainability champion and participate in any activities the landlord needs to acquire a green building certification (e.g., recycling or green cleaning and pest management)
- Minimum energy performance standards for major tenant-purchased appliances, lighting, and other equipment

METAL RECYCLING PROGRAM

LASALLE INVESTMENT MANAGEMENT's Sustainable Management Program for the European portfolio has set a target of zero direct-to-landfill waste and 80 percent of waste recycled by 2020. To help achieve these goals, LaSalle works closely with property managers to engage tenants and promote recycling.

LaSalle's Golden Square Shopping Centre in Warrington, England, has been chosen as part a of nationwide campaign, in partnership with JLL and a metal recycling company to install three collection bins for unwanted metal household items. Recycled metals save a significant amount of energy, carbon emissions, and water compared with extracting them in their raw form from the ground. Metals are also one of the few materials that can be recycled repeatedly without any loss of quality, and recycling them helps prevent valuable resources from going to landfills.

Visitors to Golden Square are invited to drop off common waste metal items—such as copper piping, pots and pans, food and drink cans, radiators, garden tools, and more—for recycling. At the end of the trial period, the collated metal will be weighed, assigned a total monetary value, and donated to a local school. During the COVID-19 pandemic, the community's local recycling center was closed, increasing the use of Golden Square's collection point, and so the recycling program is ongoing for the time being.

Metal recycling at Golden Square Shopping Centre, Warrington, England. *(LaSalle Investment Management)*

OUTCOMES

- Made it easier and more convenient for the community to recycle old metals
- Recycled 6.5 metric tons of waste metal so far, equivalent to saving 6.3 metric tons of carbon dioxide
- Contributed £1,000 ($1,292) to Warrington schools to date

"Responsible consumption is one of our four pillars of sustainability. To reduce the percentage of waste sent to landfills throughout the life cycle of an asset, LaSalle develops site waste management plans in order to reduce, reuse, and recycle materials"

SOPHIE CARRUTH, SUSTAINABILITY OFFICER, EUROPE,
LASALLE INVESTMENT MANAGEMENT

GREEN LEASE LEADERS

The U.S. Department of Energy's Green Lease Leaders program sets national standards for what constitutes a green lease, and recognizes leading organizations that are actively and effectively using the lease as a tool to increase investment in high-performance buildings and to achieve energy and cost savings.

ENERGY STAR TENANT SPACE

The U.S. EPA's Energy Star Tenant Space program provides specific recognition for sustainable tenant fit-outs. To achieve this recognition, tenants and their landlords commit to energy efficiency by meeting specific energy-related criteria, including estimating and metering energy use, lighting spaces efficiently, using efficient appliances and equipment, and sharing their energy use data.

Sustainable Tenant Fit-Outs

The tenant fit-out is a critical opportunity to integrate energy, waste, and water reductions, as well as health and wellness features. Integrating efficiency into tenant space design and construction achieves significant returns when compared with making changes after a tenant has moved into the space. ULI's Tenant Energy Optimization Program (TEOP) provides a framework for incorporating energy efficiency during pre-lease, design and construction, and postoccupancy (figure 8).

Ongoing Tenant Communications and Engagement

To improve occupant engagement and help ensure commitment to sustainable tenant behaviors, owners should continue ongoing communications and training activities:

- Train brokers and provide them with educational materials for prospective tenants.
- Host new and renewing tenant kickoff lunches and learn to share sustainability amenities and learn about tenant sustainability goals. These events can help identity sustainability champions within the building.
- Create a move-in packet for all tenants that provides initial guidelines on energy and sustainability measures to build out and operate tenant spaces efficiently.
- Provide ongoing educational materials to tenants on what they can do to help promote energy efficiency and sustainability within their space and throughout the building.

FIGURE 8 **TENANT ENERGY OPTIMIZATION PROGRAM**

	TEOP step	Owner's role
Pre-lease	1. Select a team	Connect tenants with design and construction team members (architects, engineers, general contractors) already well versed in energy and sustainability.
	2. Select an office space	Promote the building's sustainability credentials to potential tenants and provide interested tenants with additional information upon request, like a whole-building energy model. During lease negotiation, integrate green leasing clauses to align tenants and owners.
Design & construction	3. Set energy performance goals	Provide tenants all the necessary data on the space to help inform them of energy performance opportunities and goals. Review the green lease to identify opportunities to help finance energy conservation measures. Regardless of lease structure, consider submetering all tenant spaces to help tenants manage energy performance.
	4. Model energy reduction options	
	5. Calculate projected financial returns	
	6. Make final decisions	
	7. Develop a postoccupancy plan	
	8. Build out the space	
Postoccupancy	9. Execute a postoccupancy plan	Support tenants in measuring and verifying the impact of energy efficiency measures and educate them on operational best practices. Continued communications on sustainability can also help build the relationship between owner and tenants and lead to additional savings.
	10. Communicate results	Work with the tenants to track and communicate the results of the fit-out by writing an industry case study or providing a real-time energy dashboard.

- Check in with tenants regularly to identify potential opportunities to collaborate on sustainability initiatives. This activity can also include the creation of a building-wide "Green Team" with representatives from each tenant in the property to discuss how to make the building more sustainable and to better leverage the sustainability programs already in place.
- Because tenants can be strong partners in achieving green building certification or recertification, highlight any opportunities for them to get involved (such as a transit survey) or to help the process so they feel more engaged and more likely to take ownership of sustainable practices.

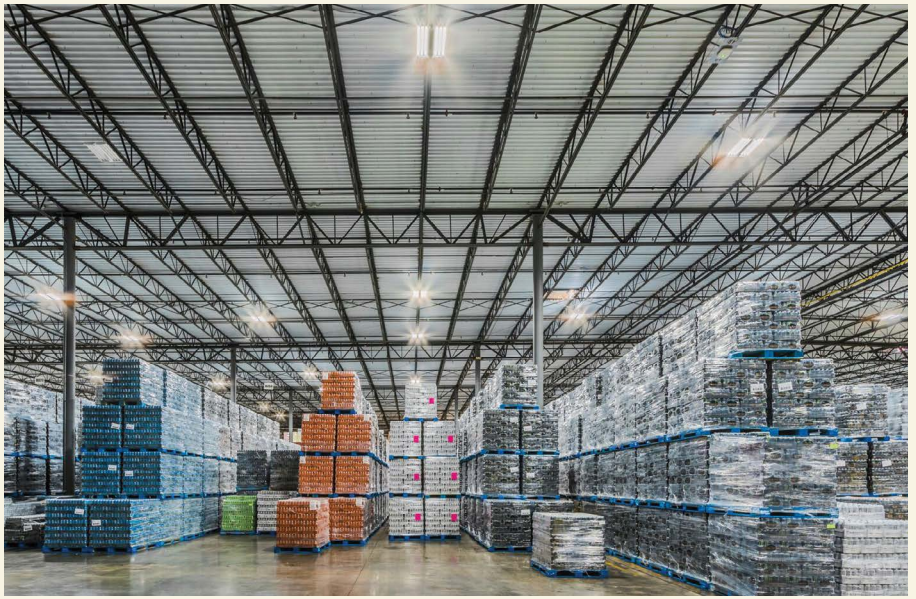
ONGOING INDUSTRIAL TENANT ENGAGEMENT

PROLOGIS, the world's largest logistics real estate company, places the customer experience at the core of its business, and this extends to its ESG program, in which the company cultivates partnerships with customers to help align ESG strategies. Eighty percent of its top 25 customers rent sustainability-certified space, and 70 percent support the United Nations Sustainable Development Goals. To better understand how the Prologis ESG program could enable its customers to achieve their own sustainability goals and promote information sharing, the company launched the Customer Sustainability Advisory Council (CSAC) in 2017.

Through its quarterly meetings, CSAC has used the forum to promote open communication lines, discuss strategies to enhance building resilience, share environmental performance data, showcase the operational and financial benefits of energy-efficient solutions (including LED lighting), address climate-related initiatives such as Science Based Targets, and support the use of Prologis's Community Workforce Initiative.

OUTCOME

- Greater engagement with Prologis's customers from an ESG perspective, and a deeper understanding of their needs. As a part of Prologis's customer outreach programs, CSAC helped contribute to an 8.9 percent increase in retention rates with Prologis's top customers.



LED lighting at a Prologis distribution center in Dallas. *(Prologis)*

"At Prologis, we are focused on customer-centric design solutions. Through our Customer Sustainability Advisory Council, we identify solutions that help Prologis and our customers reduce our collective carbon impacts. This forum's objective is to provide value to our customers while providing insight into their evolving needs on topics like renewable energy and electric vehicles, among others."

YING YU, SENIOR VICE PRESIDENT OF ESG, PROLOGIS

Engaging Tenants in Multifamily Properties

Many conversations about tenant engagement focus on office buildings and their tenants; however, opportunities exist for engaging tenants of buildings of all types. Multifamily building owners or property managers should send residents regular communications to help them understand the investments that have been made and how they can occupy the space in a cost-saving and energy-efficient manner. This approach can include training sessions on how to use smart thermostats, local utility rebates for efficient lighting or appliances, and proper recycling. Providing ongoing performance data can help residents understand how their actions affect their utility bills over time.

Sustainability leads can also train on-site staff, including property managers and site engineers, to engage tenants by hosting Earth Day events, answering tenants' questions, and providing new ideas for how to meet tenants' needs and to promote sustainable living.

Data access in multifamily buildings can be complicated because of the many tenant meters, but it is critical to the success of energy and sustainability initiatives. To gain data access in multifamily buildings, consider installing submeters, modeling energy usage by square footage, or obtaining aggregate data from utilities to avoid privacy issues (this often requires a certain number of units in the building).

MULTIFAMILY TENANT ENGAGEMENT

GID, a real estate developer, owner, and operator, equips its multifamily residents with information and resources to drive responsible behavior. To raise awareness, multiple sustainability events are held throughout the year across the entire portfolio.

Earth Hour	**March**	Residents are encouraged to join the movement and turn off lights and electronics for one hour (property lights are not shut down for safety and other concerns).
Earth Day	**April**	The biggest event of the year, with many individual properties developing their own resident events. Property managers are provided with ideas but are encouraged to be creative and put their own spin on events.
Bike-to-Work Month	**May**	All employees and residents are encouraged to ride bikes, or use alternative transportation, for their commute. This is also an opportunity to promote on-site bike storage or repair facilities (for those that have them).
Energy/Water/ Waste Awareness Campaign	**October through December**	Each month focuses on a specific resource (energy, water, or waste), with a goal of promoting sustainable resident behavior through small changes.

For all the events, GID provides property managers with resources, including resident memos about each event and sample social media content and images. Custom signage is also distributed for posting throughout common areas, such as lobbies, fitness centers, lounges, stairwells, and elevators.

OUTCOME

- 100 percent of properties in the portfolio participate or encourage residents to participate in Earth Hour, Earth Day, Bike-to-Work Month, and the annual Energy/Water/Waste Awareness Campaign.

An example Awareness Campaign for the GID portfolio. *(GID)*

"One of the primary drivers of our tenant engagement programming is to reduce tenant-side energy use, water use, and waste generation. While GID has invested significant capital into common-area retrofits, that only goes so far when it comes to our portfolio performance on a whole-building scope. We believe tenant engagement is one of the biggest challenges facing multifamily portfolios and hope to expand on this program and ultimately track direct savings from these initiatives."

JESSE SHAPIRO, HEAD OF ASSET MANAGEMENT, GID

RESOURCES

Identify and Qualify Opportunities

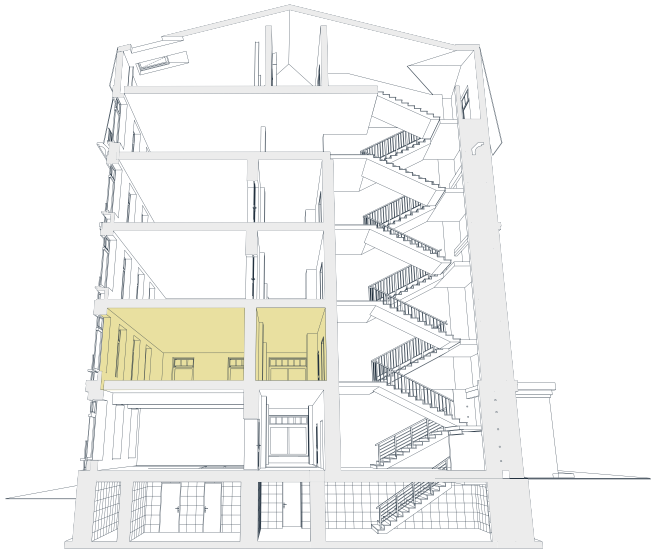
- *ASHRAE Technical Standards and Guidelines*, ASHRAE: www.ashrae.org/technical-resources/standards-and-guidelines/read-only-versions-of-ashrae-standards
- *Building Re-Tuning*, Pacific Northwest National Laboratory: https://buildingretuning.pnnl.gov/
- *Energy- and Cost-Savings Calculators for Energy-Efficient Products*, U.S. Department of Energy: www.energy.gov/eere/femp/energy-and-cost-savings-calculators-energy-efficient-products
- *Spark*, Northwest Energy Efficiency Alliance: https://buildingrenewal.org/get-started/spark
- *Sustainable Facilities Tool*, U.S. General Services Administration: https://sftool.gov/

Implement Low-Cost, High-Value Sustainability Opportunities

- *The Water & Waste (W2) Challenge*, BOMA International: www.boma.org/BOMA/Research-Resources/Sustainability/Water___Waste_Challenge/BOMA/Advocacy/W2Challenge.aspx?hkey=25a1b6cf-6402-433f-af0d-084f7d4ebf60
- *Sustainability in Hotels: Opportunities and Trends Shaping the Future of Hospitality*, Urban Land Institute: uli.org/hotelsustainability
- *The Strategic Guide to Commissioning*, ASHRAE: www.ashrae.org/file%20library/technical%20resources/bookstore/english-ashrae_bpa-brochure_fnl_6-24-14.pdf
- *Unlocking Hidden Value in Class B/C Office Buildings*, Urban Land Institute: uli.org/classbcenergyefficiency
- *Cooling Tower Guidelines*, Sydney Better Buildings Partnership: https://s3-ap-southeast-2.amazonaws.com/cdn.sydneybetterbuildings.com.au/assets/2018/06/BBP-Cooling-Towers-v03.pdf

Establish Tenant and Employee Engagement

- *A Model Energy Aligned Lease Provision*, plaNYC: www.nyc.gov/html/planyc2030/downloads/pdf/energy_aligned_lease_official_packet.pdf
- *Deep Retrofit Value (DRV) Green Leasing Tool*, Institute for Market Transformation: www.imt.org/resources/deep-retrofit-value-drv-green-leasing-tool/
- *Green Lease Guide*, BOMA International: www.boma.org/GreenLeaseGuide
- *Green Lease Toolkit*, U.K. Better Buildings Partnership: www.betterbuildingspartnership.co.uk/green-lease-toolkit
- *Responsible Fit-Out Toolkits*, U.K. Better Buildings Partnership: www.betterbuildingspartnership.co.uk/responsible-fit-out-toolkit-offices
- *Strip-Out Waste Guidelines*, Sydney Better Buildings Partnership: www.betterbuildingspartnership.com.au/resource/stripout-waste-guidelines-procurement-systems-and-reporting/
- *Sustainable Solutions for the Modern Office*, D.C. Sustainable Energy Utility and Institute for Market Transformation: www.imt.org/wp-content/uploads/2018/02/TenantLeasingGuide_r06.pdf
- *Tenant Energy Optimization Program*, Urban Land Institute: https://tenantenergy.uli.org/
- *The Business Case for High-Performing Buildings*, U.S. Department of Energy Better Buildings: https://betterbuildingssolutioncenter.energy.gov/videos/business-case-high-performance-buildings-v20
- *Owner–Tenant Engagement in Responsible Property Investing*, United Nations Environment Programme Finance Initiative Property Working Group: www.unepfi.org/fileadmin/documents/TenantEngagementReport.pdf



FINANCING AND IMPLEMENTING CAPITAL PROJECTS

After tackling low- and no-cost opportunities within a building portfolio, a sustainability lead can drive bigger capital investments in building efficiency and sustainability. These types of projects require significant funding and engineering support, but they can provide a strong long-term return on investment and substantially reduce a building's environmental footprint.

WHAT CONSTITUTES A CAPITAL PROJECT?

Larger investments in buildings to achieve sustainability improvements are often categorized as capital projects, as they must get approved in the annual capital budget process and are too large to be paid for through the operating expense budget. Sometimes, these projects require outside financing to fund the investment. Examples include a chiller replacement, window replacement, or roof replacement. Depending on the required investment and anticipated savings, some projects proposed during the annual budget cycle will be approved for the following year, whereas others will be slated into the capital plan for later in the building's life cycle.

A sustainability lead can pursue a number of strategies to identify opportunities for significant sustainable investments and to ensure that they are built into a property's capital plan:

1. **Energy and sustainability due diligence during the acquisition process.** For companies acquiring buildings on a regular basis, the best time to invest in energy and sustainability upgrades is during acquisition. Identifying upgrade opportunities before purchasing the property can help mitigate acquisition costs, and underwriting major upgrades at the point of transaction allows the company to pay for these investments with lower-cost debt. Working sustainability KPIs into the property condition assessment can help assess the overall sustainability of a prospective acquisition and spot opportunities for investment in making the building more sustainable as it enters the portfolio.
2. **Audits.** Leverage an ASHRAE Level 2 or 3 audit to identify major investment opportunities that can be made over the building's life cycle and calculate the estimated ROI from energy and maintenance savings. These investments can be made immediately to maximize the long-term ROI, or they can be built into the capital plan to execute along with complementary projects. For example, an HVAC replacement can be bundled with new efficient windows, to reduce the HVAC load required and allow the owner to invest in a smaller, more efficient HVAC system. Alternatively, investments can be made when capital is available in the building's life cycle, such as when a major tenant turns over, at the end of a current debt term, when the building is ready for refinancing, or within a year of acquisition or disposition of a property.
3. **End of useful life for major mechanical equipment.** Build an inventory of major building systems with their age, warranty information, and certified energy performance (e.g., energy efficiency ratio/seasonal energy efficiency ratio for HVAC, annual fuel utilization efficiency for boilers, R-value for insulation and windows). As equipment rolls off warranty, implement a "replace with better" policy, which encourages asset managers to upgrade to more efficient mechanical equipment, assuming that equipment will pay back with energy savings over its useful life. This policy is an improvement over the traditional "like for like" replacement strategy of reactive buildings' teams. Working with asset managers, the sustainability lead can leverage the end of a system's useful life to invest in a more efficient, sustainable replacement that is in the budget of the building's capital plan. Use these triggering events to look for other energy-saving opportunities, such as bundling upgrades to calculate a stronger blended ROI.

BUILD THE FINANCIAL BUSINESS CASE FOR THE INVESTMENT

Sustainability leads should partner across the real estate value chain on expensive and complex sustainability investments. This approach includes working with qualified vendors and service providers to identify the best technology and solution for the situation. They should also partner with asset managers to assess the long-term ROI of these projects, as well as the other financial metrics the real estate firm uses in decision-making. Property managers can help inform operational benefits, such as reduced utility expenses, lower maintenance/repair costs, and saved facilities team staff time. To build the business case for a project and calculate a project's total value require the firm to consider certain key aspects:

- **Project payback/ROI.** What is the full payback and long-term return on investment of this opportunity and does it meet the firm's threshold for project approval? To calculate the full value of a project, consider a life-cycle assessment in lieu of a simple payback analysis. Calculate reduced operating expenses over the life of the equipment that boost NOI, like lower energy/utility costs, reduced ongoing maintenance/repair costs, lower cost of insurance, reduced time required from property managers to respond to tenant complaints and facility engineers to respond to hot/cold calls, increased tenant satisfaction from improved thermal comfort, or added daylighting that makes a tenant space more marketable.

  A discount rate can be applied to determine the NPV of the project's returns to calculate a more complete representation of ROI, even for shorter hold periods. When going through the bid process with vendors, be sure to ask not just for costs, but also for expected savings, both consumption and operational. It is also important to understand that the bidders provide the basic assumptions for the calculations—including energy cost rate, operating hours, and equipment run time—and to ensure that the expected results are as accurate as possible.

- **Improved financials.** Is there an opportunity to improve ROI, either by bundling this project with complementary investments or by making the investment at the right time in the building life cycle? For example, adding a lighting retrofit to a chiller replacement project can help blend the financial metrics to a more desirable payback period. Should the company finance with low-cost debt at the point of purchase or refinancing, instead of paying for it with working capital or financing through a higher-interest loan during the hold period? Are utility incentives available to offset total project costs?

- **Source of capital.** Will the company pay for this project with internal capital or finance it with external sources? Using internal capital results in the strongest ROI but requires a large enough capital budget to fund the project; external finances can reduce/eliminate upfront costs while sacrificing ROI with interest payments. And depending on the owner's hold strategy, existing loans could complicate property disposition deals. Some firms have developed an internal revolving loan fund specifically to pay for sustainability projects, with the achieved savings returned directly to the fund to pay for future projects. No matter the financing mechanism, be sure to budget and underwrite improvements so they are part of the asset plan and do not appear to be a last-minute addition to asset managers or investors.

EVALUATE FINANCING OPTIONS FOR BIG-TICKET INVESTMENTS

Real estate organizations may have constraints on how much capital is immediately available for investments in existing buildings and may be unable to pay upfront for all cost-effective retrofits possible for a building in a single capital budget cycle. When internal funds are off the table, several external options exist to finance these projects.

New financing tools emerge regularly—so long as a sustainability project has the right financial metrics, there will be a way to finance it. Sustainability leads should stay on top of new financing tools and terms and look for the type of financing that works best for their companies' investment interests.

- **Conventional loan.** A commercial bank or company debt provider can give a loan to finance most capital improvement project investments. While loans will affect the cost of future debt (and the loan-to-value ratio), they are often the lowest-cost way to externally finance a project. Many real estate firms have a low "cost of capital" with their bank/debt provider and work with it directly to finance sustainability projects.

GREEN LOANS

The growing market for "green loans" was developed specifically to fund energy efficiency and sustainability investments, sometimes at a lower interest rate than conventional loans when certain conditions are met.

One example is Fannie Mae's Green Rewards program, which provides an interest rate discount of 0.1 percent to 0.3 percent and allows up to 5 percent more in loan proceeds if the building owner reduces the building's annual combined energy and water consumption by at least 30 percent, with a minimum energy reduction of 15 percent. Fannie Mae pays the cost of an energy and water audit. The bank also offers additional loan options for lower interest rates on buildings that are Green Building or Healthy Building certified.

- **Green revolving fund.** A company sets aside initial capital, allocated across a portfolio or several assets with a minimum rate of return that exceeds the organization's regular cost of capital. Projects expected to exceed the return rate are approved and funded, and the capital in the fund is repaid over time from monthly operating savings. To support management and tracking, funds can also be set up to allow for "administrative costs."

- **Green bonds.** Companies looking to raise capital for their sustainability investments can issue "green bonds"—a corporate bond specifically earmarked for investments in either sustainable new construction, sustainability retrofits in existing buildings, investment in on-site renewable energy, or a mix of all three. Although green bonds can have additional financial and impact reporting requirements compared with traditional corporate debt, they can attract new capital sources interested specifically in financing sustainable real estate projects.

IMPLEMENTING CAPITAL IMPROVEMENTS

Operational efficiency is a core strategy for the energy management program at **SL GREEN,** a fully integrated REIT, focused on Manhattan commercial properties. Best-in-class operations that are cost-efficient, scalable, and rapidly deployable are enabled by long-term capital investments in building infrastructure. These investments modernize base building systems, reduce operating costs, and increase a property's overall value.

SL Green partnered with Trane to install an ice plant at 11 Madison Avenue, replacing three existing chillers at the end of their useful lives with two high-efficiency chillers, achieving the same capacity while also lowering utility costs and carbon emissions. An ice plant is a high-efficiency cooling system that stores ice, created during off-peak hours, when the electric grid produces the fewest emissions, to generate chilled water for air conditioning. The building's ice plant consists of 64 individual ice tanks, a plate frame heat exchanger, a low temperature chiller, and a pumping system that produces about 500,000 pounds of ice per night. Enough ice is created to run the plant for nine hours during peak cooling season, substantially reducing the property's electricity consumption. By executing the installation ahead of schedule, SL Green also earned $2.4 million in Con Ed incentives, boosting project returns.

OUTCOMES

- Lowers tenant energy costs by 10 percent
- Decreases carbon emissions by 1.4 million pounds of carbon dioxide (CO_2) over 20 years
- Expected to generate nearly $14 million in utility savings over 20 years
- Replicated at a second property, generating an additional $11 million in savings and 766,000 pounds of CO_2 over 20 years

Chief engineer Ralph DiDomenico with the ice plant at 11 Madison Avenue, New York City. *(SL Green)*

"We have an insatiable appetite to reduce operating expenses and pass those savings on to our tenants. With New York City's goal to reduce carbon emissions 80 percent by 2050, we all have to take a serious look at reducing our footprint. SL Green is ahead of the curve, and we are making long-term decisions today in partnership with Con Ed and Trane to lead our industry and position our portfolio for success."

EDWARD V. PICCINICH, CHIEF OPERATING OFFICER, SL GREEN

- **Energy service performance contracts and "efficiency as a service."** An alternative to debt products, energy service performance contracts (ESPCs) and "efficiency as a service" (EaaS) contracts pay for the cost of a major retrofit out of the energy (or water) savings of that investment over time. Under an ESPC, a third-party company identifies opportunities for efficiency, promises a certain level of savings, and pays the upfront cost of a retrofit. To recoup its investment, it then charges a regular service fee that is less than the contractually promised operational cost savings from the investment, so that the net result is cash positive to the building owner. At the end of the contract, the ESPC will either renew the agreement (as a maintenance contract at a lower rate) or offer the opportunity to upgrade major systems to an even higher level of efficiency under a new contract.

  EaaS contracts are similar, but look more like a "rent-to-own" agreement, where lighting, HVAC, or other equipment is provided to a building under a 5- to 10-year contract and is paid for through a portion of energy savings. At the end of the contract, the equipment is "owned" by the building. EaaS providers often aim to finance upgrades with quick paybacks and long-term ROI rather than deeper retrofits with longer-term payback. Moreover, these contracts are long term and difficult to transfer at the point of asset disposition.

- **Utility on-bill financing.** Many utilities offer their own version of equipment finance, by financing building upgrades with no upfront cost and then charging back the cost of the project on a building's monthly electric bills (with interest). This type of financing allows building owners to make immediate improvements without having to build the upfront costs into their capital plan.

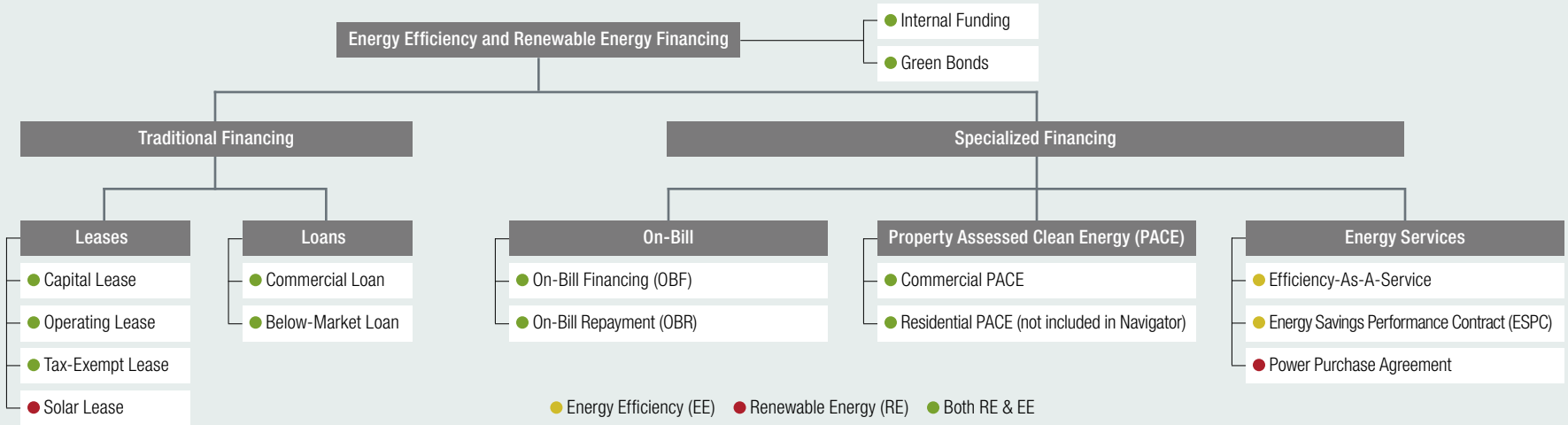
  For buildings that want tenants to pay for the benefits their space would receive from energy savings investments, utility on-bill financing is one clean way to make these investments immediately cash positive to tenants while ensuring that they help finance energy improvements in their space over the term of their lease. Note that on-bill financing programs often only apply to small businesses or certain customer subsectors in utility regions with grid strain, so the sustainability lead should check to see whether the property is eligible.

- **Commercial property-assessed clean energy (PACE).** In the many states with PACE-enabling legislation, owners of commercial and multifamily properties can now pay for the cost of major building investments off the balance sheet through their property taxes. With commercial property-assessed clean energy (C-PACE), a bank finances the upfront capital for a major sustainability investment and the owner (or the entity that pays the property taxes) pays for the investment over time on its property taxes (which are then transferred to the financial institution).

  C-PACE essentially acts like a second mortgage and can be used as part of a building's capital stack to make a project pencil out. C-PACE can be a good strategy to finance investments with a payback period longer than an owner's term, as these investments will pass to the next owner of the property. C-PACE can also help overcome the split incentive between owners and tenants, as the tax assessment and cost savings can be shared with tenants under most lease structures.

U.S. DEPARTMENT OF ENERGY'S BETTER BUILDINGS FINANCING NAVIGATOR

The **Better Buildings Financing Navigator** can help building owners find the right financing option for a specific project.



External Financing Comes with Risks

While external financing supports larger investments and retrofits, it does pose risks—mainly around the length of the term, how the funds are collected, and the consequences of breaking the agreement early. Before taking on financing, it is important to consider the potential risk of additional debt with terms, against the value it can deliver for the portfolio's financial and sustainability goals. Further, some financing strategies may be appealing to the property owner, but less attractive to the property's other investors. All financing strategies need to be carefully considered by the investment team in partnership with the sustainability lead and may require additional conversations with current investors and tenants.

The following are example challenges/risks of externally sourced financing:

- Many renewable energy finance contracts have a penalty for breaking the contract in the first five years, as this is the required term for the current federal investment tax credit. The organization that finances these deals will also require a building owner to pay back nearly 100 percent of a loan if it wants to exit the contract within five years.
- PACE loans supersede any other debt on a building, including preexisting mortgages. The primary mortgage lender on a property may sometimes not approve a new PACE loan to take precedence over its own.

TAKE ADVANTAGE OF NEW TECHNOLOGY

New technologies for real estate properties (commonly referred to as "proptech") are helping buildings be smarter, more energy and cost-efficient, and more responsive to tenant needs. Sustainability leads do not need to be proptech experts, but they should develop a process to identify, assess, and potentially pilot new technology as part of their sustainability strategy. Many stakeholders need to be engaged in this process, including information technology, asset management, property management, legal counsels, and externally trusted suppliers and peers. If the proptech installation affects tenants, they also need to be informed.

For real estate companies in need of testing a potential solution, pilots are a common way to assess a new technology's applicability to a portfolio. A pilot can determine whether an unproven solution works as advertised, and provides information to calculate a baseline ROI to determine a technology's total potential value to the portfolio. Once the results are understood, the sustainability lead can better determine whether/how to roll out the technology on a larger scale.

Tracking the array of available solutions can be overwhelming; a real estate organization can connect with innovative new technologies in multiple ways:

- **Proptech incubator.** Real estate or clean-tech incubators like Fifth Wall, VertueLab, and MetaProp provide capital to promising technology solutions and help them connect with the real estate industry. Many larger real estate firms either partner with these incubators to beta test technology or have developed their own internal incubators to assess and deploy new technology for their buildings.
- **Utility or government partnerships.** To meet efficiency goals, utilities or government entities will occasionally offer real estate organizations the ability to pilot emerging technologies. As an unbiased third-party, the utility/government program vets the vendor, installs the technology at little or no cost to the company, and monitors outcomes. Although not all technologies will yield impressive savings, they come at no extra cost and provide an opportunity to test potential benefits.
- **Cross-disciplinary membership organizations.** Membership organizations with a diverse group of members can be an excellent place to connect with and learn about potential technology and service providers. At ULI, Greenprint members engage with service providers and new technologies through the Innovation Partner program. Service providers are vetted by members to ensure honest feedback, and this partnership also provides the opportunity to pilot new proptech software.
- **Existing relationships.** Most sustainability leads work with an array of technical experts, including sustainability consultants, architects, and mechanical, electrical, and plumbing engineers whom service providers approach regularly about new technologies. These experts can help vet the viability, ROI, and long-term maintenance implications of new solutions, as well as help sustainability leads find ideal pilot buildings within a portfolio. Many vendors will also email or call sustainability leads of real estate organizations to pitch their new proptech solutions. This is not generally the preferred method to learn about new technologies; however, it is a way to connect directly with companies offering new innovations.
- **Conference trade shows.** As sustainability leads attend conferences to network with peers and learn best practices to bring back to their own companies, the trade show floor of vendors and service providers offers an opportunity to learn about new proptech innovations. Conference attendees can walk the trade show floor to browse the different booths' offerings, and when interested, engage with on-site staff to learn more about a specific proptech solution.

PILOTING NEW DECARBONIZATION TECHNOLOGIES

AXA IM–REAL ASSETS, a leading portfolio and asset manager, focuses on three pillars as part of its ESG strategy: decarbonization, resilience, and building tomorrow. To help the portfolio decarbonize and identify new opportunities to create and enhance value, AXA is piloting new technologies and strategies to later scale to other appropriate properties. Example pilots include Finnish multifamily buildings installing internal and external temperature sensors, fed with weather data and energy prices to support precise heating for each unit. In Sweden, multifamily buildings are being fitted out with solar panels and geothermal groundwater heating to create a more comfortable living environment while lowering energy costs for the owner and tenant.

AXA also piloted an innovative sustainable design and development strategy with Hello Lenzburg, a 20-unit multifamily building in Switzerland. Building construction incorporated prefabricated apartment modules built with Swiss timber. Bathrooms, kitchens (including energy-efficient appliances), doors, windows, and coverings were preinstalled. The support structure comprises steel scaffolding, making taller buildings possible and removing the need for a conventional building core. The building is also highly efficient, built in accordance with the Minergie-A standard, with a geothermal probe heat pump and a photovoltaic system producing 56,000 kWh of electricity per year—more renewable energy than is needed for operations.

The materials and development of this project lowered embodied carbon and total energy while saving about nine months of construction time and lowering material costs. These savings can also be passed along to the tenants, with a 3.5-room apartment costing about 1,600 francs (US$1,750) per month, a lower-than-average price. And in addition to a highly energy-efficient space that lowers energy costs, tenants at the building pay AXA directly for renewable electricity, generated on site at a much lower rate than electricity from the grid and removing the grid fee. With the lessons learned from Hello Lenzburg and tenant feedback, AXA expects that future developments using this technique will be constructed quicker and more cost-effectively.

OUTCOMES

- Eliminating unnecessary overheating in Finland saves 5 to 15 percent of energy consumption per property annually, translating into €1.6 (US$1.89) per square meter per year in additional net rent (1 percent of gross rents since owners pay heating costs directly).

Hello Lenzburg in Lenzburg, Switzerland. *(AXA Investment Managers)*

- Additional solar energy in Sweden was sold to the grid resulting in an annual NOI improvement of €0.58 (US$0.69) per square meter per year.
- Removal of boilers and burners in Swedish multifamily homes from geothermal groundwater heating is expected to reduce nonrecoverable operating expenses by €0.24 (US$0.28) per square meter over a 15-year lifetime.
- An EUI of 29.5 kWh per square meter was achieved at Hello Lenzburg, well below Switzerland's targeted energy efficiency.

"With Hello Lenzburg, we have designed and constructed an integrated sustainable building that meets tomorrow's expectations with a focus on energy efficiency and a variety of social aspects, which aligns with our integrated approach to responsible investment where we focus our efforts on decarbonization, resilience, and building tomorrow."

MAXIMILIAN KUFER, GLOBAL SUSTAINABILITY MANAGER, AXA INVESTMENT MANAGERS

INVESTING IN NEW TECHNOLOGY

RUDIN MANAGEMENT COMPANY, a private and diversified real estate owner, began investing in real estate technology in 2009. Rudin's strategy is to invest in technologies that enhance its business by making buildings run more efficiently, lease up faster, and improve tenant retention. Rudin is committed to the sustainable management of its portfolio and constantly evaluates its portfolio for opportunities to upgrade building systems and components with state-of-the-art, efficient equipment and technologies.

To operate its buildings as intelligently as possible, Rudin developed and piloted Nantum, ultimately establishing Prescriptive Data. Prescriptive Data's Nantum operating system analyzes data from disparate building systems (building management system, utility and power quality meters, and access control, to name a few) combined with data from third-party sources (such as weather, occupancy, and IoT [Internet of Things] sensors) to prescribe operational adjustments in real time that improve building performance and tenant comfort. These operational adjustments fine-tune building startup times or automatically adjust building mechanical system capacity control according to the actual and fluctuating real-time building occupancy level. It also makes energy-saving practices scalable, irrespective of the differences between buildings.

OUTCOMES

- Achieved $5 million in demonstrated savings across Rudin's commercial portfolio with Nantum
- Achieved an average annual normalized building energy savings of 9.4 percent and average annual nonnormalized building energy savings of 13.6 percent
- Reduces manual errors and frees up building staff from routine monitoring to proactively address issues that affect tenant satisfaction
- Achieved 70 percent reduction in hot and cold calls
- Received the Corporate Energy Management award from the International Chapter of the Association of Energy Engineers in 2020

NEXT PHASE

- **Return to work.** Using existing occupancy data within Nantum, the Prescriptive Data team has developed new features for their tenant mobile app. Rudin tenants now have a mobile app for building reminders and notifications. Tenants can view elevator wait times to better plan their day, see building indoor air quality conditions, and navigate their building with contactless access all through their mobile device.
- **Carbon accounting.** Earlier this year, the Prescriptive Data team launched a real-time carbon emission calculator across the Rudin portfolio. This module allows Rudin's operations and sustainability team to visualize each building's carbon emissions against its Local Law 97 2024 and 2030 carbon thresholds in real time, allowing operators to work toward compliance goals and more efficient operations. In the upcoming months, this carbon emission calculator will be accompanied by a real-time measurement and verification application for energy project ROI analysis, as well as a renewable energy generation application for tokenized carbon intensity trading.
- **Grid-interactive efficient buildings.** The Prescriptive Data team has been collaborating with several utility providers to demonstrate an automated demand response product offering. This product will create a direct connection between utility providers and building operators to decrease energy use during high-energy-demand days and alleviate stress on regional grids.
- **Cybersecurity.** The Prescriptive Data team has also been working on an automated smart building cybersecurity solution that will alert building operators to compromised building hardware and IoT devices and notify information technology (IT) and operations personnel of any potential intrusions. As the number of devices and data points within buildings exponentially increases, this solution will bridge the gap between the operations and IT teams and provide more security.

"Our role as owners and managers of real estate has changed dramatically, and our ability to make sense of the data we extract from our properties and use it to enhance the tenant experience is now crucial to our success. We created Nantum to help solve this problem, and we are very proud of what we have accomplished."

JOHN J. GILBERT III, CHIEF OPERATIONS OFFICER/EXECUTIVE VICE PRESIDENT, RUDIN MANAGEMENT COMPANY INC.

RESOURCES

Build the Financial Business Case for the Investment

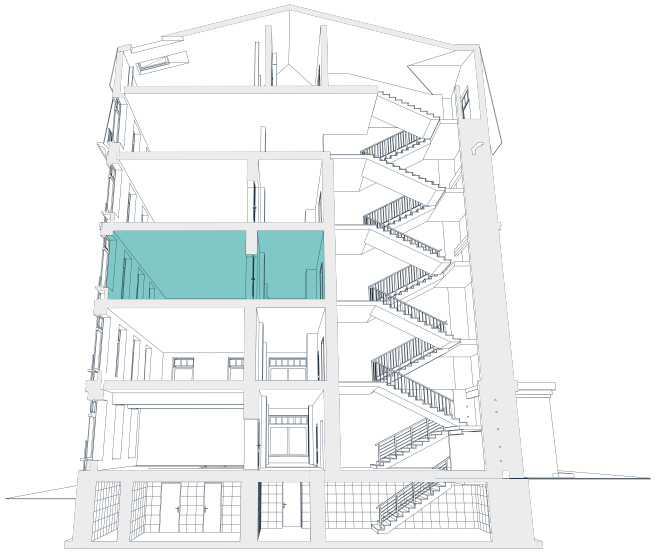
- *Breaking Down the Bottom Line: The Business Case for Energy Efficiency in Buildings,* Institute for Market Transformation: www.imt.org/resources/breaking-down-the-bottom-line-the-business-case-for-energy-efficiency-in-buildings/
- *Deep Retrofit Tools and Resources,* Rocky Mountain Institute: https://rmi.org/our-work/buildings/deep-retrofit-tools-resources/
- *The Financial Case for High Performance Buildings: Quantifying the Bottom Line of Improved Productivity, Retention, and Wellness,* Stok: https://stok.com/wp-content/uploads/2018/10/stok_report_financial-case-for-high-performance-buildings.pdf
- *Building Upgrade Value Calculator,* Energy Star: www.energystar.gov/buildings/tools-and-resources/building-upgrade-value-calculator

Evaluate Financing Options for Big-Ticket Investments

- *BOMA Energy Performance Contracting Model,* BOMA International: www.boma.org/BOMA/Research-Resources/1-BOMA-Reports/BOMA-Energy-Performance-Contracting-Model.aspx
- *Internal Funding,* U.S. Department of Energy Better Buildings: https://betterbuildingssolutioncenter.energy.gov/financing-navigator/option/internal-funding
- *Green Revolving Funds,* U.S. Department of Energy Better Buildings: https://betterbuildingssolutioncenter.energy.gov/toolkits/green-revolving-funds
- *Financing Energy Efficient Buildings: The Path to Retrofit at Scale,* Green Finance Institute: www.greenfinanceinstitute.co.uk/wp-content/uploads/2020/06/Financing-energy-efficient-buildings-the-path-to-retrofit-at-scale.pdf
- *Sustainable Finance Industry Guide,* NABERS: www.nabers.gov.au/publications/sustainable-finance-industry-guide

Take Advantage of New Technology

- *Global PropTech Confidence Index,* MetaProp NYC: www.metaprop.org/confidence-index/
- *Kilroy Innovation Lab,* Kilroy Realty Corporation: https://kilroyrealty.com/sites/default/files/171205_Kilroy_Sustainability_InnoLab_SNeff.pdf



INTEGRATING SUSTAINABILITY ACROSS THE REAL ESTATE VALUE CHAIN

With sustainable design and operation strategies established, sustainability leads can review and reset the practices of the real estate business beyond traditional building construction and operations. To create a stronger impact, the entire real estate value chain can integrate sustainability from supply chain to the investment committee.

ENGAGE THE SUPPLY CHAIN

A large portion of the emissions from real estate operations comes from the real estate supply chain, which consists of everything from building materials, mechanical equipment and fixtures, and equipment from building retrofits to paper products, cleaning supplies, and pest management. Engaging the supply chain on sustainability is important; it reduces the social and environmental impacts of the business operations, and it makes the supply chain more reliable and responsive. The sustainability lead can achieve this objective by developing a supply chain policy and set of criteria for vendors/suppliers to adhere to in order to obtain business from the real estate firm.

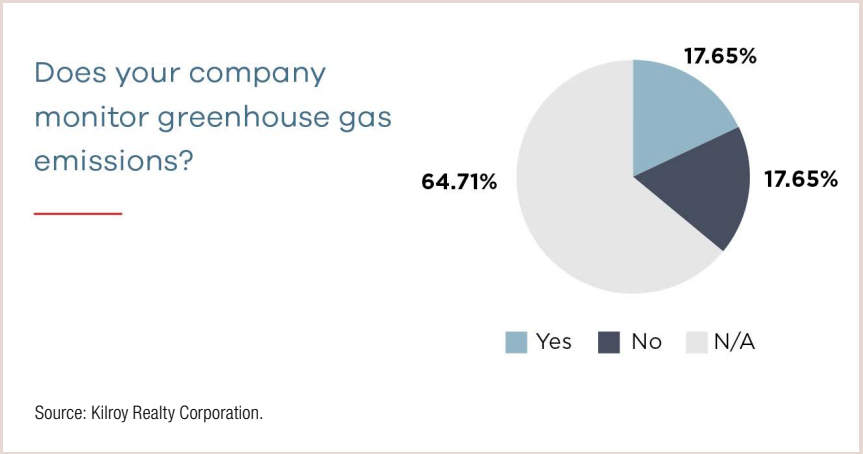
A real estate firm's supply chain could become an endless list. To maximize the impact, the sustainability lead can identify top suppliers by procurement spend, as the majority of spend represents a small "top tier" subsection of overall suppliers. Proactive engagement with these top stakeholders throughout the value chain is key, usually at no additional cost to the developer beyond staff time to manage the communications.

At minimum, the real estate firm's supply chain policy should specify a preference for ecocertified low-carbon, locally sourced, preferably recycled-content building materials, with an expectation that construction waste be reduced, reused, and recycled. This requirement can be written into RFPs for any supply chain contract.

"We recognize that much of the environmental footprint of our operations lies in our supply chain, the services and products we procure to construct and operate our buildings, and the services and products that those suppliers in turn procure. From 2018 to 2019, we conducted a supplier excellence survey to understand the environmental and social performance of our critical Tier 1 operational suppliers, those suppliers with whom we interact directly and for whom a business disruption on their part would cause an immediate disruption to our business. The extensive survey showed that our Tier 1 suppliers are more sophisticated on social issues such as human rights than on environmental issues such as carbon, and we look forward to helping them improve performance in the future."

SARA NEFF, SENIOR VICE PRESIDENT OF SUSTAINABILITY, KILROY REALTY CORPORATION

KILROY REALTY CORPORATION'S 2019 SUPPLIER EXCELLENCE SURVEY



Source: Kilroy Realty Corporation.

Assessing Suppliers

Companies are also being increasingly assessed by their sustainability performance. Key global sustainability ratings and rankings have been putting more priorities on companies' supply chain risk management, supplier engagement programs, and supply chain impacts.

The supply chain policy for a real estate company can cover both the products of the vendors (both new and current) and their internal governance and practices. Responsible supply chains can be driven through the creation of company-wide ESG policies, action plans, training, and supplier evaluation on the topics of business ethics, child labor, health and safety, environmental process and product standards, human health-based product standards, human rights, and labor standards.

Although third-party procurement firms can assess potential risks within a supply chain, some internal best practices should be considered:

- Develop a code of conduct for all suppliers that outlines expectations for how a supplier conducts business. These suppliers should commit to high ethical standards, pay fair wages, comply with laws and regulations, and demonstrate a commitment to reducing the environmental impact of their operations.
- Screen vendors for ESG criteria that align with the real estate organization's standards and objectives.
- For already-contracted vendors, regularly audit for compliance with ESG performance criteria thresholds through a survey or some other assessment. While this can be a challenge to roll out across all suppliers, real estate organizations should focus on the top-tier suppliers that make up a large percentage of a company's annual spend.
- Create a formalized process to meet with and provide feedback to vendors based on their ESG performance.
- Track and report on performance and all supply chain risks over time to guide decision-making and improve performance, and continue to reassess these metrics to ensure that they are meaningful and accurately measure performance aims.

KEY SUPPLIER CODE OF CONDUCT VALUES

- Legal compliance
- Human rights, including child and forced labor
- Discrimination and harassment
- Wages and working hours
- Health and safety
- Environmental stewardship and resource management
- Fair competition
- Corruption, extortion, and embezzlement

INTEGRATE SUSTAINABILITY INTO THE INVESTMENT CYCLE

Acquisitions and dispositions present a significant opportunity to create value through investments in energy efficiency, health, and building resilience. Understanding the sustainability potential value of a high-performing, sustainable building allows buyers and sellers to better assess and price the deal going in, to underwrite sustainability investments to drive higher returns, to market the value created by these investments to tenants, and to communicate this value to buyers when selling an asset.

"PGIM Real Estate utilizes a data-driven approach to ESG during preinvestment, operations, refurbishment, and disposition. By doing so, we believe we are minimizing ESG-related risks while maximizing returns for our investors."

DAVID DEVOS, VICE PRESIDENT, GLOBAL DIRECTOR OF SUSTAINABILITY, PGIM REAL ESTATE

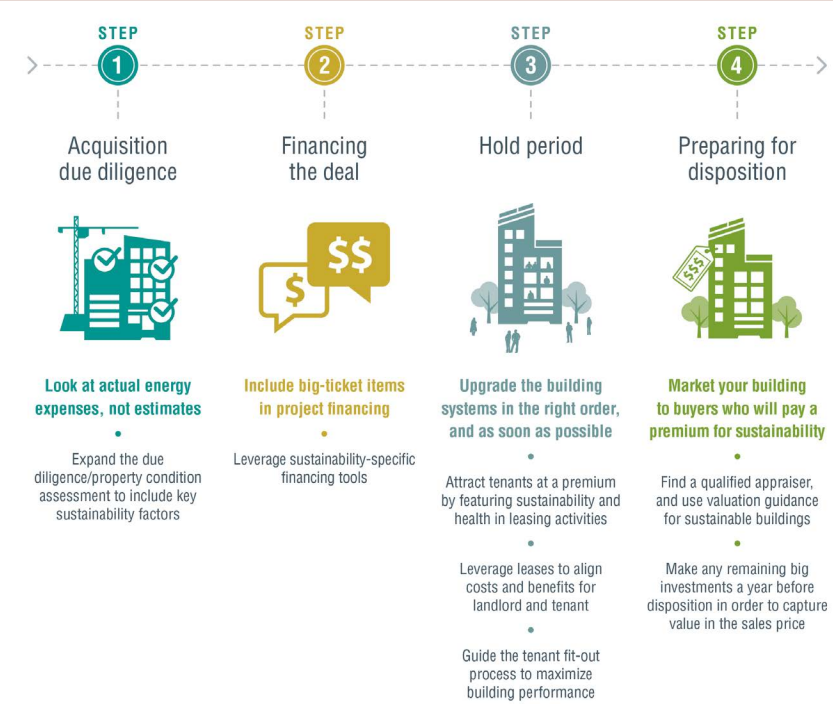
Acquisition of a property provides a key opportunity to assess sustainability opportunities, with some organizations creating a sustainability analysis for every potential acquisition the investment committee considers. During due diligence, the property condition assessment (PCA) can also uncover a number of opportunities to add value during underwriting and the hold period, as well as a number of risks by reviewing the building's green certification or certification potential, commissioning statements, current leases, long-term climate risks, and health aspects. If any of these areas identified from the PCA require major investment, acquisition financing is the most strategic time to make those decisions, as the cost of capital is lower for the acquisition than for a loan during operations. This capital or sustainability-specific financial product can be used to replace major systems or future-proof the buildings.

During the due diligence or hold period, an energy audit can identify additional opportunities that can be integrated into the investment plan. Investments could include upgrading building systems in a strategic order (e.g., high-performance windows and better building insulation enable maximum downsizing of HVAC systems), partnering with tenants interested in sustainability to identify potential upgrades, greening leases to align costs, and maximizing performance through the tenant fit-out.

When disposing of an asset, sustainability can be leveraged to market the building and can even be used as a tool to make long-term investments; if projects can exhibit a positive impact on NOI within the first 12 months of operation, it can be written into the future cash flows of the building and captured in the sales price, immediately increasing the value of the asset.

ULI's report *Embedding Sustainability in Real Estate Transactions* provides further guidance on how to incorporate the value of sustainability in transactions.

11 STRATEGIC OPPORTUNITIES TO EMBED SUSTAINABILITY IN REAL ESTATE TRANSACTIONS



Source: Urban Land Institute, *Embedding Sustainability in Real Estate Transactions,* 2019.

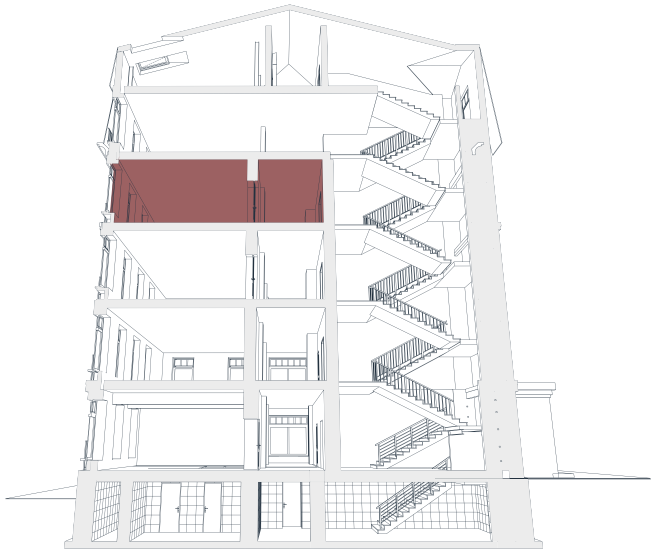
RESOURCES

Engage the Supply Chain

- *Green Building Standards and Certification Systems,* Whole Building Design Guide: www.wbdg.org/resources/green-building-standards-and-certification-systems
- *Living Building Challenge Resources: Materials Guidance,* International Living Future Institute: https://living-future.org/lbc-3_1/resources/#materials-guidance
- *Managing ESG Risk in the Supply Chains of Private Companies and Assets*, U.N. Principles for Responsible Investment: www.unpri.org/download?ac=1894
- *Sustainable Procurement in the Real Estate Industry: Towards a Better Involvement of the Supply Chain,* GRESB: https://gresb.com/sustainable-procurement-real-estate-industry-better-involvement-supply-chain/
- *The Red List,* International Living Future Institute: https://living-future.org/declare/declare-about/red-list/

Integrate Sustainability into the Investment Cycle

- *Acquisitions Sustainability Toolkit,* U.K. Better Buildings Partnership: www.betterbuildingspartnership.co.uk/acquisitions-sustainability-toolkit
- *An Introduction to Responsible Investment: Real Estate,* U.N. Principles for Responsible Investment: www.unpri.org/an-introduction-to-responsible-investment/an-introduction-to-responsible-investment-real-estate/5628.article
- *Embedding Sustainability in Real Estate Transactions,* Urban Land Institute: uli.org/sustainabletransactions



TRACKING, REPORTING, AND COMMUNICATIONS

As a sustainability program starts to achieve success and sets goals for the future, it is important to track and report on all progress and results. Sustainability leads are often responsible for reporting progress to both internal and external stakeholders. These communications can involve formal reports as well as responses to informal requests. Ensuring that strong data-tracking policies and practices are in place is key to understanding progress, adjusting as needed, and creating meaningful reports to share the results.

TRACK PERFORMANCE

All too often, benchmarking data sit in a dashboard and are not used to their full potential. Tracking the performance of a real estate portfolio against its baseline, against its goals, and against its peers is critical to driving progress and improvement. Performance data trends can be used by the sustainability lead to adjust a strategy or double down on an initiative. As performance metrics are tracked over time, the sustainability lead may also decide to publish these results, either internally to showcase successes and build momentum or externally to showcase results to the broader marketplace.

ESTABLISH SUSTAINABILITY REPORTING

Reporting collected performance data and organizational policies helps a company understand its performance, measure achievements, and identify opportunities for improvement across the portfolio. Sustainability reporting refers to the disclosure of performance data or policy information to a third-party standard. Some external reporting is required by investors, whereas other reporting is voluntary to show market leadership. No matter the reporting method, the reporting process requires strict attention to detail and is often very time-consuming.

To ensure that sustainability reporting metrics are comparable across the larger industry and define content to include in a public report, many organizations align with a disclosure standard. This disclosure standard can be used to inform content in a public corporate sustainability report or other document. In addition, multiple public disclosure initiatives exist to which companies can disclose ESG data that are indexed and scored based on progress. Each of these frameworks and disclosure initiatives supports transparency and informs investors on the environmental impact of their investments.

COMMON SUSTAINABILITY REPORTING FRAMEWORKS AND DISCLOSURE INITIATIVES

- **CDP.** Global disclosure system for investors, companies, cities, states, and regions to manage their environmental impacts. They can submit ESG data for climate, water, or forests. Data supplied are assessed and scored to measure progress and incentivize action.
- **European Association for Investors in Non-Listed Real Estate Vehicles (INREV) Sustainability Reporting Guidelines.** A disclosure framework that highlights meaningful data that provide insight into an organization's ESG efforts in line with annual financial reporting.
- **European Public Real Estate Association sBPR Database.** A set of guidelines for consistently measuring sustainability performance across 28 different ESG metrics for listed European real estate companies.
- **Global Reporting Initiative (GRI).** Global standards for sustainability reporting to communicate impact on critical sustainability issues, such as climate change, human rights, governance, and social well-being.

(continued on next page)

COMMON SUSTAINABILITY REPORTING FRAMEWORKS AND DISCLOSURE INITIATIVES (continued)

- **GRESB.** Assessments of and benchmarks for the ESG performance of real assets, based on what investors and the industry consider to be material issues and aligned with international reporting frameworks. Results of this analysis provide standardized and validated data to investors, including portfolio scores.
- **ISO 140001.** Standards for environmental management systems. Standards include approaches to audits, communications, labeling and life-cycle analysis, and environmental challenges such as climate change.
- **S&P Dow Jones Index ESG Scores.** A robust survey-based approach to evaluating corporate ESG performance with a focus on financial materiality.
- **Sustainability Accounting Standards Board (SASB).** Industry-specific standards that communicate financially material sustainability information, including key topics, metrics to report, and ways to normalize.
- **Sustainable Development Goals (SDGs).** Seventeen goals adopted by all U.N. member states that provide a global blueprint for peace and prosperity for people and the planet, including methods to improve health and education, reduce inequality, end poverty, protect the environment, and spur economic growth.
- **Task Force on Climate-Related Financial Disclosure (TCFD).** Consistent climate-related financial risk disclosures for use by companies to consider the physical, liability, and transition risks associated with climate change and what constitutes effective financial disclosures across industries.
- **U.K. Better Buildings Partnership.** Member-submitted annual performance data to create industry benchmarks for commercial properties in the United Kingdom.
- **U.N. Principles for Responsible Investment.** Annual reports by signatories on their ESG activities, including the investment policies and accountability mechanisms covering at least 50 percent of assets under management. In 2020, TCFD-based reporting will become mandatory.
- **ULI Greenprint.** Member-submitted annual performance data to track progress toward reaching a 50 percent reduction by 2030 and to create industry benchmarks.

With a variety of reporting structures and investor requests, how a sustainability lead chooses to communicate the tracked progress and reported results can vary widely. These decisions, including where to report, will all need to align with the organization's overall goals for the sustainability program, as set during the program's development.

Corporate Sustainability Reports

Once a company has a comprehensive set of policies and data, the sustainability lead can create a publicly available corporate sustainability report. An annual and public-facing corporate sustainability report often includes details on an organization's overall environmental impact, corporate policies and programs, progress toward organizational goals, and case studies on new and innovative projects. Corporate sustainability reports generally provide standardized information based on reporting frameworks like the GRI or SASB and aims to share relevant ESG information with investors, residents, employees, and communities.

"Parkway reports to initiatives like GRESB to validate our performance across environmental, social, and governance practices, as well as health and well-being and climate and resilience topics. Reporting helps us compare our performance against our internal targets and the performance of our peers. High GRESB scores are associated with high-quality management and strong operational and financial performance of our assets and are sought after by investors. By participating in peer comparisons and industry benchmarks, we can evaluate our progress, remain competitive, and boost our reputational value in the marketplace. Other than ESG frameworks, we also report to various certifications and rating systems, such as LEED, Energy Star, and the Department of Energy's Better Buildings Challenge. We have been involved with Energy Star since its inception in 1999 and with the U.S. Green Building Council since we began LEED-certifying our buildings in 2011, and continuing to benchmark our buildings through these certification systems has helped us continue to increase the performance of our portfolio over time."

KARA EDMONSON, ASSOCIATE DIRECTOR OF SUSTAINABILITY, PARKWAY PROPERTIES

REPORTING RESULTS TO INVESTORS AND THE MARKET

As a leading asset manager responsible for managing a global real estate portfolio on behalf of its clients, **DWS** considers ESG benchmarking, performance reporting, and performance disclosure to be important pillars of a successful global sustainability program. The primary driver for DWS's focus on ESG reporting and performance disclosure is to provide transparency to investors as evidenced by DWS's participation in investor-oriented reporting schemes, such as GRESB and PRI.

By reporting on ESG performance and disclosing its ESG performance scores, DWS signals to investors that the firm is committed to transparency and the inclusion of ESG performance considerations in its investment philosophy. These ESG reporting frameworks also provide valuable feedback on the strengths and weaknesses of the DWS sustainability program, allow DWS to benchmark the firm's ESG performance against its peers, and help DWS set goals for the following year. For DWS, reporting creates a positive feedback loop that results in increased focus on continuing to improve ESG performance with each passing year. The value and progress achieved over time have led DWS to consider participating in additional reporting frameworks to help further refine its sustainability program with respect to topics such as carbon mitigation, climate change adaptation, and resilience.

DWS property. *(DWS)*

OUTCOMES

- In 2012, DWS submitted its first GRESB assessment for one U.S. fund, and now eight years later DWS is submitting GRESB assessments for 15 of its funds across the United States and Europe.
- DWS is currently reviewing additional ESG reporting frameworks, including CDP, TCFD, and Science Based Targets, to further signal the firm's commitment to sustainability and is reporting ESG performance and issues to investors.

"As investors continue to show increased interest in ESG disclosure and performance, we make every effort to improve and expand our reporting capabilities."

ZACHARY BROWN, ENERGY AND SUSTAINABILITY DIRECTOR, DWS

"Documenting our environmental, social, and governance performance through annual ESG reports is a key component of stakeholder engagement. Now, more than ever, prospective and current investors are evaluating our ESG performance and want to see positive trends. Our annual ESG reports showcase our most material ESG achievements, and there is growing interest among our employees and tenants to get involved in our ESG program as we work to ensure a long-term and sustainable future for our communities and our company."

DAVID STRIPH, EXECUTIVE VICE PRESIDENT, HEAD OF OPERATIONS AND INVESTOR RELATIONS, HOWARD HUGHES CORPORATION

An example corporate sustainability report can include the following information:

- Letter from a senior executive showcasing the organization's commitment to ESG
- Highlights from the past year, including awards or recognition, targets achieved, and high-level performance metrics (total energy, water, and waste reductions)
- Outline of all program goals, including external initiatives the organization is aligned with and total progress toward each of those goals
- Overview of the reporting framework used for the report
- Policies, program highlights, and case studies on material topics, such as energy, water, waste, carbon, transportation, materials, employee education, biodiversity, health and wellness, social equity and workforce development, diversity, and gender equity initiatives.

Although some companies issue a separate sustainability report, other companies are moving toward including the financial and nonfinancial performance metrics into one combined annual progress report. This way, investors can view material environmental and financial metrics all together, further linking environmental performance to financial performance.

COMMUNICATE PROGRAM RESULTS

Communicating the results of a sustainability program helps articulate the value of sustainability in both an up market (capture more value, land the anchor tenant, attract more capital) and a down market (reduce costs, squeeze more value out of existing assets, future-proof portfolio). Using aligned metrics and a common language, real estate firms can better communicate their performance with one another and with tenants. The data communicated could be from utility bills, measurement and verification of a project, tenant surveys, or other sources. Audiences can range from internal company peers and tenants to investors and the public market.

Internal Company Updates

Many real estate organizations now note that sustainable business practices are of great interest to top young talent, with multiple surveys showing that the majority of millennials prefer working at a company with social responsibility practices and actively consider this when making a job decision.

Internal sustainability newsletters help communicate success stories and track progress toward company goals. These newsletters keep all employees informed on the work and increase the likelihood that someone will identify a new way to make their work more sustainable. After all, a good idea can come from anywhere!

Internal reporting also helps build accountability for sustainability goals across the organization. Highlighting individuals who helped drive the sustainability program in different departments provides positive reinforcement for these internal champions, and some healthy competition for other program leads who see their peers being recognized across the company.

Lastly, internal updates are important for the C-suite to understand the successes and value that the sustainability program brings to the company. This practice helps drive buy-in from top-down leadership and ensures longevity of the firm's sustainability efforts.

Engaging and Marketing to Tenants

Tenants play an important role in a building that is operating sustainably, and sustainability can also help a building attract new tenants. Many large corporate tenants—including tech companies, law firms, and consulting firms—now have their own sustainability mandates and are looking for office space that aligns with their organizational commitments. Moreover, strong research shows that sustainable or green-certified spaces make tenants more productive and healthier. Further, multifamily residents are becoming more aware of the impact real estate has on the environment and are looking for sustainable choices. With these new drivers, owners of sustainable real estate are reporting faster lease-up times, stronger retention, and even rental premiums.

Showcasing a Commitment to Sustainability to Secure Tenants

A green-building certification is often the easiest way to indicate your sustainable commitment to tenants, especially those generally unfamiliar with energy efficiency strategies. Real estate brokers can also play an important role here, as they can help educate tenants on the benefits of a sustainable building. However, to make those recommendations, the broker needs access to educational materials about the building beyond just the certification's name, including a one pager outlining sustainable features. Some owners have also leveraged signage in rentable spaces that highlights the building's green features, making it clear to every tenant the building's commitment to sustainability and lower operating expenses versus peer buildings.

ANNUAL CORPORATE SUSTAINABILITY REPORT

ALLIANZ—one of the world's largest insurers, investors, and assistance providers—has issued a group-wide corporate sustainability report for the past 20 years. Originally communicating the company's environmental impacts, the report's scope has since expanded to provide transparency on the company's broader ESG activities, including corporate governance, stakeholder engagement, and social inclusion. The primary stakeholders for this report are investors, ratings agencies, and nongovernmental organizations (NGOs). Allianz also prepares a sustainability brochure in six languages for its customers, distilling over 100 pages of content in the main report into 10 pages that highlight the company's sustainability story in a consumer-friendly format.

While reporting requirements exist for listed companies, particularly in Europe, Allianz has also committed to reporting against GRI standards. To identify other material topics to include in the report, Allianz conducts a materiality assessment every two years by interviewing NGOs and other stakeholders, researching hot topics, and including sustainability questions in the customer marketing survey.

As the world's largest investor in the asset class, Allianz Real Estate not only acquires buildings that fulfill the highest sustainability standards, but also is committed to encouraging business partners to achieve globally recognized or locally dominant green building certifications. With regard to new fund investments, Allianz Real Estate only works with partners that are equally committed to ESG guidelines. As a responsible long-term investor and active asset manager, Allianz Real Estate transforms and innovates buildings to keep the portfolio's environmental standard at the highest level. This commitment also translates into engagement with the tenants of buildings owned—or financed—where the business pushes partners to improve ESG standards and energy performance across Europe, the Asia-Pacific region, and the United States.

Since Allianz has made strong climate commitments, reporting comprehensive and accurate data is key. On the real estate side, for both corporate offices and investment properties, strong data quality controls are in place. For energy consumption data, for example, these can range from automated digital smart meter readings to meter readings written down and photographed for audit purposes. Putting in the additional work and controls at the beginning of the data collection process ensures high quality and auditable data on the back end, with each report receiving a third-party audit.

Finally, the sustainability report is released in a digital format to investors through the investor relations portal, to employees through internal communications, and to all external stakeholders through coordinated social media and the company website.

Allianz Group's corporate sustainability report for 2019. *(Allianz)*

> "At Allianz, we seek to integrate sustainability into existing processes as much as possible. Future sustainability reports will now be the responsibility of the finance team, and instead of parallel processes, the sustainability and annual report will receive the same rigor and same data quality processes to ensure that we use our roles as an insurer, investor, and asset manager to manage the risks posed by climate change and to foster a more inclusive society."

NICO AHN, PROJECT MANAGER, ESG BUSINESS INTEGRATION AND SUSTAINABILITY REPORTING, ALLIANZ GROUP

OUTCOMES

- The report provides the most comprehensive overview of Allianz's ESG integration approach and nonfinancial data for all stakeholders.
- Allianz was one of the first Germany-based companies providing a comprehensive climate disclosure based on the recommendations of the Financial Stability Board's Task Force on Climate-Related Financial Disclosure in its sustainability report.
- The report is one input in helping Allianz achieve the number one position in the Dow Jones Sustainability Index's insurance industry group for the past three years.

SELLING SUSTAINABILITY

Real estate brokers help sell and lease buildings and are a strong link between property owners and tenants. Brokers can help tenants make informed decisions by showcasing a property's energy and sustainability performance, and sustainability leads should be sure to educate brokers on the benefits of these features and green leases.

By using sustainability details to market a space, brokers create a more comprehensive market standard in evaluating and leasing commercial office space. And by emphasizing the competitive advantage of the sustainability features, brokers also benefit by leasing spaces faster or for higher-than-average rents.

Ongoing Engagement during Tenant Occupation

Once tenants have signed leases and moved in, there are continued opportunities to engage them in sustainable building operations, which reduces utility costs for both the tenants and owner. It also builds a strong relationship between the owner, property manager, and tenant. The following are some opportunities for communicating with and educating tenants on sustainable practices after they occupy the space:

- Tracking and reporting on annual savings you achieved together, whether publicly in the lobby or privately via email
- Signage and job aids (like a startup and shutdown checklist) to enhance performance
- Competitions and recognition for achieving success, at the building and tenant level (annual gathering to complete LEED EB or review Energy Star score and discuss ways to work together to do even better)
- Celebrations of sustainability-related events, like Earth Day, Earth Hour, or Bike to Work Day

Recent research shows that tenants continue to improve their performance over time as long as the building owner continues the conversation—even during "Waste Education Month," the tenants will continue to think about sustainability in general and conserve energy and water use as well.

INVESTOR QUESTIONS FOR CURRENT OR PROSPECTIVE FUND MANAGERS THAT SUSTAINABILITY LEADS SHOULD BE PREPARED TO ANSWER

- Do you follow any international standards, industry guidelines, reporting frameworks, or initiatives that promote responsible investment practices?
- What policies and programs do you have in place to address diversity and inclusion?
- How do you engage stakeholders within the communities in which you operate?
- How is ESG considered during the investment process?
- What is the portfolio's exposure to climate risk, and how are you mitigating it?
- Are you tracking environmental metrics (energy, carbon, water, and waste)? If so, how are they trending over time?
- What projects are you implementing across your portfolio?
- Are you employing innovative technologies or renewables?
- How are you engaging with service providers and property-occupant stakeholders on sustainability?
- What is the average Energy Star score of your properties, and how much has it improved over time?
- What kinds of certifications and external ratings have been achieved?

Communicating to Investors

Many investors now see ESG as material to long-term investment returns and work with asset managers to balance ESG and financial returns. These investors ask real estate owners and asset managers for information on their funds' ESG programs when allocating capital and reviewing performance. These reporting requests can take multiple forms:

- ESG questions in RFPs or informal requests to disclose progress toward portfolio-level goals
- Industry-wide reporting initiatives like the real estate-specific GRESB or broader cross-industry reporting frameworks like the CDP, GRI, and TCFD

ENGAGING OFFICE TENANTS ON SUSTAINABILITY

At **COMMONWEALTH PARTNERS,** a privately owned real estate investment, development, and management organization, stakeholder engagement is key to promoting tenant satisfaction and sustainable operations. CommonWealth maintains a monthly calendar of sustainability events on topics such as Earth Day, Earth Hour, Bike to Work Day, Daylight Hour, energy, water, waste, social responsibility, health and well-being, and more. Programs are communicated to tenants through the corporate and property-specific websites, as well as newsletters and annual reports. All new tenants receive green lease language, a "Green Office Guide," and other property-specific guides, including a sustainability leasing flyer. CommonWealth's "Green Office Guide" provides several simple and low-cost strategies and resources to create a sustainable office. It was designed to be used in conjunction with the Green Tenant Improvement Guide, which shows how sustainable tenant spaces can boost employee health and productivity.

At City National Plaza—two 52-story multitenant class A office towers in Los Angeles—the property team ensures sustainable operations that assist in minimizing environmental impact while providing tenants a boost to occupant well-being through continuous tenant engagement. In addition to CommonWealth's Green Guides, tenants are kept informed through a biannual sustainability newsletter, quarterly lobby events, and annual e-waste and Earth Day events. In one year, City National Plaza held numerous events for tenants and employees, including the Wildlife Learning Center, book fairs, an earthquake Lunch N' Learn, boardroom yoga, and Wellness Wednesdays that feature health-focused lunch programs, flu shots, or blood donation drives.

OUTCOMES

- Hosted 25 events for 6,720 occupants of City National Plaza in 2019
- Achieved LEED Platinum, Energy Star, BOMA 360, and Fitwel 1 Star certification

City National Plaza in Los Angeles. *(CommonWealth Partners)*

"Our team works hard to find creative ways to engage tenants, but the true point of pride for the CommonWealth Partners team is how well the building is managed and operated on a day-to-day level. And sustainability is woven throughout these operations, whether they are engaging tenants through environmentally themed events like Waste Awareness Month or offering green amenities like bike storage."

RICHARD COREY, GENERAL MANAGER, COMMONWEALTH PARTNERS

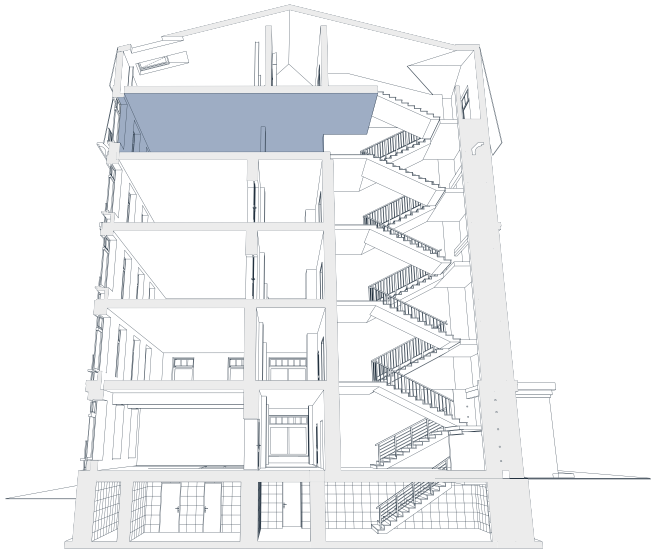
RESOURCES

Establish Sustainability Reporting

- *Business Reporting on the SDGs: An Analysis of the Goals and Targets,* GRI and U.N. Global Compact: www.globalreporting.org/resourcelibrary/GRI_UNGC_Business-Reporting-on-SDGs_Analysis-of-Goals-and-Targets.pdf
- *Changing Course Real Estate: TCFD Pilot Project Report and Investor Guide to Scenario-Based Climate Risk Assessment in Real Estate Portfolios,* U.N. Environment Programme Finance Initiative: www.unepfi.org/wordpress/wp-content/uploads/2019/11/TCFD-Real-Estate-Web_final_28112019.pdf
- *Forging a Path to Integrated Reporting,* GRI: www.globalreporting.org/resourcelibrary/GRI-CLG_IntegratedReporting.pdf
- *Using GRESB to Leverage Investment Portfolio Sustainability,* INREV: www.inrev.org/system/files/2017-11/INREV_Sustainability_Case_Study-Goodman.pdf

Communicate Program Results

- *7 Ways to Effectively Work with Your Investor Relations Team on Sustainability,* Greenbiz: www.greenbiz.com/article/7-ways-effectively-work-your-investor-relations-team-sustainability
- *Changing the Climate, Changing the Future: Integrated Sustainability Report 2020:* City Developments Limited: http://cdlsustainability.com/pdf/CDL_ISR_2020.pdf
- *Essential Guide to Enhancing Investor Engagement,* CFO Leadership Network: www.accountingforsustainability.org/en/knowledge-hub/guides/enhancing-investor-engagement.html
- *Successes in Sustainability: Landlords and Tenants Team Up to Improve Energy Efficiency,* Energy Star: www.energystar.gov/buildings/tenants/recognize_and_communicate_success/successes_sustainability
- *Sustainability & Employee Engagement,* Greenbiz: www.greenbiz.com/report/sustainability-employee-engagement



THE EVOLUTION OF "SUSTAINABILITY" PROGRAMS

The role of a sustainability lead has expanded over time to take on such aspects as climate risk, environmental protection, tenant health, and community engagement. Sustainability programs are no longer simply about implementing projects to save energy, water, and waste; the goals are loftier, the expectations are higher, and the scope is wider. The three parts of ESG—environmental, social, and governance—all fall within the purview of sustainability directors. In 2020, the COVID-19 pandemic and racial justice protests are shifting the conversation even further and bringing greater attention to health and racial equity in the context of real estate, with regard to both addressing historic injustices and determining how to make improvements going forward.

COVID-19 has accelerated an already-growing conversation, with tenants more aware than ever of the built environment's impact on their health and well-being. To address that impact, many building owners are increasing ventilation, enhancing cleaning standards, and reducing building touchpoints.

In addition, the 2020 racial justice protests across the globe further elevate the need for the real estate industry to acknowledge this legacy while prioritizing investments to make real and lasting progress. The Black Lives Matter movement is driving a new intensity in the industry to acknowledge the systemic failures in community planning, real estate development, financing, and hiring that have helped establish a legacy of racial inequities. Fully identifying and rectifying these failures will help the industry build just and inclusive communities that can thrive.

While these events may lead to the creation of new positions in real estate organizations, such as a chief public health officer or chief diversity and inclusion officer, the sustainability lead should stay aware of these issues and understand how ESG and sustainable real estate can positively influence vulnerable populations. In addition, sustainability leads should be prepared for the possibility that ESG reporting initiatives—which already include questions on health, resilience, and equity—may increase requests for this type of information in coming years.

SET A PATHWAY TO NET ZERO

To meet the goals of the Paris Climate Accord, many countries, cities, and private-sector leaders are calling for a new global goal of net-zero carbon by 2050. Major tenants, like tech companies, have already set net-zero goals and are looking for spaces that align with their targets, and a global coalition of investors have made their own commitments to achieve net-zero carbon in their investment portfolio by 2050 or earlier. For real estate, this means that buildings and portfolios will have to develop their own pathway to net-zero carbon. Cities are also passing local regulations and codes to require net zero in both new and existing buildings in the future.

Not every real estate organization is ready to set a public net-zero target today; to stay aligned with the market and to ensure that net-zero regulations will not make buildings functionally obsolete, all organizations should consider a strategy to achieve net zero over time. It is becoming more and more cost-effective to work toward this goal, as new technologies become available, proven solutions become cheaper, new development techniques are implemented, and incentives are increasingly available.

Although net-zero carbon is required to avoid the most severe impacts of climate change, the real estate industry is also looking to achieve net-zero energy, net-zero water, and net-zero waste to reduce its overall environmental impact, with complementary strategies.

SETTING NET-ZERO GOALS

HUDSON PACIFIC PROPERTIES, a REIT focused on West Coast epicenters for media and technology, has set leadership in sustainability—whether designing a new property, reimagining a dated building, or managing its existing portfolio—as a strategic priority. As part of that strategy, the company has set bold goals to achieve net-zero carbon and net-zero waste in all operations by 2025.

To achieve net-zero carbon, Hudson Pacific is taking a two-pronged approach that focuses first on reducing energy use as much as possible, and then on converting remaining energy consumption to renewable sources. To maximize energy efficiency, the company is investing in a mix of capital and operational projects to reduce its energy consumption, including LED lighting, variable frequency drives and equipment retrofits, and real-time energy management software.

The renewables strategy prioritizes on-site generation wherever feasible, even integrating solar panels on the vertical facade of the Epic office tower in Hollywood, California. However, recognizing the limited potential of on-site renewables to power its entire portfolio, Hudson Pacific entered into a three-year renewable energy credit agreement in 2019, effectively eliminating all Scope 2 GHG emissions and taking the company 80 percent of the way to net-zero carbon. With the remaining element of the company's carbon footprint now driven by the natural gas use in its buildings, Hudson Pacific is currently exploring various ways to reduce natural gas usage, including converting from gas to electric appliances wherever possible, as well as securing carbon offsets.

In parallel with these decarbonization efforts, Hudson Pacific is also implementing a net-zero waste strategy by strongly engaging building stakeholders, such as property management, tenants, janitorial teams, and waste haulers. Initial efforts include a portfolio-wide analysis of the current recycling and composting services and identifying opportunities to expand landfill diversion services with key waste haulers. In addition, Hudson Pacific is piloting and scaling zero-waste solutions, sharing best practices across all markets.

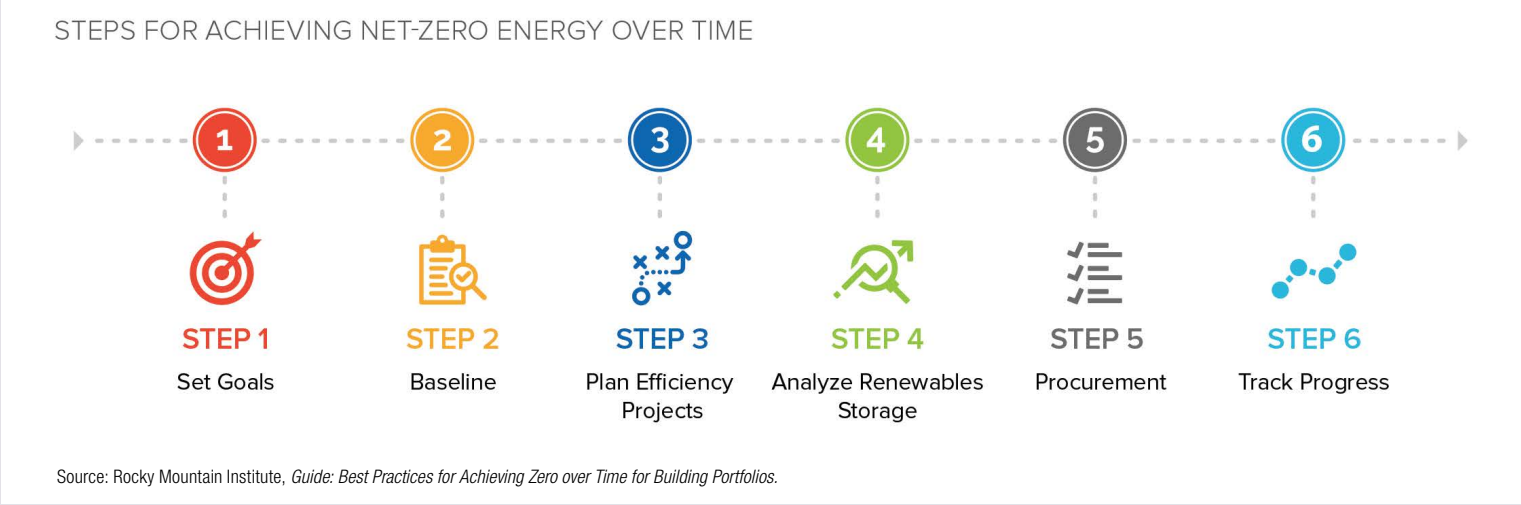
> "As a commercial real estate owner with cutting-edge media and technology tenants who share our commitment to the environment, being a leader in sustainability not only is the right thing to do, but is also critical to our success."

NATALIE TEEAR, VICE PRESIDENT OF SUSTAINABILITY AND SOCIAL IMPACT, HUDSON PACIFIC PROPERTIES

Epic in Hollywood, California. *(Gensler/Makena Hudson)*

PORTFOLIO-WIDE NET ZERO

To help portfolio owners achieve cost-effective deep energy retrofits over time, the Rocky Mountain Institute, with contributions from ULI, developed a road map to achieving net zero in the *Guide: Best Practices for Achieving Zero over Time for Building Portfolios.* This approach focuses on long-term planning to deliver a series of cost-effective projects over 20 years that, together, amount to zero-energy status for the entire portfolio while increasing revenues. The six key steps are (1) goal setting, (2) baseline performance, (3) planning for efficiency projects, (4) analysis of renewable energy and energy storage, (5) procurement to implement projects, and (6) progress tracking. This section of the Blueprint focuses on steps 3 and 4.



Source: Rocky Mountain Institute, *Guide: Best Practices for Achieving Zero over Time for Building Portfolios.*

Key Steps to Get to Zero

1. **Energy efficiency improvements in existing buildings.** The best opportunities to make these investments are at key transition points within the building life cycle, including lease turnover, major equipment replacement, acquisition of a new building, disposition of a building, a major building renovation, or regular energy assessments.
   - **Low-cost/no-cost efficiency measures** that also achieve high ROI as outlined in the *Quick Wins in Existing Buildings* section of this Blueprint, including energy-efficient facility management strategies and tenant engagement, supported by policies and programs that operationalize these measures across the portfolio.
   - **Deeper efficâiency retrofits** through new technologies and building strategies. Such retrofits will include advanced building automation systems and controls (possibly coupled with software and microsensors), new building insulation materials and strategies, and new hyperefficient windows, heat recovery systems, and passive heating/cooling strategies (like ground-level geothermal). Advanced green building certifications from organizations can help outline deep retrofit strategies.
2. **Renewable energy, both on site and off site.** The company should maximize the amount of renewable energy produced on site first, then look to off-site solutions to offset any additional energy consumption that cannot be covered by on-site renewables.
   - On-site solar photovoltaics (PVs), including rooftop solar and solar car canopies. Some buildings are also integrating solar curtain walls, solar pavers and walkways, and even PV-integrated roofing systems.
   - Other renewable energy sources on site, such as geothermal, cogeneration, biogas/digester, sewer heat recovery, and microturbines.
   - Off-site renewable systems, such as district energy, community solar, and solar and wind "virtual power purchase agreements."

Beyond achieving net-zero carbon, additional steps can be taken to help a building achieve net-zero energy:

- **Electrification.** To achieve true net zero without carbon offsets, buildings have to eliminate all fossil fuel combustion, including natural gas and fuel oil for heating, cooking, and other machinery and appliances. Electrification of the built environment is necessary to accelerate the switch from fossil fuels to renewable energy. In new buildings, developers can avoid investments in gas

equipment or lines that may soon become outdated. And as the grid becomes cleaner over time through the input of additional renewable energy sources, the total carbon emissions of building operations will continue to drop. Leading sustainable developers are already moving toward all-electric buildings in certain markets. And as of 2020, at least eight cities in California have already passed new codes requiring building electrification for new development, with more likely to follow suit.

- **Energy storage.** To achieve consistent net-zero energy, a building will need to invest in energy storage (batteries, fuel cells, and other storage technology) that can harvest renewable energy on site when there is a surplus, and use this energy to run the building with renewables when there is a deficit. In some markets, energy storage can also improve the economics of on-site renewable energy, by storing this power when energy prices are low, and feeding it back into the grid (selling it) when prices are higher.

And in addition to net-zero energy, opportunities exist to achieve net-zero water and waste as well:

- **Zero waste.** Achieving net-zero waste involves finding nonlandfill solutions for all waste streams during construction or building operations, whether through recycling, composting, digestion, or incineration to generate energy. Like the old mantra "reduce, reuse, recycle," achieving net-zero waste starts with waste reduction, then reuse, and finally recycling and composting, or finding a use for waste materials as a feedstock for another's products and processes. Achieving net-zero waste in construction follows a strategy similar to net-zero waste in operations.
- **Zero water.** Achieving net-zero water use involves investing in deeper water conservation measures, identifying cost-effective ways for rainwater harvesting on site and use in building operations, and recycling opportunities for water, including graywater and blackwater systems.

MAKE RENEWABLE ENERGY WORK

Making renewable energy work for real estate portfolios can be a challenge because of the nuances of real estate company financials, uncertain building hold periods, varying business cases with differing utilities and rate structures, long-term contract risks, and evolving technologies.

Solar energy can be cost-effective anywhere, but it works best in areas with high utility rates, with a combination of federal and state financial incentives, and for buildings with enough space (roof, parking lot, siding) to install a reasonably sized system. Solar development requires engineering support to help choose the best solution for an individual building and to help understand the wide range of financing options, contracts, and tax credits and other incentives in your region. Buildings looking to achieve net-zero energy may push the envelope to meet on-site renewable requirements with such advancements as solar cladding (used instead of siding). If a building owner decides to sell a property within the lifetime of the potential on-site renewable energy, it is also important to consider how that risk and value will factor into disposition and acquisition.

For buildings in dense urban areas with limited roof space, developers have deployed a range of other renewable energy strategies, including installing ground-level geothermal systems, using biodigesters (which convert food waste to natural gas on site), and tapping into renewable energy–produced heating and cooling sources (like deep lake district heating/cooling loops), and waste heat from sewer gas lines and industrial processes.

Markets have been created for building owners to invest in off-site renewable energy in a number of cost-effective ways:

- **Community solar.** The company owns a portion of solar generated on someone else's roof.
- **Virtual power purchase agreement.** The company owns a block of renewable energy generated elsewhere.
- **Renewable energy credits.** The company buys renewable generation credit from another company putting the renewable energy into the utility grid.
- **Green power contracts.** The company buys renewable energy from the local utility, which buys a commensurate amount from a renewable energy generator in the region.

Net-zero certifications and city climate goals can differ for the type of renewable energy that counts toward their goals, so the sustainability lead should confirm local requirements before committing to a multiyear renewable energy contract.

BUILD FOR CLIMATE ADAPTATION AND RESILIENCE

"Resilience" is defined as "the ability to prepare and plan for, absorb, recover from, and more successfully adapt to adverse events." In practice, resilient design at the building level comprises addressing the physical risks posed by climate change, ranging from more frequent and intense storm events to sea level rise, extreme heat, and wildfires. Cities are also seeking to prepare for these climate impacts, such as large storms, rising water levels, and potential scarcity of resources, through infrastructure and policy changes.

Real estate faces real risks in adapting to the results of climate change. Many buildings that will be facing the climate-related stressors and extreme weather of the future are insufficiently prepared. And preparation may entail costly retrofits—or even the need to relocate. To prepare for future events, the sustainability lead should review each asset in the portfolio for resilience risks and develop capital investment and emergency response plans.

Resilience is important to consider at both the building and community scale. Even if a building is able to avoid flooding during an extreme weather event, if tenants cannot get to the building because nearby sites are flooded, or if construction slows because extreme heat makes safe outdoor labor

DEVELOPING AN ASPIRING NET-ZERO OFFICE BUILDING

Boulder Commons, developed by **MORGAN CREEK VENTURES,** is one of the largest multitenant buildings in the United States that aspires to achieve net-zero energy. The development provides inspiration for innovative and approachable solutions that can be incorporated into a wide variety of sustainable building design and management strategies. A holistic approach to development that encompassed high-efficiency building design, on-site solar energy production uniquely tailored to the project, and an aligned leasing strategy collectively seeks to make it easier for tenants and landlords to achieve the project's net-zero energy goals. Highlights of this approach include the following:

- **Tenant energy budget.** The cornerstone of Boulder Commons' high-performance investment strategy is its unique approach to green leasing that brings attention to each tenant's controllable energy consumption. The use of off-the-shelf energy monitoring, which measures energy consumption of plug-in receptacles, allows for the creation of an annual energy budget tied to plug-load usage within a tenant's premises. Net rental rates that were negotiated to allow for typical energy budgets within the market benefit tenants by providing competitive occupancy costs and additional energy costs only when they exceed their annual allocation. In support of the project's net-zero energy goals, tenants are also required to offset their above-standard energy use through the purchase of renewable energy certificates. To help tenants manage and measure energy use, Morgan Creek Ventures shares information through monthly plug-load energy reports and an annual energy consumption report and works collaboratively to discuss property management strategies and community guidelines designed to manage efficient energy use.
- **High-performance buildings.** Boulder Commons integrates design elements, construction methods, and material choices aimed at reducing the building's baseline energy demands. This building package includes triple-pane fiberglass-framed windows; LED lighting and controls that complement natural daylight to surpass local energy codes; plug-load monitoring; a highly efficient HVAC system with variable refrigerant flow and energy recovery ventilators; and an advanced building envelope design that uses continuous exterior insulation and the innovative use of air sealing technology to achieve lowered air-infiltration rates.
- **Renewable energy.** Renewable energy production by nature has to be tailored to specific considerations unique to each project. Morgan Creek Ventures worked to maximize solar energy production at Boulder Commons through much more than just the rooftop panels that are installed. Boulder Commons is home to one of the largest vertical solar arrays on the building's eastern facade. It was installed in lieu of a standard building facade. Rooftop production was further enhanced by designing the building's mechanical systems to be placed over the garage entrance, within the building shell, allowing significantly more rooftop space for solar panel installation. The result was a 575-kilowatt solar array, modeled to generate 716,397 kWh per year, which should be capable of offsetting the entire building's electricity use under normal office use conditions.

Boulder Commons in Boulder, Colorado. *(Morgan Creek Ventures)*

"For Morgan Creek Ventures, our high-performance development strategy is intended to be a catalyst to encourage industry adoption of sustainable building methods and management practices by illustrating their capability to contribute to a project's financial returns. The next phase of Boulder Commons will include a multifamily residential building and a commercial office building that will look to progress building performance, the efficiency of on-site energy production, and further alignment of tenant and landlord toward the goal of 100 percent renewable energy utilization."

ANDY BUSH, PRINCIPAL, MORGAN CREEK VENTURES

OUTCOMES

- An investment model designed to offset 100 percent of the building's energy consumption with renewable energy through the use of on-site renewable energy production and purchase of renewable energy certificates for tenants with above-standard energy use
- Reduced energy costs, estimated to be $146,000 annually, that benefit project ownership as a return on investment in building performance and on-site energy production
- Tenant space end energy use estimated to be at least 36 percent more efficient than the baseline ASHRAE 90.1-2010 code

impossible, a business disruption will still occur. In addition, if the surrounding market is affected by drops in value due to unmitigated climate risks, even a resilient building could lose value—or at worst, could become a stranded asset. Various resilience techniques are presented in figure 9.

As applied to the built environment, resilience is becoming more focused on risk management, and developers and owners can play an important role in helping the investment community get better at factoring climate risk into their decision-making. The key next step is to quantify that risk and the value of mitigation through resilience interventions, potentially from lower insurance premiums or by generating more revenue, and to attract tenants that value business continuity and sustainability.

To help investors understand the risk, the TCFD framework aims to improve the consistency, clarity, and transparency of this information. Many large owners and investors are already piloting this framework, identifying their portfolio's climate risks, both transitional (market conditions or policies) and operational.

FIGURE 9 **RESILIENCE TECHNIQUES**

Building scale	Community scale
• Architectural strategies to reduce heat gain (facades, shading, cool roofs, etc.) • The elevation of the ground level and mechanical equipment • Deployable flood barriers • Water reuse and recycling • Use of green infrastructure for stormwater management • Backup energy sources	• Critical urban infrastructure protection • Resilient stormwater and flooding management systems (whether traditional "hard" components like floodwalls or levees, green infrastructure like parks or coastal wetlands, or a hybrid of the two) • Incentives for high-density development in less vulnerable locations

TIPS FOR A SUSTAINABILITY DIRECTOR TACKLING RESILIENCE

- Assess all buildings' current and future climate risks using available and up-to-date data that incorporate climate projections. Most advisers recommend following Representative Concentration Pathway 6.0 or 8.5, given that they most closely align with current emission rates. Some data resources to assess flooding and other types of climate impacts are freely available from nonprofit organizations or federal agencies, such as the U.S. National Oceanic and Atmospheric Administration, through the Digital Coast partnership.
- Review results of an assessment and take steps to mitigate specific asset-level risks when possible. For flood risk, consider investments like elevating mechanicals, making ground floors easier to repair after flooding events, mitigating flood risk through permeable surfaces or green infrastructure that absorbs more water, changing site topography to channel water away from the site, or adding permanent barriers like floodwalls. For extreme heat, consider the orientation and massing of buildings; use cool roofs, walls, and pavements; and create shade and open space to reduce heat gain.
- Analyze long-term financial risks beyond property value by looking at insurance cost and availability, long-term tenant demand, and the city's ability to maintain critical infrastructure to your building (and increases in property taxes to pay for it). When costs are unmanageable and look like they may erode current NPV, consider a disposition strategy.
- Review emergency preparedness plans and other plans for business continuity at the time of disruption from a climate event.
- Become more familiar with relevant city infrastructure and resilience policies and identify strategies to provide input at the city level to advocate for protective infrastructure that is designed for the climate of the future.

EXTREME HEAT RESILIENCE STRATEGIES

In addition to a holistic sustainability program, **JBG SMITH**—an owner and developer of mixed-use properties in and around Washington, D.C.—takes a proactive stance to identify, prioritize, and address risks associated with the impacts of climate change.

Heat and humidity are major issues for JBG Smith, which controls 7.4 million square feet at National Landing, a Northern Virginia neighborhood that will soon host Amazon's Arlington headquarters. The existing office complex lacks vegetation, and the D.C. region expects the number of dangerously hot and humid days per year to grow from 30 to 75 by 2050.

As part of a comprehensive placemaking plan to improve the area's streetscape, sidewalks, parks, and other outdoor gathering spaces, JBG Smith also sought to enhance the pedestrian experience through a reflective paving pilot program. The pilot invested $40,000 to install 550 gallons of reflective coating over 17,000 square feet ($2.40 per square foot) in a driveway between two office buildings in the core of National Landing. The reflective coating is a gray, water-based asphalt emulsion seal coat (instead of a paint, it is a mix of asphalt cement with additional minerals, polymers, and emulsifiers) designed to be 33 percent reflective. Typically, two coats are applied to ensure total coverage of the underlying asphalt. And although the program started with 17,000 square feet, the development's large footprint allows for innovations that can later scale to have an impact on all the people who live, work, and play in the neighborhood.

OUTCOMES

- Initial readings from the installation in July 2017 showed a 10-degree (cooler) difference between the control and CoolSeal area.
- In July 2019, a site visit was conducted to assess the performance of the CoolSeal installation. Using a calibrated infrared thermometer, findings indicate a minimum of a 7-degree (cooler) difference between the control black pavement and the CoolSeal area. Several areas of delamination did occur because of surface preparation, so those areas are being recoated. The product should continue to perform for a minimum of two years—consistent with the three- to seven-year life expectancy claims.
- The overall urban heat-island mitigation strategy installed additional trees, green space, and green roofs.
- Value is added to the development by driving market recognition and creating a marketing advantage.

National Landing in Arlington, Virginia. *(JBG Smith)*

"Combined with a suite of heat-island mitigation strategies such as green roofs and urban tree canopy deployment, cool pavement will round out our climate mitigation approach. Our next step is to quantify the specific impacts that this temperature difference has on tangible elements—this will be the final piece to scaling this kind of installation."

KIM PEXTON, VICE PRESIDENT OF SUSTAINABILITY, JBG SMITH

CLIMATE RISK AND RESILIENCE

DWS's incorporation of ESG considerations into its investment philosophy includes a proactive focus on implementing preventative measures to mitigate climate risk. This approach yields more value to the property and investors as the alternative of responding to a catastrophic and damaging climate event after the fact often proves to be far more costly. To determine the climate risks in its U.S. real estate portfolio, DWS piloted a climate risk assessment strategy focused on East Coast properties that had already experienced climate-related floods and hurricanes in the past.

This U.S. pilot program focused on each property individually and identified where a climate plan was needed to secure the safety of each building's occupants (tenants, residents, staff, and contractors/vendors) and protect the property against climate risk during short-, medium-, and long-term time horizons. Because of the success of the program, DWS expanded this program into a regular top-down portfolio evaluation review with a bottom-up approach to addressing climate risk at the property level.

OUTCOMES

- DWS evaluated its U.S. portfolio to understand and set a baseline for high-climate-risk properties.
- DWS assessed individual properties appearing to be at risk through a climate risk checklist.
- DWS determined how and when to incorporate third-party consulting services to further diligence on the impact of potential or actual climate risks.
- DWS performs portfolio evaluation reviews and incorporates mid-term and long-term considerations relating to climate risk into the annual budget cycle.

DWS property. *(DWS)*

"The Climate Risk and Resiliency pilot paved the way for a holistic, in-depth approach when evaluating risks and opportunities in our Americas portfolio. We created a process that can be applied to various locations and natural disasters. Moreover, we have been able to communicate our success of these investments to our investors and insurers."

RIELLE GREEN, ENERGY AND SUSTAINABILITY MANAGER, DWS

CONSIDER HEALTH AND WELL-BEING

Too often, people do not have the opportunity to make healthy choices, but smart and low-cost or no-cost adjustments to business as usual in development have the potential to both improve health outcomes and increase the appeal of buildings and projects. Health is now the most important building amenity, shown in Kingsley tenant surveys across the office and multifamily sectors. Even the retail and industrial sectors are adopting health and well-being amenities for occupants, as these tenants now recognize the employee retention benefits of a healthier workspace.

COVID-19

The global COVID-19 pandemic is making the role that buildings play in promoting health and preventing the spread of disease front of mind for tenants and building users, changing cleaning practices, HVAC operations, and use of common space. Although some actions to address COVID-19 may increase energy use, such as increased ventilation and reduced elevator capacity, opportunities still exist for energy conservation at this time, including shutting down unoccupied floors and a new focus on HVAC maintenance by identifying inefficiencies early. New health and well-being modules are being developed in response to the pandemic that sustainability leads should understand and consider applying across their portfolios.

The 3-30-300 model is a rule of thumb that estimates a typical U.S.-based organization's spending at $3 per square foot per year on annual utility expenses, $30 per square foot per year on annual rent, and $300 per square foot per year on employee payroll. Therefore, energy-saving opportunities that also support employee health and productivity can generate significant cobenefits. Improving indoor air quality, encouraging fitness and mobility, increasing natural light, providing views of nature, and making healthy food choices available have all been proved to increase employee productivity and reduce long-term employee turnover and sick days, which generate significant financial benefits for tenants.

To start tracking investments and indicate a commitment to health and wellness, some building owners are adding healthy building certifications to their new development and retrofit standards. Broader green building certifications—such as LEED, the Living Building Challenge, BREEAM, and others—include health features, but health-focused certifications, such as WELL and Fitwel, push owners and occupants to consider the impact that buildings have on occupants beyond traditional energy use and sustainability. Note that these health certifications are not a replacement for green building certifications—they are additive, as they track different or deeper metrics. Healthy building certifications do not award points for energy efficiency upgrades, but instead for elements of healthy and active design, such as open and accessible staircases, wellness rooms, cleaning procedures, and more. Even without pursuing certifications, building owners can take steps to improve occupant health using these free guides, as well as ULI's *Building Healthy Places Toolkit.*

MARKET-LEADING HEALTHY BUILDING CERTIFICATIONS

- **Fitwel certification.** Run by the Center for Active Design, Fitwel is a rating system for optimizing buildings in support of health. The standard focuses on 12 wellness health factors: location, building access, outdoor spaces, ground floor, stairwells, interior environmental quality, workspaces, shared spaces, water supply, cafeterias, vending machines, and emergency procedures.
- **WELL certification.** The WELL Building Standard was launched by the International WELL Building Institute as a performance-based system for measuring, certifying, and monitoring features of the built environment that affect human health and well-being. WELL combines best practices in building design, construction, and management with evidence-based medical and scientific research on environmental health, behavioral factors, health outcomes, and demographic risk factors that affect health.
- **RESET air certification.** Created by GIGA, RESET certification prioritizes real-time air quality data, ongoing performance, and long-term occupant health. Indoor air quality data are collected through sensors that measure CO_2, particulates, temperature, total VOCs, and relative humidity. While there are no mandatory mechanical design requirements, standards are set for monitoring performance, density and location of sensors, sensor calibration, reporting methodology, and overall air quality. The performance data from continuous monitoring must also be available and communicated to building occupants.

Across the entire real estate space are opportunities to develop buildings in a way that promotes tenant health and wellness, such as community gardens or park space, access to bicycle racks, or siting in an area with a high walk score. Leveraging this high demand from tenants adds strong value for building owners through more productive and satisfied tenants.

ADDRESS EMBODIED CARBON AND THE CIRCULAR ECONOMY

Operational emissions are only part of the overall carbon emissions related to the real estate industry. "Embodied carbon" is defined as "the carbon emissions attributed to manufacturing and transporting construction materials and the process of construction." Of the 39 percent of global emissions attributed to the built environment, 28 percent are from building operations and the other 11 percent are embodied carbon.

Unlike operational carbon, embodied carbon cannot be reduced in materials once a building's construction is complete. To achieve ambitious climate goals, addressing embodied carbon upfront has to be a part of the real estate industry's climate mitigation strategy. A business case for calculating and reducing embodied carbon in the built environment is growing:

HEALTH AND WELLNESS BEFORE AND AFTER COVID-19

As a part of their overall sustainability program, **THE TOWER COMPANIES**—a privately held real estate developer, owner, and property management company—have a strong focus on occupant health and wellness. While Tower had already started implementing design, construction, and operational strategies focused on health in their buildings more than two decades ago, the COVID-19 pandemic has been a catalyst to increase investment and create a renewed focus on communicating health features and associated benefits to employees and tenants.

And while each building is unique, Tower uses green leases across 90 percent of their portfolio as a tool to partner with tenants and ensure a sustainable and healthy workplace for all. Their green lease contains clauses that address such topics as energy, water, waste, and indoor environmental quality. A green lease language example that touches on indoor air quality is, "After construction is complete, the Leased Premise has been cleaned, and major punch list items that impact volatile organic compound levels have been finished, Tenant is required to conduct baseline IAQ testing in accordance with LEED Reference Guide for Interior Design and Construction v4.1."

At 1828 L Street, N.W., a multitenant commercial office building in downtown Washington, D.C., health and wellness have long been a featured amenity. The building includes a LEED-certified fitness center that holds regular yoga and Pilates classes, as well as educational events with different health-focused partners. The building also offers a state-of-the-art bike room, a weekly community-supported agriculture farm share program that tenants can use, and regular indoor air quality testing provided by a third-party vendor. In addition, Prescriptive Data's Nantum operating system, a smart building technology, has been installed to drive energy efficiency by using real-time occupancy data, but also to monitor indoor air quality metrics like temperature and relative humidity, allowing the building team to better manage tenant comfort.

> Tenant preferences for stunning architecture and high-quality building amenities remain intact, but now it's an arms race to have not only the most sustainable building, but the healthiest building. People are demanding this, and we have known for years that it's good for business. To continue success, building owners must respond genuinely to this call to action."
>
> **JEFFREY ABRAMSON,** PARTNER, THE TOWER COMPANIES

Community-supported agriculture distribution at 1828 L Street, N.W., in Washington, D.C. *(The Tower Companies)*

To proactively address health and safety concerns in response to COVID-19, Tower has invested in indoor air quality and ventilation, cleaning, and social distancing measures. These upgrades include new MERV 15 filters to capture airborne particles, UV-C lighting to destroy airborne viruses, new stairwell vents, common-area hand sanitizer stations, enhanced cleaning and disinfecting practices, personal protective equipment for all building staff and vendors, reduced elevator capacity, and signage outlining recommended social distancing measures.

In addition, an extra level of attention is put on preventative maintenance for mechanical systems to ensure optimal performance, and, ultimately, to provide better indoor air quality. Educational training for tenants and building staff and clear signage throughout the building help housekeeping, security, brokers, and all stakeholders recognize and understand these investments and their associated health benefits.

HEALTH AND WELLNESS IN NEW DEVELOPMENTS

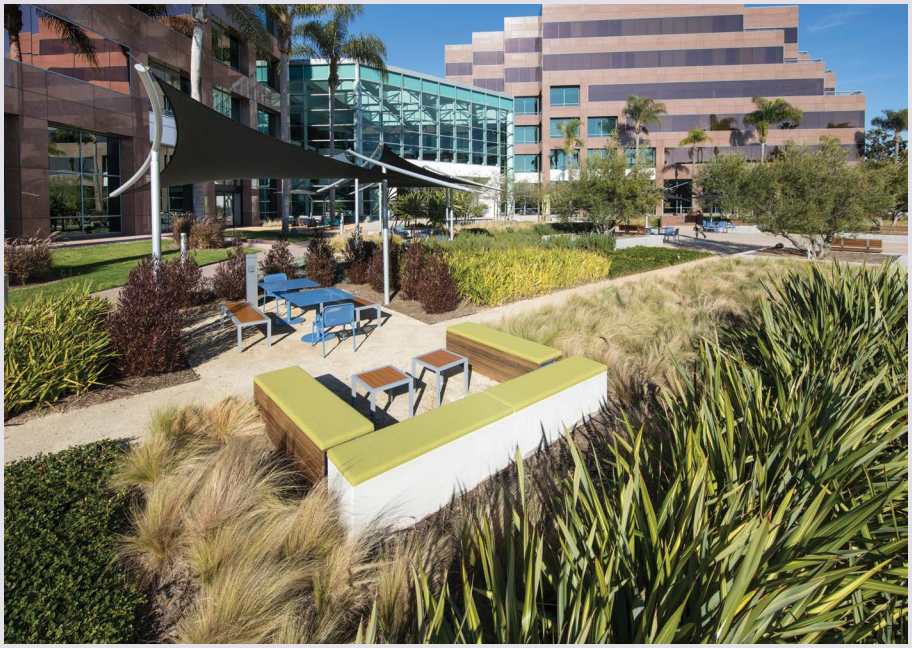
GRANITE PROPERTIES—a commercial real estate investment, development, and management company—is committed to providing innovative and sustainable work environments. Granite buildings are designed to provide an abundance of natural light, and many include a large hospitality-driven lobby called The Lounge and outdoor green spaces called The Yard with a variety of seating options for indoor and outdoor meetings, for socializing, or for a quiet space to work.

Granite puts the customer experience first in providing compelling and productive work environments. In 2020, in response to the COVID-19 pandemic and growing customer attention to health, Granite launched Inspire Wellness, a comprehensive program that includes permanent design changes to create healthy and environmentally friendly workplaces in its existing buildings and all new developments. As a part of Inspire Wellness, Granite is spending over $10 million on touchless fixtures and enhancing the air quality, including $3.6 million on bipolar ionization.

In existing buildings, to respond to customer concerns and to adapt to the latest CDC/ASHRAE protocols, Granite has implemented a number of safety measures portfolio-wide, installing touchless restroom fixtures; ozone-free, needlepoint bipolar ionization technology to the HVAC system to actively kill pathogens; bipolar ionization in all building elevators; and self-cleaning NanoSeptic touchpoints throughout the buildings in elevators and entry and restroom doors. To communicate these updates to tenants, Granite prepared safety precautions signage, a regularly updated "Guide to Building Re-Entry" explaining new protocols, building-specific videos to show what customers can expect when they return to the office, and regular customer surveys to address customer concerns.

Granite is also updating design plans of future developments to advance health and cleanliness standards, focusing on air quality and touchless fixtures, including the following:

- Increasing the filter rating on the air handlers from MERV 8 to MERV 13 to align with ASHRAE recommendations for controlling airborne pathogens
- Integrating bipolar ionization technology to the HVAC system and elevators
- Exploring touchless technologies for elevators, doors, and bathrooms



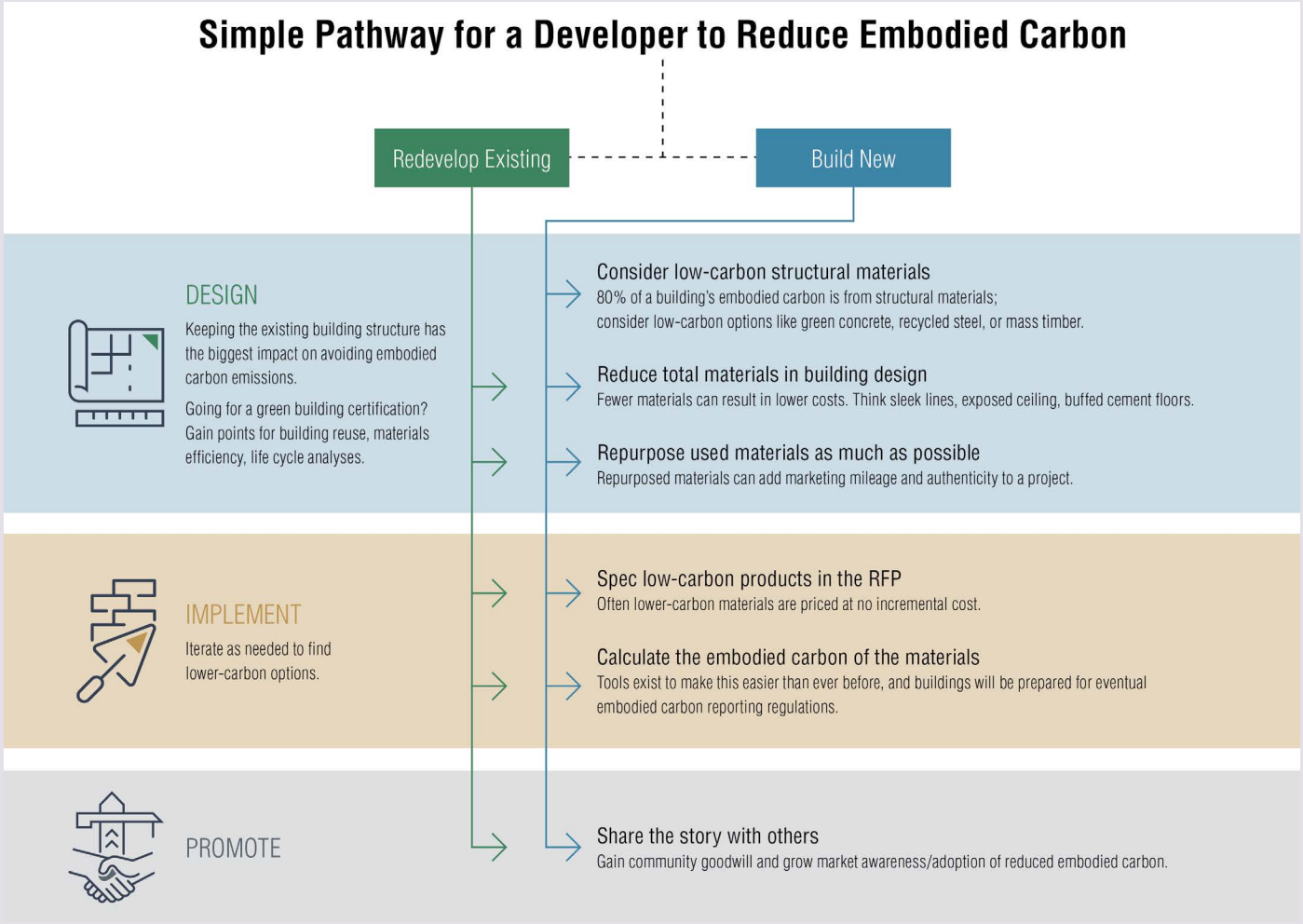
Outdoor workspace at 100 Bayview in Newport Beach, California. *(Granite Properties)*

"The challenge is to be timely but not be reactionary in making upgrades to address pathogen control. We are consuming data objectively and employing capital dollars where they will be most effective. We do not wish to give our customers superficial confidence but rather intentionally make meaningful improvements to the safety of their environment."

AARON BIDNE, DIRECTOR OF DEVELOPMENT, GRANITE PROPERTIES

- New regulations are on the horizon, mandating low-impact materials.
- Green building certifications like LEED and BREEAM already provide points for low-carbon, local, or recycled materials.
- Reporting initiatives like CDP have started to integrate questions about embodied carbon in new developments.
- Most importantly, making smart design choices or selecting low-carbon alternatives can reduce costs. Products like mass timber sequester carbon while also allowing a shorter development time frame and require fewer workers to set up. Streamlining design choices also reduces the number of materials a developer needs to purchase.

STEPS TO REDUCE EMBODIED CARBON



Source: Urban Land Institute, *Embodied Carbon in Building Materials for Real Estate,* 2019.

EMBODIED CARBON REDUCTION STRATEGY

CITY DEVELOPMENTS LIMITED (CDL) is a leading global real estate company based in Singapore with a global presence in 29 countries and regions. Its longstanding sustainability strategy for over two decades is anchored on four key pillars: integration, innovation, investment, and impact. CDL is committed to reducing its carbon footprint in the way it designs, builds, and manages its assets and stakeholders.

In 2018, CDL became the first real estate company in Singapore to have its carbon reduction targets assessed and validated by the Science Based Targets initiative (SBTi). With that, CDL is committed to reducing its carbon emission intensity across its Singapore operations by 59 percent from base year 2007. For development projects, CDL has pledged to use sustainable building materials, instead of their conventional equivalents, to reduce embodied carbon by 24 percent by 2030. In addition to supporting its carbon reduction targets, reducing embodied carbon is also deemed a business case as CDL anticipates that carbon-intensive building materials, such as steel and cement, will become increasingly costly.

To consider the wider carbon life-cycle impacts of its projects, CDL tracks and reports on the top five building materials and the embodied carbon of the construction materials used in its property development activities annually. The embodied carbon emission intensities are derived from the types and quantity of construction materials used in projects and the Building and Construction Authority's Carbon Calculator.

To reduce consumption of raw materials and achieve lower embodied carbon intensities, CDL uses materials certified by the Singapore Green Building Council or the Singapore Environment Council, such as green concrete, recycled concrete aggregates, and washed copper slag from approved sources to replace coarse and fine aggregates for concrete production, precast concrete volumetric prefabricated bathroom unit systems wherever possible, and recycled steel in projects for reinforcement works.

OUTCOME

- Achieved an average expected embodied carbon footprint of 0.55 tons of CO_2 emissions per square meter for projects due for completion in 2021–2022, putting CDL on track to achieve its targets.

Amber Park in Singapore has set a new benchmark of devoting some 65 percent of its site to landscaping, facilities, and lifestyle space, going beyond Singapore's planning requirements. A BCA Green Mark GoldPlus development, it uses environmentally friendly and sustainable products certified by approved local certification bodies, including low-carbon recycled concrete and low-VOC paint for all internal walls. *(City Developments Limited)*

"CDL recognizes that embodied carbon accounts for 11 percent of total global carbon emissions, or close to one-third of the built sector's total carbon emissions. Besides setting an ambitious SBTi-validated target to reduce the embodied carbon in our development projects by 24 percent by 2030, we have also strengthened our engagements with our builders, consultants, suppliers, and other stakeholders across the value chain, which is crucial in reducing embodied carbon."

ESTHER AN, CHIEF SUSTAINABILITY OFFICER, CITY DEVELOPMENTS LIMITED

The buildings and construction industry is the largest global consumer of raw materials, and demand for these materials is only increasing as developing countries urbanize. Sustainability leads can review materials usage in development projects and fully address the environmental impact of buildings by quantifying their environmental impacts from creation to disposal. By considering material usage, real estate can move toward a circular economy where material waste is minimized. As materials become increasingly scarce and expensive, the business-as-usual "cradle to grave" mentality needs to be transformed to a "cradle to cradle" one instead, by designing and constructing buildings for easier disassembly and material reuse. The main principles of circularity are to reduce the use of materials to what is really needed, to reuse available materials whenever possible, and to recycle any waste to minimize value lost.

These sustainable approaches to design and construction reduce carbon emissions as well as increase the longevity of assets for the benefit of future generations. They also make the transition to a circular economy a smart choice environmentally and economically for developers.

SUPPORT FOR SOCIAL EQUITY, COMMUNITY, AND WORKFORCE DEVELOPMENT

Environmental, social, and governance factors are used to make socially responsible decisions in real estate. Although substantial work has been done on the environmental factors in real estate, the work on social factors is starting to increase. "Social" refers to the effects of a company's operations on the labor and human rights of the people and communities. How commercial real estate addresses the "social" of ESG depends on a number of considerations, including investment strategy, geographic region, and asset type. Racial justice protests in 2020 have also driven an increased emphasis on racial equity as a focus in real estate's social equity efforts.

PolicyLink defines "social equity" as "just and fair inclusion in a society where all can participate and prosper." The goal of equity is to create conditions that allow everyone to reach their full potential by addressing issues relating to income equality, racial justice, gender parity, and inclusion of all languages and abilities, as well as by addressing historical barriers. Negative impacts from climate change and other environmental stressors disproportionately affect vulnerable communities, but smart real estate design choices in these communities can mitigate and play an active role in solving those challenges.

Sustainability leads can play a role in encouraging developer teams and building operators to incorporate social equity through projects and programs. Internal company policies regarding diversity, equity, and other governance procedures may also fall under the sustainability director's purview, or alternatively with Human Resources. And these types of programs are not just for multifamily buildings; all asset types can play a positive role in their communities. The following are some examples of incorporating social equity into real estate assets:

ENVIRONMENTAL AND CLIMATE JUSTICE

Environmental injustices—including those caused by pollution and a changing climate—disproportionally affect communities of color, indigenous communities, and low-income communities. Achieving environmental and climate justice requires developers to understand and be responsive to underserved populations, as well as to use sustainable design features to mitigate their projects' environmental impact. Real estate organizations looking to take an active role in correcting these injustices through their building design and operations should look for and engage local grassroots environmental justice organizations.

- Workforce development programs that aim to match underserved communities with job placement assistance that expands job opportunities into new populations, increases workforce diversity, and addresses labor shortages.
- Genuine and thorough community engagement during development to understand the neighborhood's needs and align with the greater interests of the local community/residents.
- Creation of strong inclusion diversity and inclusion policies, setting up programs to support them and tracking progress toward goals.
- Affordable housing to create high-quality housing for low-income communities, including seniors. These initiatives also integrate strong amenities in community spaces, including low-cost child care and after-school tutoring for residents. Prevention of homelessness and eviction is also being piloted in some organizations, to reduce tenant turnover and provide tenant support at critical times.
- Responsiveness to the energy burden in workforce or affordable housing projects by investing in energy efficiency—including LED lighting, window replacements, efficient appliances, and efficient HVAC systems—that improves tenant comfort, lowers energy costs, and reduces emissions in low-income communities with higher rates of asthma and other pollution-related illnesses.
- Community development with private investment that upgrades or revitalizes community spaces. These initiatives also promote local small businesses, local artwork, healthy living, or other charitable projects.

The impacts of social equity are not as easily quantified as are the impacts of energy efficiency investments. However, with visionary leadership, strong market demand for equitable projects, and regulatory forces requiring equitable projects, the real estate community should expect to see more studies attempt to quantify project benefits and accelerate the integration of racial equity considerations in real estate.

AFTERSCHOOL PROGRAMMING

A family's location and housing costs can directly affect their financial well-being and the community at large. To address social equity and equitably represent the communities in which it operates, FCP—a privately held investor of multifamily and office assets—partners with local nonprofits to provide low-cost after-school and summer child care programs.

FCP sought to ease the heavy burden of after-school care for its residents by offering subsidized quality after-school and summer programs at two multifamily properties: Holly Spring Meadows in a Maryland suburb of Washington, D.C., and Stratford Ridge outside Atlanta, Georgia. FCP repurposed vacant or underused common areas in these properties and partnered with local nonprofits (Community Services Foundation in Maryland and Star-C in Georgia) to offer robust after-school and summer programming, including science, technology, engineering, and math classes. The nonprofits use state and local grants to fund the program, and FCP uses operating capital to cover a portion of the program's operating costs. These programs have been very successful, increasing resident retention to a level where the programming cost is offset by reduced turnover expenses, and leading FCP to consider expanding the program to more properties in the coming years.

OUTCOMES

- After-school programs met enrollment capacity in 2019, with a 20-student wait-list at one building.
- Many participating children are now earning a spot on their school's honor roll.
- Resident referrals and word-of-mouth recommendations have increased.
- One property had a 20 percent increase in tenant retention, significantly reducing costs associated with resident turnover and marketing (bringing retention to 80 percent).

Holly Spring Meadows, Capitol Heights, Maryland.

"With FCP's after-school programming, our residents can continue to work, earn income, and feel less stressed knowing that their children are cared for in a quality environment. Implementing this program provides a desperately needed service to our residents, aligns with our goal to preserve workforce housing, and creates an opportunity to differentiate our company from competitors."

SUMMER HALTLI, SENIOR VICE PRESIDENT FOR STRATEGIC MANAGEMENT AND SUSTAINABILITY, FCP

INCORPORATE BIODIVERSITY

Biodiversity provides ecosystem services that are vital for the real estate industry, including stormwater management, microclimate regulation, air quality improvement, greenhouse gas sequestration, plant pollination, and recreation. In urban areas, biodiversity has decreased because of building on top of green space, population increases, and global warming.

Degradation of biodiversity leads to an unstable and less resilient ecosystem, which can negatively affect real estate longevity and lead to food scarcity, reduction of freshwater, poor air quality, and rising temperatures in urban environments. To mitigate impacts, sustainability leads can research and encourage development teams to consider new design strategies to better integrate buildings into the larger urban ecosystem by developing with biodiversity in mind. Benefits for real estate companies include happier tenants, improved stakeholder relations, new market opportunities, and long-term stability.

BIODIVERSITY THROUGH BEEKEEPING

Bees are dying at alarming rates as a result of pesticides, herbicides, fungicides, and disease. As pollinators of over 100 fruit and vegetable crops in the United States, bees are essential to the ecosystem. In 2019, **CLARION PARTNERS,** a U.S. real estate investment manager, partnered with a beekeeping company to install 27 beehives on 17 multifamily properties across the United States to improve biodiversity and help save bees. With the successful implementation of beehives at residential properties, Clarion is looking to expand to other property types, especially office buildings.

OUTCOMES

- Biodiversity and the honeybee populations have improved.
- Each beehive produces 30 pounds of honey that is packaged and provided to tenants for free.

"Bees play a significant role in our economy and the health of our ecosystems. According to the USDA [U.S. Department of Agriculture], one out of every four bites of food people take is courtesy of bee pollination, with bee pollination being responsible for more than $15 billion in increased crop value each year. Clarion is excited to partner with beekeeping specialists to help combat the loss of bees and biodiversity while also engaging tenants in this important ESG initiative."

KELLY HAGARTY, DIRECTOR OF SUSTAINABILITY, CLARION PARTNERS

1000 Jefferson in Hoboken, New Jersey.

RESOURCES

Set a Pathway to Net Zero

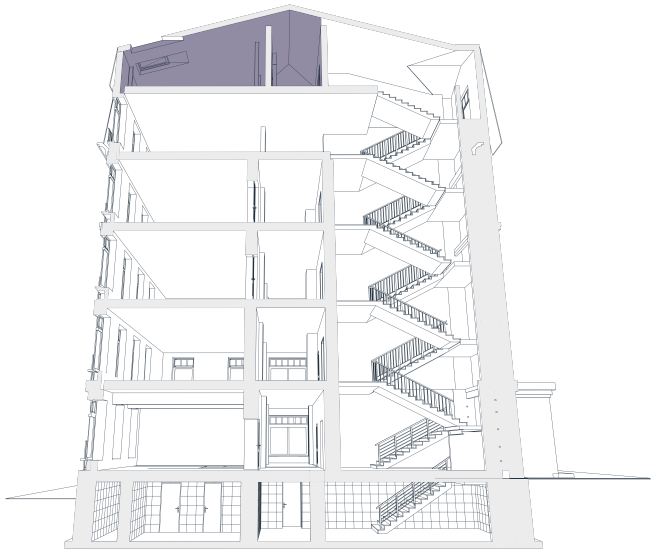
- *Accelerating Building Decarbonization: Eight Attainable Policy Pathways to Net Zero Carbon Buildings for All*, World Resources Institute: https://wriorg.s3.amazonaws.com/s3fs-public/accelerating-building-decarbonization.pdf
- *Guide: Best Practices for Achieving Zero over Time for Building Portfolios*, Rocky Mountain Institute and Urban Land Institute: https://americas.uli.org/wp-content/uploads/sites/2/ULI-Documents/Zero_Over_Time_2018.pdf
- *Carbon Risk Real Estate Monitor (CRREM)*, GRESB: www.crrem.eu
- *Going Electric: Retrofitting NYC's Multifamily Buildings*, Urban Green: www.urbangreencouncil.org/sites/default/files/urban_green_going_electric_4.22.2020.pdf
- *Rocky Mountain Institute Tenant Energy Optimization Case Study*, Urban Land Institute: https://tenantenergy.uli.org/case-study/rocky-mountain-institute/
- *Zero Energy Commercial Building Targets*, New Buildings Institute: https://newbuildings.org/resource/zero-energy-commercial-building-targets/

Make Renewable Energy Work

- *Incorporate Solar PV on Your Commercial Buildings*, U.S. Department of Energy Better Buildings: https://betterbuildingssolutioncenter.energy.gov/toolkits/incorporate-solar-pv-your-commercial-buildings
- *On-Site Energy Storage Decision Guide*, U.S. Department of Energy Better Buildings: https://betterbuildingssolutioncenter.energy.gov/sites/default/files/attachments/BB%20Energy%20Storage%20Guide.pdf
- *Renewable Energy Procurement*, Renewable Energy Buyers Alliance: https://rebuyers.org/programs/education-engagement/renewable-energy-procurement/
- *Renewable Energy Resource Hub*, U.S. Department of Energy Better Buildings: https://betterbuildingssolutioncenter.energy.gov/renewables
- *Solar Energy and Commercial Real Estate: Insights for Your Investment Property*, Solar Energy Industries Association: www.seia.org/sites/default/files/2018-01/Solar-Commercial-Real-Estate-SEIA-SolarKal_Jan2018-Final.pdf
- *Solar Economics Calculator*, National Renewable Energy Laboratory: https://pvwatts.nrel.gov/

Build for Climate Adaptation and Resilience

- *Climate Change Preparedness and Resiliency Checklist*, U.S. Climate Resilience Toolkit: https://toolkit.climate.gov/tool/climate-change-preparedness-and-resiliency-checklist
- *Climate Risk and Real Estate Investment Decision-Making*, Urban Land Institute and Heitman: https://americas.uli.org/wp-content/uploads/sites/2/2019/09/ULI_Heitlman_Climate_Risk_Report_February_2019.pdf
- *Developing Urban Resilience*, Urban Land Institute: https://developingresilience.uli.org/
- *Finance and Resilience*, U.S. Department of Energy Better Buildings: https://betterbuildingssolutioncenter.energy.gov/finance-resilience-toolkit
- *Getting Physical: Assessing Climate Risks*, BlackRock Investment Institute: www.blackrock.com/us/individual/insights/blackrock-investment-institute/physical-climate-risks
- *Harvesting the Value of Water: Stormwater, Green Infrastructure, and Real Estate*, Urban Land Institute: https://americas.uli.org/research/centers-initiatives/urban-resilience-program/stormwater/
- *Ten Principles of Urban Resilience*, Urban Land Institute: https://americas.uli.org/wp-content/uploads/sites/2/ULI-Documents/10P_BuildingResilience.pdf
- *Tackling Task Force on Climate-Related Financial Disclosures (TCFD): Early Lessons in Climate Risk Disclosure*, Principal Real Estate Investors for GRESB: www.principalglobal.com/documentdownload/106697
- *Scorched—Extreme Heat and Real Estate Report*, Urban Land Institute: https://americas.uli.org/wp-content/uploads/sites/2/ULI-Documents/Scorched_Final-PDF.pdf
- *2030 Palette*, Architecture 2030: http://2030palette.org/



Consider Health and Wellness

- *Addressing the Impact of COVID-19: A Roundup of Available ULI Resources*, Urban Land Institute: https://urbanland.uli.org/covid-19/addressing-the-impact-of-covid-19-a-roundup-of-available-uli-resources/
- *Building Healthy Places Toolkit,* Urban Land Institute: http://americas.uli.org/wp-content/uploads/sites/2/ULI-Documents/Building-Healthy-Places-Toolkit.pdf
- *Green Lease Leaders: Using the Lease to Make Buildings More Healthy and Efficient*, Institute for Market Transformation: https://www.imt.org/resources/green-lease-leaders-using-the-lease-to-make-buildings-more-healthy-and-efficient/?
- *Healthy Housing for All*, Urban Land Institute: https://americas.uli.org/wp-content/uploads/sites/2/ULI-Documents/Healthy-Housing-for-All-Interactive-1-lo.pdf
- *Healthy Housing Rewards Program,* Fannie Mae: https://multifamily.fanniemae.com/financing-options/specialty-financing/healthy-housing-rewards
- *How to Integrate Indoor Environmental Quality within Long-Term Renovation Strategies*, Buildings Performance Institute Europe: http://bpie.eu/publication/policy-paper-how-to-integrate-indoor-environmental-quality-within-national-long-term-renovation-strategies/
- *Optimizing Sustainability and Wellness: A Guide for Managing Office Buildings during COVID-19,* Institute for Market Transformation: www.imt.org/wp-content/uploads/2020/05/OptimizingSustainabilityAndWellness_5.20.pdf
- *The Business Case for Healthy Buildings: Insights for Early Adopters Report,* Urban Land Institute: https://americas.uli.org/the-business-case-for-healthy-buildings-insights-for-early-adopters-report/

Address Embodied Carbon and the Circular Economy

- *Embodied Carbon in Building Materials for Real Estate*, Urban Land Institute: uli.org/embodiedcarbon
- *Embodied Carbon in Construction Calculator,* Building Transparency: www.buildingtransparency.org/en/
- *Carbon Leadership Forum*, University of Washington: http://carbonleadershipforum.org/
- *City Policy Framework for Dramatically Reducing Embodied Carbon,* Carbon Neutral Cities Alliance: www.embodiedcarbonpolicies.com/

Consider Social Equity, Community, and Workforce Development

- *Centering Equity in the Sustainable Building Sector*, NAACP: https://naacp.org/climate-justice-resources/centering-equity-sustainable-building-sector/
- *LIIF Social Impact Calculator,* Capital for Healthy Family and Communities: www.liifund.org/calculator/
- *The Social Value Portal*, Social Value Portal: http://socialvalueportal.com/
- *Public Health Benefits per kWh of Energy Efficiency and Renewable Energy in the United States: A Technical Report,* U.S. EPA: www.epa.gov/sites/production/files/2019-07/documents/bpk-report-final-508.pdf
- *SEED Evaluator Tool*, Social Economic Environmental Design (SEED) Network: https://seednetwork.org/seed-evaluator-4-0/

Incorporate Biodiversity

- *Designing for Ecology,* American Institute of Architects: www.aia.org/showcases/6082454-designing-for-ecology
- *Biodiversity and the Built Environment,* United Kingdom Green Building Council: www.ukgbc.org/sites/default/files/Biodiversity%2520and%2520the%2520Built%2520Environment%2520-%2520Full%2520report%2520and%2520appendices.pdf

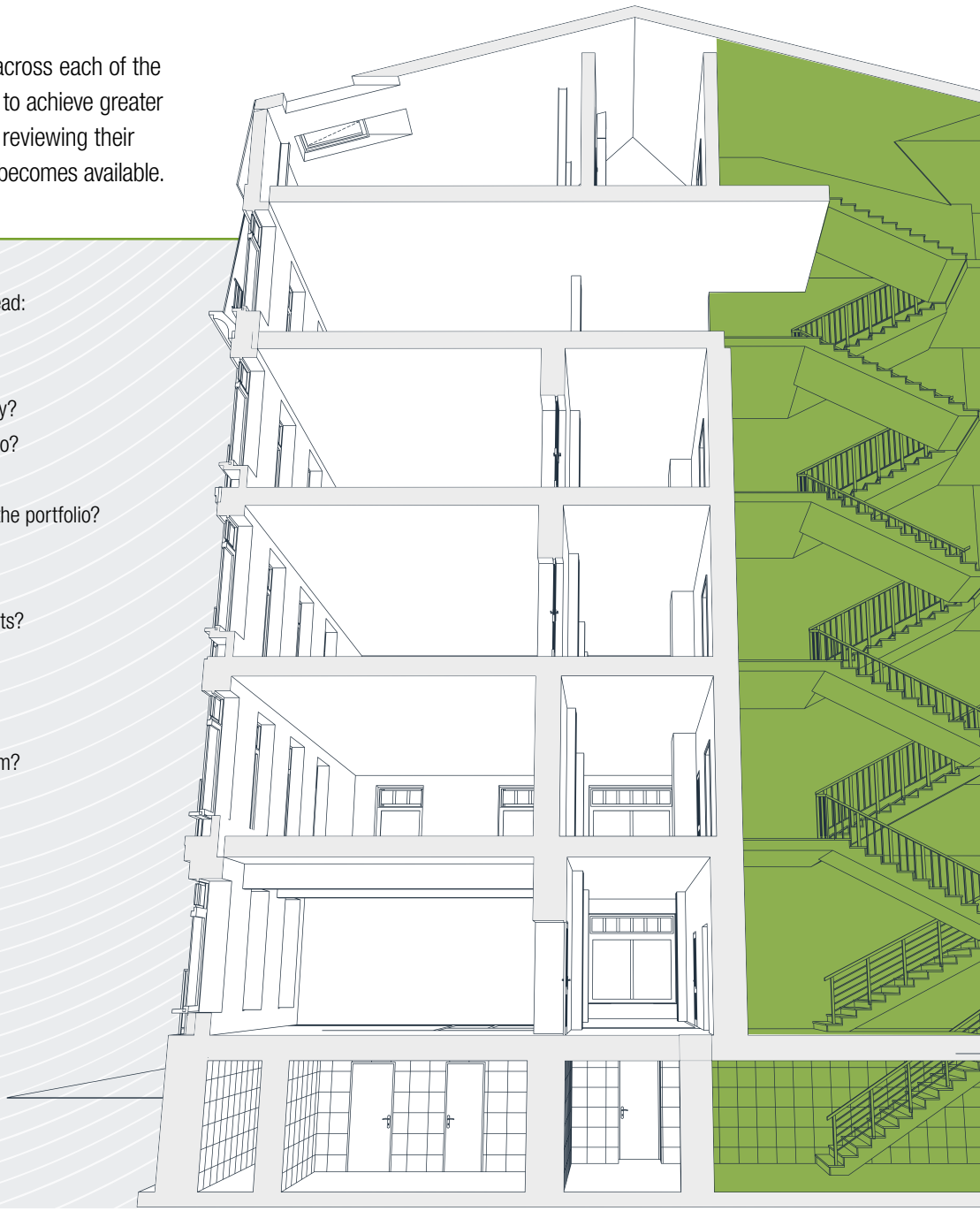
CONCLUSION

Sustainability is not a linear journey. Even after implementing many of the strategies across each of the chapters outlined in this Blueprint, there will still be opportunities for improvement and to achieve greater value from a sustainability program. The process should be iterative, with companies reviewing their progress and selecting new opportunities as sustainability evolves and new technology becomes available.

When identifying areas for improvement, the following questions can help guide a sustainability lead:

- If the organization has met its ESG goals, what should the new goals and criteria be?
- What new data are available for analysis and benchmarking?
- What new metrics can be tracked to more comprehensively calculate the value of sustainability?
- What new policy trends and regulations can drive proactive sustainability across the portfolio?
- Is the development team aware of upcoming building code changes?
- Are certain sustainability certifications that are growing in popularity worth considering for the portfolio?
- What new financing mechanisms can be leveraged for faster project implementation?
- What new technologies could be piloted in assets to achieve greater resource efficiency?
- Have the newly acquired buildings in the portfolio been analyzed for sustainability improvements?
- How do new suppliers handle supply chain sustainability?
- Have newly hired staff members been trained on energy, waste, and water procedures?
- Do new investors have different ESG reporting requirements to meet?
- What are the sustainability goals of new tenants and how can the organization align with them?
- What current events are influencing local, national, and international communities and what is the role of the built environment?

By continually investing time and funds into sustainability, real estate organizations can remain competitive in the market. It is up to sustainability directors to continuously drive ESG innovation and advance progress across a real estate portfolio and ultimately the real estate industry.



Urban Land Institute **Greenprint**

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