CoreNet Global | New York City Chapter

GHG Emissions Reduction & Commercial Real Estate

PLAYBOOK

Aligning corporate sustainability goals with your real estate portfolio

JANUARY 2023

Sustainability Committee

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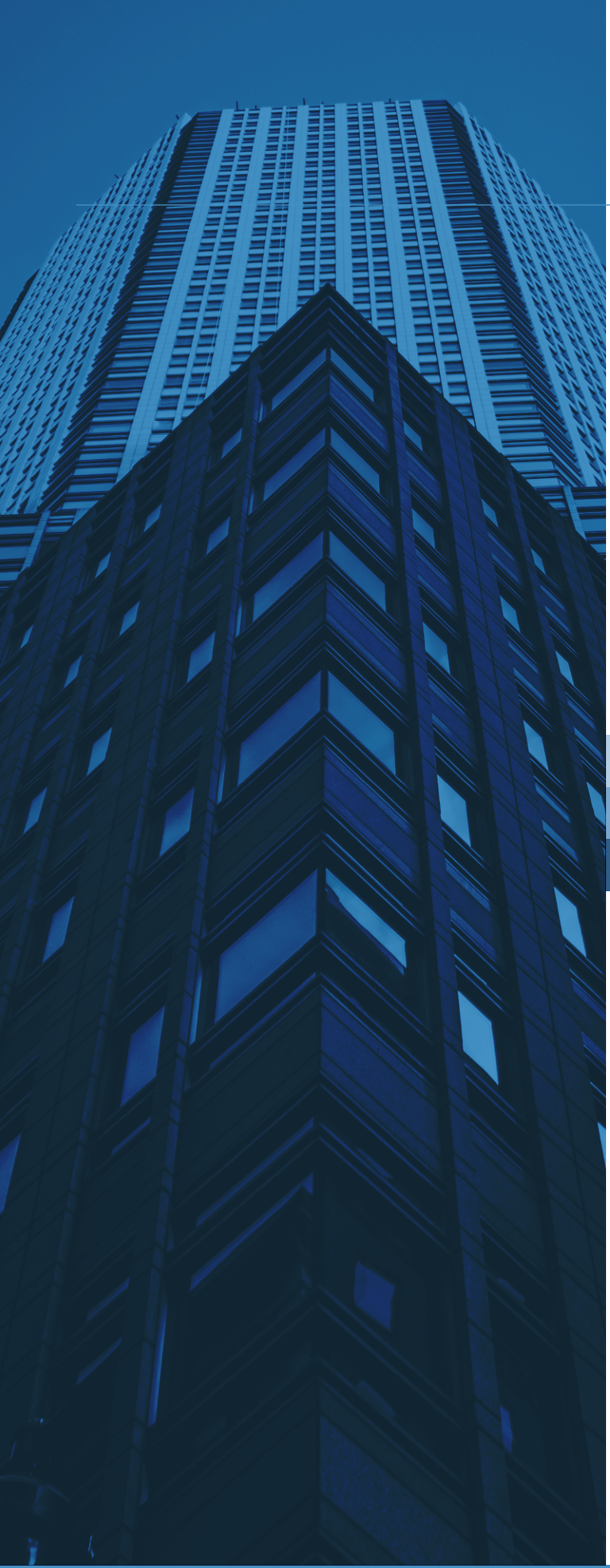
"Most stakeholders – from shareholders, to employees, to customers, to communities, and regulators – now expect companies to play a role in decarbonizing the global economy. Few things will impact capital allocation decisions – and thereby the long-term value of your company – more than how effectively you navigate the global energy transition in the years ahead...

Every company and every industry will be transformed by the transition to a net zero world. The question is, will you lead, or will you be led?"

- LARRY FINK, CHAIRMAN AND CHIEF EXECUTIVE OFFICER, BLACKROCK

Source: Larry Fink's Annual 2022 Letter to CEOs[1]



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Foreword from our Playbook Sponsor

Tackling climate change must be at the forefront of decision making across all levels of government and business as well as our personal lives. The actions we take over the next decade to mitigate emissions will be critical for future generations - every country, sector, industry, as well as each one of us, must find ways to reduce the carbon footprint we produce.

This necessary transition starts by raising awareness. The CoreNet New York Chapter's Sustainability Committee has developed this playbook to provide insights into who from your stakeholder group and project team need to be involved to drive optimal sustainability outcomes. It also provides practical strategies that can be implemented at the key stages of a project's lifecycle. Turner & Townsend is proud to have sponsored the production of this playbook as it aligns with our ambition of transforming performance for a green, inclusive and productive world. We're currently on our own journey to achieving net zero, having reached carbon neutrality in January 2021. We continue to support our clients with decarbonization strategies and solutions across differentsectors and throughout their diverse portfolios.

We hope the playbook serves as a useful resource to you and your teams. We look forward to hearing your success stories over the coming months and years.

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Turner & Townsend

Company overview

Turner & Townsend is a multinational professional services company specializing in program management, project management, cost management and consulting across the real estate, infrastructure and natural resources sectors. The company was founded in 1946 and has 112 offices in 45 countries, with a presence in the UK, Europe, Middle East, the Americas, Asia Pacific and Africa. Turner & Townsend has been supporting clients in the U.S. since 1995.

Turner & Townsend has pledged to achieve net zero carbon emissions by 2030 and have been a carbonneutral company since January 2021. Their strategy follows guidance from the Intergovernmental Panel on Climate Change (IPCC) and has been verified by the Science Based Targets Initiative (SBTi), which is established with backing from the United Nations Global Compact and the Worldwide Fund for Nature.

Sustainability expertise

Through their extensive global net zero implementation experience, Turner and Townsend has crafted specific capabilities to address every aspect of major net zero and sustainability program delivery for their clients. Their approach prioritizes the combination of program management principles and sustainability expertise to deliver optimum outcomes for their clients.

Turner & Townsend has developed three proprietary carbon assessment tools to aid clients in their sustainable transitions.

1. The Net Zero Scorecard was built in conjunction with Columbia University's Global Leaders in Construction Management (GLCM) program to focus on carbon emissions generated in three main aspects of a typical construction project: manufacture, delivery, and installation.
2. An Embodied Carbon Calculator (ECC) tool that assures industry best practices are followed in carbon accounting and provides a clear, concise report detailing the carbon performance of projects and programs.
3. Lastly, an Operational Carbon Calculator was designed to demonstrate the sustainable impact of changes made through the selection of improved MEPS and critical infrastructure equipment.

These tools, combined with other partner-developed technologies, allow Turner & Townsend to build a bespoke carbon assessment plan for each client, to meet the unique demands each program and portfolio requires to ensure a low carbon future.

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OVERVIEW

Introduction

The CoreNet GHG Emissions Reduction and Commercial Real Estate Playbook is written with practicing corporate real estate professionals, architects, sustainability consultants, owners and other building stakeholders in mind. It provides simple and powerful explanations of the trends associated with carbon assessments and how to identify the best frameworks and strategies for intended goals. This Playbook will provide readers with insights to harness the full potential of carbon reduction opportunities. It also offers a summary of action items that can be implemented to plan, track and reduce Scope 1, 2 and 3 emissions throughout a project's life cycle.

> To achieve these goals, it is imperative that all stakeholders involved in commercial real estate assess the existing carbon assessment frameworks and apply them to their decision making process. This forces building professionals to look beyond their initial costs, find ways to turn risks into opportunities and support long term business goals. Truly sustainable business looks beyond the environmental and economic impacts of decisions to also see the impact on communities and supply chains.

10 Reasons

The Commercial Real Estate Industry should care about addressing their GHG emissions:

- Imperative for attracting and retaining top talent
- Enhances transparency reporting for investors/shareholder, customers and employees
- Business to business clients are increasingly requiring GHG emissions through supplier policies
- Gains or maintains a competitive edge
- Future-proofs assets against changing government regulations
- Enhances resiliency by reducing the chances of locking into a dirty grid
- Reduces energy bills
- Addresses direct operations and supply chain emissions
- Identifies opportunities for social impact
- Enhances accountability for corporate performance
- Allows project teams to collaborate and assess their sustainable return on investment

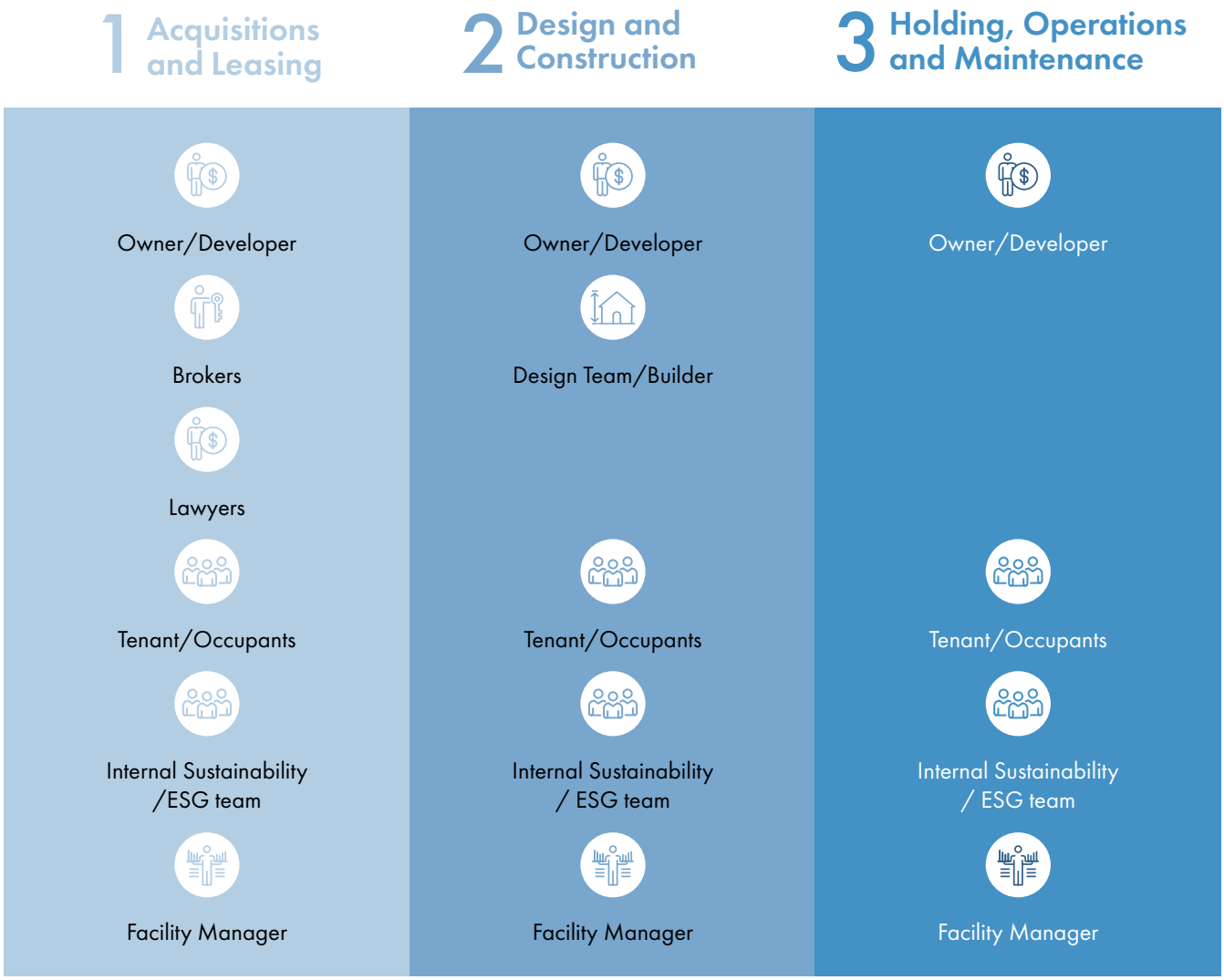
How to Use This Playbook

This playbook will allow all members of the CoreNet community to identify the major stakeholders throughout a project's phase and their role in addressing GHG (green house gas) reductions within the built environment. We encourage you to use this interactive diagram, which will direct you to targeted sections with practical strategies that can be implemented.

This playbook is divided into the following sections:

1. Introduction to GHG Emissions
2. Addressing GHG Emissions in:
    a. Acquisitions and Negotiations
    b. Design and Construction
    c. Holding, Operations and Maintenance

We hope that you will find this information valuable and use it as a resource to help improve and integrate your current approach to address GHG reductions.



Call to Action Matrices

At the end of each section, you will find a matrix of action items that building tenants and owners can take to help progress the conversation with various team members. These best practices have been defined on a scale of good, better and best:

Good - Planning and management practices

These action items provide a great starting point for organizations to implement practices that aligns with the intent. They focus on internal governance of the strategies so that a strong foundation is built.

Better - Tracking and reducing your footprint

Footprints are the negative consequences to sustain your organization. These items start putting strategies into action and measures your footprint. They help you understand your current stance at assessing GHG emissions. Most organizations are at this point in their journey - working towards understanding their footprint and how to reduce it.

Best - Taking into account handprinting

Handprints focus on the positive changes your organization brings into the world. These action items are asking organizations to look beyond their immediate boundaries. The ultimate question this will answer is "how are my decisions impacting my community and/or supply chain?".

Example: Aligning Green Leases with your GHG goals

Tenant	GOOD	BETTER	BEST
	Engage a broker and real estate lawyer familiar with green leases; prioritize green lease terms in negotiations. Tenant to review their internal GHG goals. Identify three or more strategies that the base building can annually report to support your corporate goals. Engage in a study of the building systems along with energy saving measures that include rebates.	Submeter energy end uses that contributes to more than 10% of the tenants energy consumption. Identify what are important to track for your space (lighting, HVAC, etc.) and ask the landlord what can accurately be tracked with the building BMS. Look for landlords that have achieved certification as a Green Lease Leader. Educate staff about your goals, track and publicly display your corporate Scope 2 emissions to employees.	Pool funds among tenants and landlord to engage in a virtual power purchase agreement to support a just transition to a green economy.

WHAT ARE GHG EMISSIONS AND WHY ARE THEY IMPORTANT IN COMMERCIAL REAL ESTATE?

Learning Objectives

1. Identify the drivers behind GHG reporting
2. Explain what should be tracked in GHG emission reporting
3. Identify how to align real estate goals with corporate GHG commitments

Summary

A large percentage of the energy consumption and GHG emissions in NYC and the rest of the world comes from buildings. These GHG emissions include those that are embodied in the building materials and those which are generated through the operations of the buildings. As Environmental, Social and Governance (ESG) reporting moves into the mainstream, it is important to understand what a company is measuring when it comes to GHG emissions. The scope can and should include emissions that are both company controlled and supply-chain dependent. In order for corporations to make a significant dent in GHG emissions, commercial real estate must be involved and integrated throughout the process.

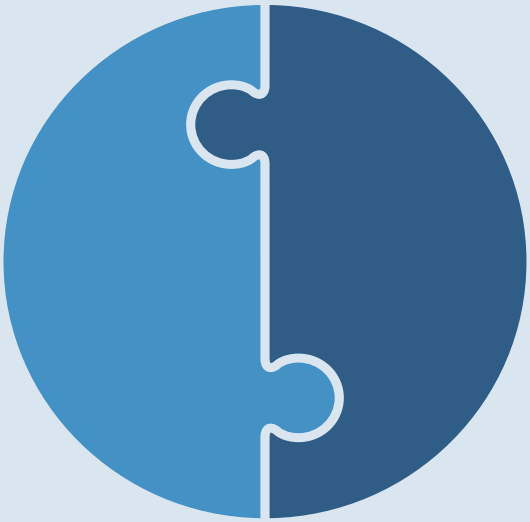
Factors Influencing GHG Disclosures

The building sector accounts for nearly one-third of global energy consumption.[2] In NYC, buildings account for two-thirds of GHG emissions and therefore should be an area of focus to decarbonize the building stock.[3] The sizable carbon emissions arising from the built environment are attributable not only to the use of built assets – operational emissions (Scopes 1 and 2), but also to their construction – embodied emissions (Scope 3). With the present global building floor area set to more than double by 2060, there will be increased demand for construction materials for new buildings, extensions, renovations and infrastructure; creating significant and immediate carbon emissions before a project's completion.[4] It is therefore important for the real estate and construction sectors to consider the life cycle impacts of the construction process as well as the emissions from in-building energy use.

> As a result, building owners are under increasing pressures from stakeholders to understand the impact of climate change on their investments. In addition, government regulations are placing a price on carbon and it is important for building owners and asset managers to minimize risks to their clients with respect to GHG emission target reductions. Large institutions are publicly disclosing their environmental impact through ESG reporting, since it is no longer a nice-to-have but is now becoming a mandatory part of annual reporting to stakeholders and investors.

EXTERNAL FACTORS

Investors
Shareholders
Customers
Government Regulations
Supply Chain
Competitive Edge



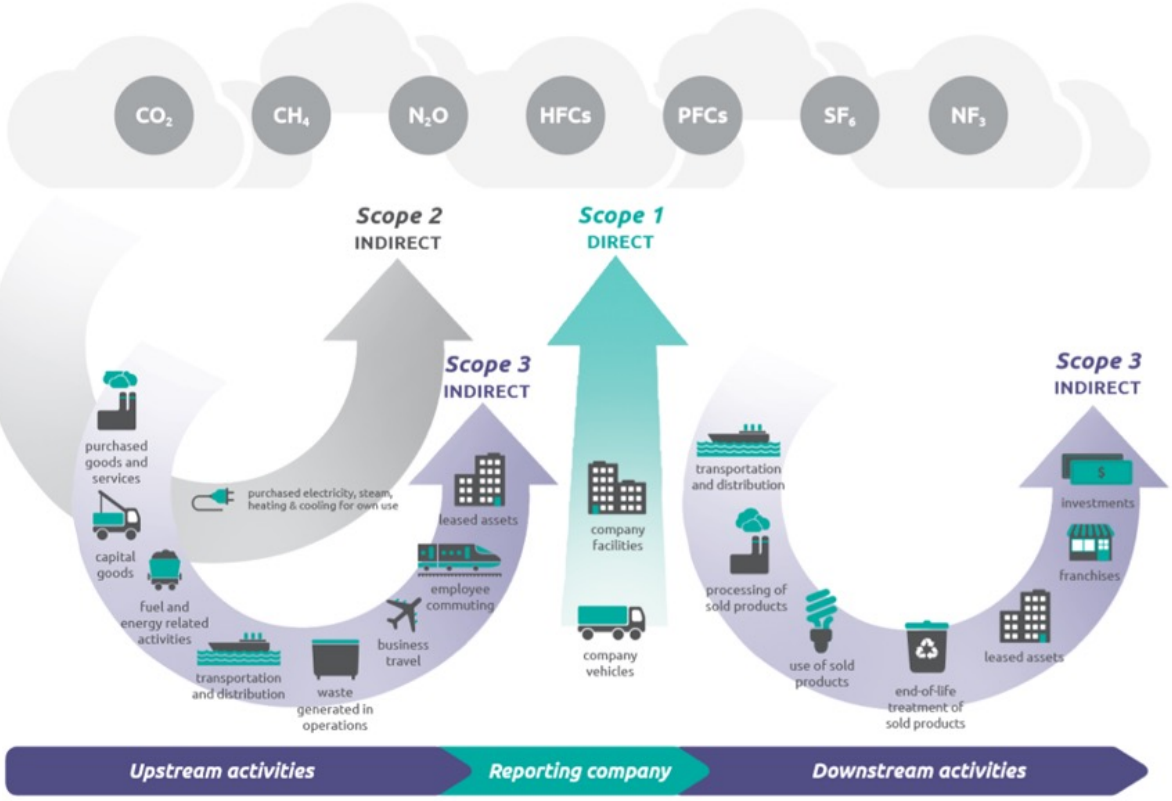
INTERNAL FACTORS

Employees
Governance: Integration across business units
Innovation / Forefront of solving problems
Brand Enhancement
Risk Management
Opportunity Identification

GHG Emissions Breakdown

As more corporations make ambitious GHG emissions targets such as achieving net-zero by 2040, it is important that the type of emissions associated with those goals are identified and clearly expressed. In NYC, the commercial real estate industry may focus on reducing energy usage and finding opportunities for cleaner sources of energy. However, this is only one part of your GHG emissions and there is more than you can do to address the emissions throughout your project's life cycle.

There are three types of emissions that should be identified, quantified and constantly tracked as part of your overall GHG emission goals - scope 1, scope 2 and scope 3.[5] This image provides an overview of the three types of emissions:



Source: Corporate Value Chain (Scope 3) Accounting and Reporting Standard[6]

SCOPE 1

Emissions are the "direct emissions from company-owned and controlled resources."[5] Scope 1 emissions can be divided into four categories: stationary, mobile, fugitive and process emissions.[5]

Stationary combustion produces emissions from boilers, heaters or other machinery on-site. An example for this in the real estate sector is an on-site natural gas boiler. The EPA Center for Corporate Climate Leadership is a reference to help identify and estimate direct GHG emissions from stationary (non-transport) combustion of fossil fuels at a facility (e.g., boilers, turbines, process heat).

Mobile emissions are from vehicles owned or leased by an

organization. The EPA Center for Corporate Climate Leadership is a reference to help quantify these types of emissions.

Fugitive emissions are leaks from refrigeration, air conditioning units. Chlorofluorocarbons (CFCs) and other refrigerants such as hydrochlorofluorocarbons (HCFC) contribute to the depletion of the stratospheric ozone layer. Addressing refrigerants helps to address global warming because refrigerants have a disproportionately larger effect on global warming compared with other greenhouse gases.[5] The EPA Center for Corporate Climate Leadership is a reference to help screen and quantify fugitive emissions. It is highly recommended that corporations take an inventory of these emissions and develop a plan to reduce refrigerants within their buildings.

"Process emissions are released during industrial processes, and on-site manufacturing (e.g. production of CO2 during cement manufacturing, factory fumes, chemicals)."[5] This type of emission has no relevance on the Scope 1 emissions in commercial real estate.

SCOPE 2

"Emissions are indirect emissions from the generation of purchased energy, from a utility provider."[5] It includes all GHG emissions from the "consumption of purchased electricity, steam, heat and cooling."[5] In the commercial real estate industry, when we talk about reducing GHG emissions from energy consumption, we are generally targeting Scope 2 emissions. But, this is only part of the equation! We also need to be aware that Scope 2 emissions can be further broken down into location-based or market-based. Location-based Scope 2 emissions deal with the energy consumption occurring on-site. For example, a building owner can reduce its location-based Scope 2 emissions by installing all LEDs or upgrading to a more efficient HVAC system. Market-based Scope 2 emissions focus on where a corporations buys their energy. For example, the emissions from a solar farm will be lower than the emissions from your local natural gas provider. In NYC, Scope 2 emissions are receiving a lot of attention due to carbon pricing as outlined in Local Law 97. [3]

SCOPE 3

Emissions are almost 80% of a company's GHG emissions.[7] Scope 3 emissions look at your interaction with your supply chain. This means that you cannot make a dent in your corporations GHG emissions without integrating with your supply chain. To identity the biggest contributors to your Scope 3 emissions, GHG Protocol created a Scope 3 Evaluator; that way you can make targeted efforts on the activities that will substantially decrease your GHG emissions.[8] In commercial real estate, Scope 3 emissions can be assessed through quantifying embodied carbon during construction or emissions from construction equipment. These are harder to quantify but are necessary to address climate change.

Environmental, Social and Governance (ESG) frameworks provide guidance for corporations to align their business with climate goals. The top 5 environmental KPIs that are expressed throughout these frameworks are:[9]

Climate Change Opportunities and Risk
Greenhouse Gas Emissions
Environmental Policy
Energy
Environmental Management System

What are we really measuring? Greenhouse Gases, CO2, CO2e, or Carbon

Corporations conduct a carbon footprint to quantify their emissions as part of their annual ESG reporting. However, the term carbon footprinting can be a bit misleading. When conducting a "carbon" footprint, it is oftentimes the CO2e (carbon equivalent) that is calculated. This means that the greenhouse gases are identified and quantified, which is then multiplied by its global warming potential (GWP) to represent it as CO2e.[10]

GHGs

"A greenhouse gas (or GHG for short) is any gas in the atmosphere which absorbs heat." [10]

Water vapour (H2O)
Carbon dioxide (CO2)
Methane (CH4)
Nitrous oxide (N2O)
Ozone (O3). [10]

CO_2

"Carbon dioxide (CO2) is the most common greenhouse gas (GHG) emitted by human activities." [10]

CO_2e

Helps describe different greenhouse gases(GHGs) in a common unit. [10]

For any quantity and type of greenhouse gas, CO2e signifies the amount of CO2 which would have the equivalent global warming impact. [10]

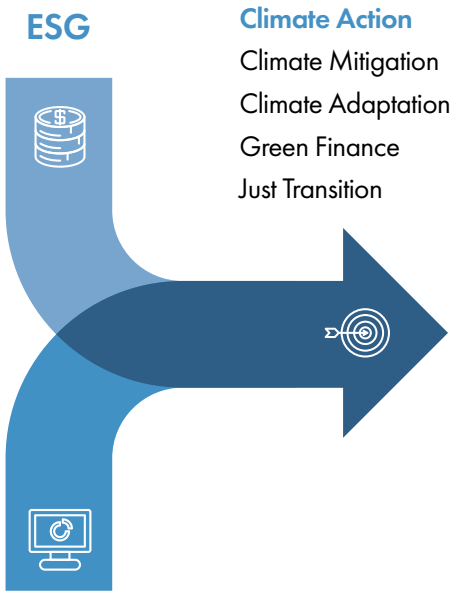
CARBON

Carbon is a chemical element which is present in many gases and compounds. [10]

Adjusting the Current Approach

In commercial real estate, sustainability is synonymous with acquiring a building certification. However, the market is shifting and industry conversations are beginning to focus on how commercial real estate can support companies' ESG objectives and reporting. In order to accurately address the GHG emissions needed for ESG reporting, corporate sustainability goals must be integrated in all conversations throughout commercial real estate. When this integration occurs, we will be able to take climate action to a level that will create a dent in our GHG emissions. In the current market, climate action can be broken into four buckets: climate mitigation, climate adaptation, green finance and just transition to a green economy.

Climate Mitigation:
Reducing emissions to limit global temperature increase
Climate Adaptation:
Addressing and reducing vulnerability to climate change
Green Finance:
Making finance flows consistent with climate goals
Just Transition:
Making "the energy transition affordable for all consumers."[1]



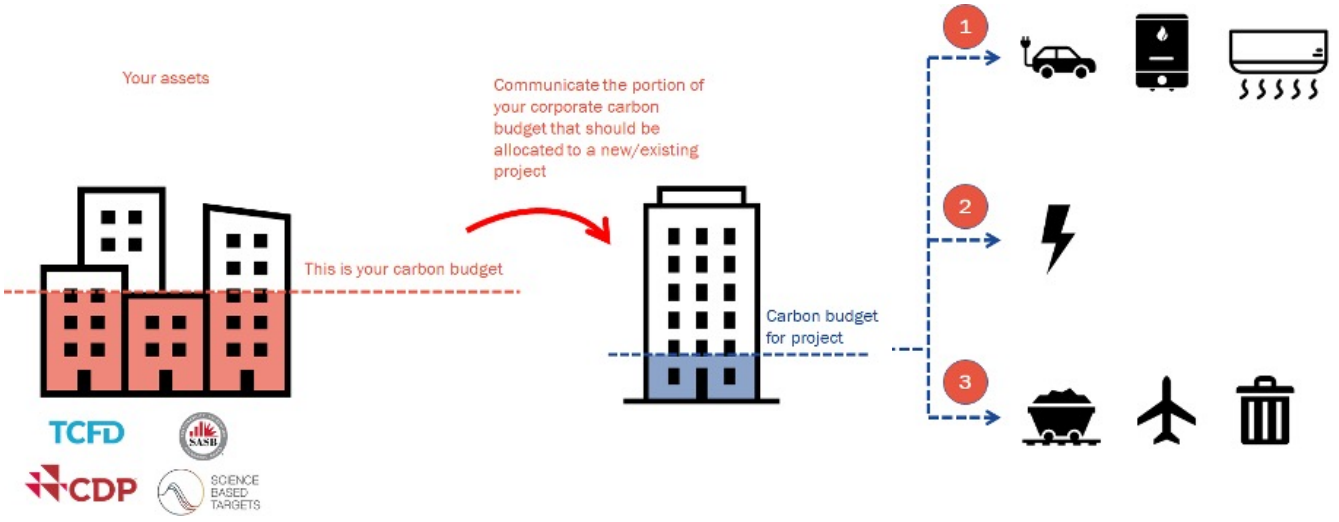
carbon

You have a limited budget...use it wisely!

Your carbon budget is limited, which means you have to plan on how to allocate your budget across your assets. Two things will become important as your budget reduces each year: (1) deep renovations of existing buildings, and (2) creating net zero new construction buildings.

Does your company have a carbon budget? Do you know how much of your company's total carbon budget should be allocated to each building within your portfolio? What is your plan to actively address your operations to reduce carbon emissions?

It is not enough to procure green power/carbon offsets as a way to reduce your GHG emissions. You have to change the way you approach projects to address the issues at its core.



Source :Sheryl Owen[11]


ACQUISITIONS
AND LEASING

Learning Objectives

1. Explain what green leasing is and who should be involved during lease negotiations to capture corporate sustainability goals
2. The importance of selecting a site that aligns with local laws and supports a corporation's sustainability goals
3. Identify strategies that are mutually beneficial to tenants and landlords that want to reduce their GHG emissions

Summary

Landlords and tenants must work hand-in-hand to reduce GHG emissions, and lease agreements should direct this cooperation. Making sure brokers are well-versed on both the corporate and the building's energy goals is key. The way the industry looks at lease clauses involving energy and other sustainable features will need to change with technology and data collection being very important. Incentives are also available to help with building upgrades to control GHG emissions.

Introduction

A study conducted by the Institute for Market Transformation (IMT) demonstrated that green leases have the potential to save the U.S. office market $3.3 billion annually, cutting energy consumption by up to 22 percent in leased buildings.[12] Despite a drastic reduction in building occupancy due to the COVID-19 pandemic, buildings are still using a significant amount of energy. While other sectors such as transportation have seen a decline in their respective GHG emissions during the pandemic, the built environment has not been able to demonstrate similar strides. Most buildings operated as if they were fully occupied due to a number of factors such as outdated infrastructure, servers and HVAC systems operating as they were due to lease obligations and pre-COVID-19 norms. The building industry has missed an opportunity to not only reduce their energy consumption but also their Scope 2 emissions. This has highlighted a gap in building performance, which owners will be accountable for as outlined in New York's Local Laws 95 and 97.[13,14] For a building owner to reduce their GHG emissions, they must realize that not only their operations will play a critical role, but cooperation from their tenants will be important.

> Green leases can help landlords and tenants align their respective sustainability priorities to create a win-win situation. Landlords are looking for ways to minimize their risks with current and upcoming local laws/regulations. Simultaneously, tenants are looking for ways to reduce their emissions from energy consumption (Scope 2) emissions to support their GHG reporting. Reducing GHG emissions in alignment with corporate sustainability goals should be discussed and outlined during lease negotiations.

Lease negotiations are typically completed by corporate leadership, brokers and lawyers; however, corporate sustainability leaders and Facility Managers historically have not been included in these discussion. By bringing each of these stakeholders onboard during the leasing process you add an opportunity to capture more value in the lease in the form of sustainable performance. Brokers are the primary contact between landlords and tenants and they are in a unique position to help guide their clients during the acquisition phase of a project. Therefore, if brokers make themselves familiar with the building's energy goals they gain a more competitive position to raise the lease's GHG performance. A similar opportunity presents itself for lawyers with the language required in clauses or amendments, which may vary based on lease structure. Other sources for further reference are the UK's Better Building Partnerships "Transactional Agents Sustainability Toolkit" and The Penn Institute's for Urban Research's 2016 "Educating Commercial Real Estate Brokers on Green Leasing/Energy Efficiency".

Barriers of Green Leases

For green leases to become mainstream in commercial real estate, building professionals should recognize and address some of the shortcomings that exist within standard leases and building infrastructure. Arguably, the biggest hurdle that will need to be addressed is human behavior. Landlords and tenants must identify their goals and be transparent about the benefits and hurdles that exists for both parties. Ideally, this should be outlined during lease negotiations but the same will hold true for tenants in existing leases that would like to incorporate a green lease via an amendment. Landlords will need to consider the manner in which a space is used by the tenant. For example, if a tenant has an energy

intensive use type (i.e. trading floor), the landlord may have to pivot their approach. In this instance, landlords should consider an internal carbon trading program between tenants as part of their green lease.

Under a typical commercial net lease, tenants likely are responsible for their electric bills and are more inclined to perform energy efficient upgrades as opposed to building owners. The opposite holds true in a gross lease, where the landlord may have an incentive for the building be more efficient, however the tenants have no incentive to conserve energy. Most leases for multi-tenant buildings just divide the total energy cost to heat the building by area leased and charge each tenant for its square footage. In turn, there is no financial incentive for the owner or a tenant to reduce its heating use because the savings go to others. Regardless of the type of lease, tenants and landlords can hold each other accountable for their share of GHG emissions but technology and data collection will be pivotal. The costs associated with implementing this infrastructure, the timeline to complete upgrades and projected timeline to see a reduction in GHG emissions will dictate which tenants will be interested in splitting the costs. Other sources for further reference are Boston Bar Associates' 2012 "Green Lease Guide", the Oregon Commercial Association of Brokers' (CAB) Green Leases, Buildings.com's "Submetering Best Practices for Multi-Tenant Buildings" 2019 article, A Better City's 2014 Green Leasing article and the Institute for Market Transformation (IMT)'s "Landlord-Tenant Energy Partnership Analysis: Why Landlords Should Take The Lead On Installing Submeter Technology".

> Most buildings are requiring tenants to submeter their total energy consumption. Landlords in NYC should not lose sight of Local Laws 88 and 132, which requires all non-residential buildings greater than 25,000 square feet to install electrical sub-meters for each large non-residential tenant space greater than 5,000 square feet and provide monthly energy statements.[15,16] Tenants that are signing long term leases may have not considered including submeters for their space. Before deciding to update a building management system, the first step that landlords should consider completing is updating building electrical drawings.

Financing Your Upgrades

There are numerous incentives available for building owners to utilize for their building upgrades. This list is not exhaustive but lists some of the incentives currently on the market that should be considered in your next project. In addition to external sources of funding, sustainability is an opportunity to reach beyond silos, form new collaborations across the organization, and innovate. You may be able to tap internal budgets that support the bottom line across various business units.

- The New York Green Bank helps developers and financiers overcome transaction barriers to scalable and replicable clean energy projects. The landlord of a building must be involved with the energy upgrades in order for tenants to utilize funds from the New York Green Bank. At the time of writing this playbook, there are a number of requests for proposals for landlords to leverage.[17,18]

- Commercial Tenant Program (CTP) supports improvement of leased spaces and can help at any point in the leasing cycle. Through this process The New York State Energy Research and Development Authority (NYSERDA) covers the cost of a consultant to help tenants uncover energy savings opportunities. The CTP has phased into the NYSERDA Flexible Technical Assistance (FlexTech) Program.[19]

- Con Edison Commercial and Industrial Energy Efficiency Program offers incentives for installing energy-efficient equipment and technologies.[20]

Theory of Change

The transformation effort needed to bring GHG emissions to the forefront requires identifying strategies that integrate all parties that will play a role in executing the goals of your corporation. The question you should ask yourself is "What is our vision of results and how can the landlord and its tenants support each other?". Each of the ideas listed below represent either a systems or organizational transformation.

Setting Targets That Align With Climate Science

Landlords and tenants need to identify the targets that they would like to achieve for their spaces. Landlords and tenants may have targets within their ESG frameworks, and if so they should communicate them to each other for alignment and potential partnership. For corporations that have not set targets, Science Based Targets may be a great place to start. Green leases should incorporate interim targets that are consistent with limiting warming to 1.5°C. [21]

Incorporating a Passthrough Clause

If building owners are going to upgrade building systems to reduce the base building energy systems, tenants must be willing to pay for those benefits as well. Building owners should communicate their plans for energy efficient improvements. Tenants will likely only be willing to pay for the benefits if they see a direct value in their energy bills or reduction in CO2 emissions. In a passthrough clause, there's an opportunity for a performance based approach.

Incorporating a Performance-based Approach

Local regulations are moving towards a performance pathway rather than a prescriptive one - why should a green lease be any different? Incentives can be offered to tenants that perform better than the targeted GHG emissions. The comparatively small incentive that landlords would offer will be no match to the penalties that will be paid for not complying with Local Law 97. In order to take full advantage of performance-based approach, submetering of energy uses will be important so that tenants and landlords understand what is driving a reduction in carbon.

Mitigation

In cases where a tenant is not able to meet the targets outlined in the green lease, the landlord should develop a plan with the tenant to remediate the problem. This is where submetering becomes important because you will be able to track the greatest source of energy consumption. Data will play a role in the mitigation plan, so the building management system must be able to track this information.

Incorporating a Reporting Clause

During lease negotiations, tenants and landlords should engage their respective corporate sustainability teams to identify mutual CO2e targets. In each of these teams they may reference their ESG reporting frameworks such as Carbon Disclosure Project (CDP), Science Based Targets (SBTs), Task Force on Climate Related Disclosures (TCFD).[21,22,23] Don't forget to acknowledge that your respective CO2e targets should reduce annually, and these reductions should be captured in your reporting clause. Both the landlord and tenants should identify a point of contact that will track and share data monthly/quarterly.

Key Takeaways - Conclusion

Green leases require commitment from the tenant, landlord and their respective employees to achieve ambitious carbon reduction goals. The statistic about the potential savings green leases can have on office spaces is so telling that it's worth restating; green leases have the potential to save the U.S. office market $3.3 billion annually, cutting energy consumption by up to 22 percent in leased buildings.[12] Tenants and landlords need to understand their corporate commitments, identify strategies to support each other's goals, learn from setbacks, collaborate with industry professionals and maintain communication.

The challenge for the commercial real estate industry is to account for reductions resulting from **direct action from their tenants and within their operations** rather than relying on offsets to reduce a building's GHG emissions. While green power/carbon offsets should not be the initial solution to reduce a building's Scope 2 emissions, some green leases may include a portion that focuses on green power. The question will be where should you procure these offsets from and is there an opportunity to address social impact? Some commercial real estate owners may be in a tug of war about where to procure them - either directly from the grid to comply with Local Law 97 or to support the development of solar farms with a registered apprenticeship program that trains and employs workers who work in conventional energy and/or come from environmental justice communities. In either case, you will receive green power, but one clearly has a social benefit.

While this section focused predominantly on energy management and Scope 2 (energy consumption) emissions; there are opportunities to address Scope 1 and Scope 3 (indirect emissions from your supply chain) emissions. Green leases can also include water and waste management, facilities for alternative transportation (i.e. bike racks and showers), electric vehicle charging stations, health and wellness, sustainable purchasing, green cleaning, etc. Tenant demand is critical to success. When tenants demand green leases, landlords and brokers will be more willing to implement them.

Aligning Green Leases with your GHG goals

	GOOD	BETTER	BEST
Tenant	Engage a broker and real estate lawyer familiar with green leases; prioritize green lease terms in negotiations. Tenant to review their internal GHG goals. Identify three or more strategies that the base building can annually report to support your corporate goals. Engage in a study of the building systems along with energy saving measures that include rebates.	Submeter energy end uses that contributes to more than 10% of the tenants energy consumption. Identify what are important to track for your space (lighting, HVAC, etc.) and ask the landlord what can accurately be tracked with the building BMS. Look for landlords that have achieved certification as a Green Lease Leader. Educate staff about your goals, track and publicly display your corporate Scope 2 emissions to employees.	Pool funds among tenants and landlord to engage in a Virtual Power Purchase Agreement to support a just transition to a green economy.
Landlord	Work with your internal sustainability and legal team to identify cost-sharing incentives that can be included in current/future leases (i.e. Phantom load switches). Update your building's electrical documentation especially if you are not the original owner. Engage in a study of the building systems along with energy saving measures that include rebates.	Assure that the tenants overall energy consumption is submetered. At a minimum assure that the tenants overall energy consumption is submetered. Require an energy model to be completed. Tenants in NYC can take advantage of NYSERDA's Commercial Tenant Program to offset cost. Require Energy Star Tenant Space Criteria for tenant fit-outs. Incorporate a mitigation plan in case targets are not met by a tenant.	Implement a performance based approach with incentives for tenants to reduce GHG emissions. Incorporate a reporting clause with your tenant. Consider implementing a carbon trading program between tenants.

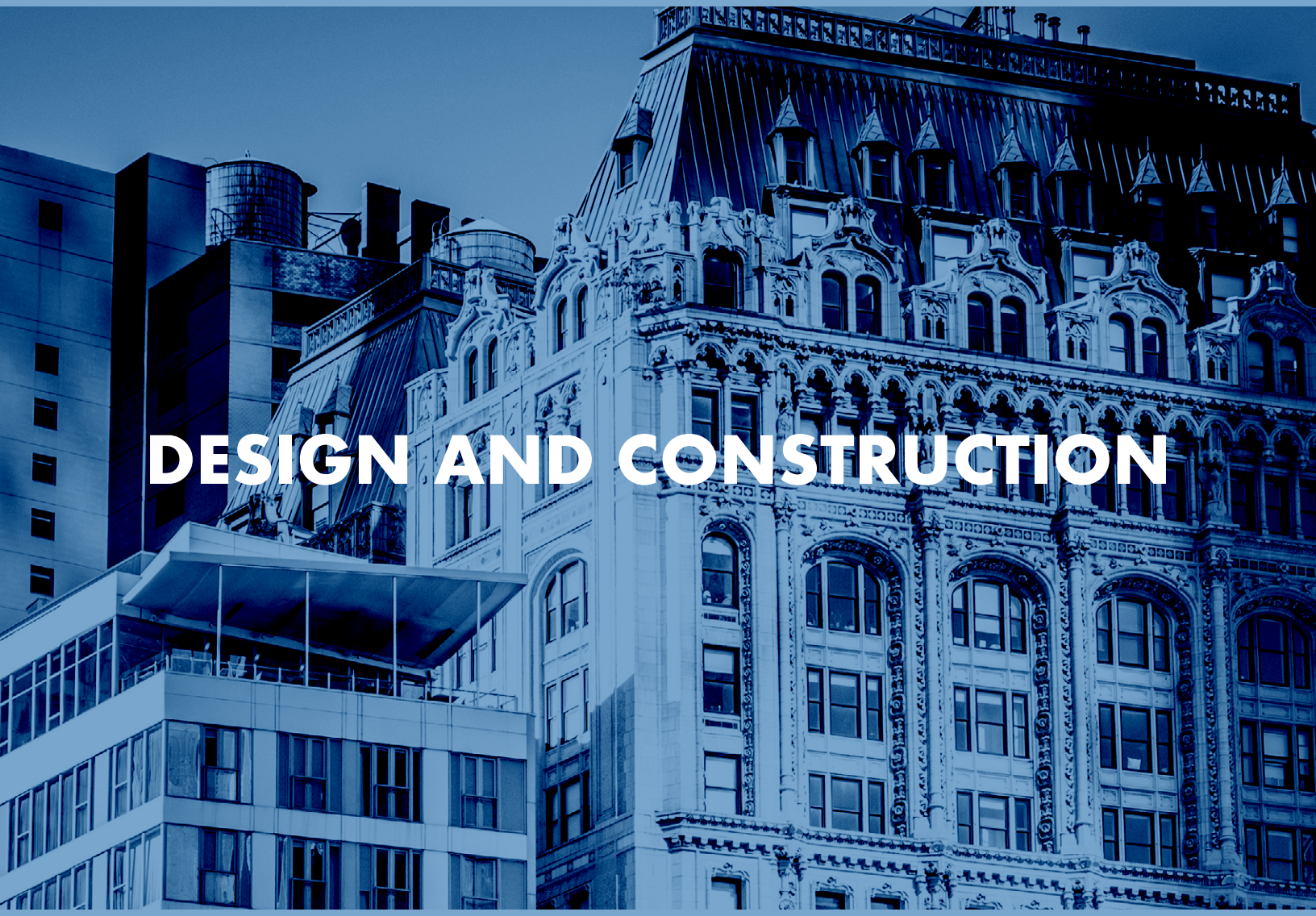
Aligning Green Leases with your GHG goals

Key Terms

Green Lease:
"The practice of realigning the financial incentives of sustainability or energy measures in lease documents." [12]

Internal Carbon Trading:
"An internal price places a monetary value on greenhouse gas emissions, which businesses can then factor into investment decisions and business operations." [24]

Virtual Power Purchase Agreement:
"A contract between an energy buyer and the developer of a renewable energy project... where the energy doesn't physically flow from the project to the buyer... The buyer continues to get their electricity from their utility company at their utility's rate." [25]



DESIGN AND CONSTRUCTION

Learning Objectives

1. Understand the importance of future-proofing your assets and the role of AEC professionals
2. Develop goals that reduce operational and embodied carbon throughout a project's design and construction process
3. Identify building certifications that can be implemented during design and construction that support a corporation's sustainability goals
4. Establish best practices to reduce Scope 2 and Scope 3 emissions during design and construction

Summary

Many government agencies are enacting laws pertaining to carbon and climate targets. Organizations are setting their own internal sustainability and carbon reduction goals. For renovations and new construction, the building envelope should be considered for significant impacts on energy use and GHG emissions reduction in alignment in these two key areas. Some key design strategies for reducing GHG emissions are modular spaces, zoning and compartmentalization. Embodied carbon and Scope 3 emissions should not be ignored since they are the largest contributor to GHG emissions. Building and sustainability certifications are one way to stay on track with Scope 2 and 3 emissions. It is important to set both operational and embodied carbon goals in the beginning, and then create a strategy to execute in the design and construction phase. Alignment between facility management, design and construction teams best supports meeting these goals.

Future Proofing Your Assets

More government agencies are enacting local laws that set a price on carbon and require the commercial real estate industry to meet climate targets. Buildings are the largest contributor to NYC's carbon emissions and as a result, a number of local laws have been passed to address those emissions, such as Local Law 95, 97 and 132.[13,14,16] Building professionals have known that designing to code is not enough to meet ambitious climate goals and for the first time building owners are being held accountable for how their building performs. The approach to design and construction must change and it starts with property owners requesting high performance buildings.

The COVID-19 pandemic drove some commercial real estate landlords to look for renovatable Type B office buildings due to both a decrease in price and increasing demand from tenants looking for buildings that comply with Local Law 97. Focusing on existing buildings and their energy efficiency means that there will be a reduction in Scope 2 emissions. There are number of challenges that come with updating existing buildings such as revenue, tenant disruption and the initial cost of upgrades. A deep renovation of an existing building can reduce your energy usage due to the amount of energy that is lost through the building envelope. Building enclosure design is directly related to a building's energy consumption. However, the energy losses associated with a building envelope are rarely quantified and incorporated into energy modeling. This consideration has already been accounted for in standards such as Passive House.[26]

If you are working on a new build, adaptive reuse, core and shell or major renovation, do not do yourself a disservice by neglecting the importance of addressing your building envelope to drive energy reductions and GHG emissions. Building envelope renovations of an existing building is the most challenging because of disruption to tenants, costs and loss of rentable square feet. When updating your building envelope you can either build outside your existing facade or enhance thermal properties from the inside. In NYC, it may prove difficult to improve thermal performance from the outside because you are hindered by your lot line.

As the grid becomes cleaner, building owners should be cautious about locking-in carbon intensive services, which will quickly reduce your carbon budget and undermine the goal of reducing your impact on climate change. As upgrades are made to existing buildings, consider future proofing your asset for the decarbonization that will occur in the grid. While gas is currently cheaper than electricity, as the grid shifts towards clean sources of energy, the cost of electricity will likely decrease over time.

Your Project Process

1	2	3	4	5
Goal Setting	**Strategy**	**Design**	**Construction**	**Close-Out**
Work with your internal sustainability and legal team to identify cost-sharing incentives that can be included in current/ future leases (i.e. Phantom load switches). Update your building's electrical documentation especially if you are not the original owner. Engage in a study of the building systems along with energy saving measures that include rebates.	Identify the reporting methods for the selected design team to provide input about embodied carbon goals. Identify how to remediate goals that are not achieved. Set EUI targets for your space and complete an energy model. Confirm that the goal set for operational carbon aligns with your corporate ESG goals. Set embodied carbon targets for your design team to achieve. Have a conversation with your ESG team to find out what are Scope 3 goals the company is targeting and how the project can support them.	Design team to provide an update on material selection. Mechanical team to provide an update on EUI goals.	Assessments of materials that have been value engineered should still be in alignment with GHG Scope 3 emission goals. Execution of construction documents/shop drawings.	Enhanced Commissioning & Monitoring Based Commissioning. Facility Managers must be educated on how to use the spaces to maintain the GHG emissions and energy use goals. Facility Managers must continuously gather data and opportunities to improve. Facility Managers must communicate accomplishments with employees and seek their engagement to support the GHG emissions and energy use goals.

The Changing Layout

Each of the below suggestions for design enhances functionality and value to the building.

Modular Systems for tenant spaces

Landlords and tenants can consider a kit of parts solution for their spaces to reduce their Scope 3 emissions. In this situation, tenants can design a layout that works for their needs and also allows for easy deconstruction and reuse. This method requires collaborating with manufacturers and industry experts in deconstruction, setting metrics/targets and data collection to make this a success. By actively engaging with manufacturers during the design, there is a opportunity to address the Scope 3 emissions associated with the end-of life treatment of their sold products as outlined by the GHG Protocol.[27] Owners should consider getting involved with creating material passports to catalog each piece of material, its source and potential end-of-life solutions/destinations. This will require leveraging technology to collect and store data, as well as exchanging information with relevant parties throughout the supply chain.[28] The current market reflects an enhanced focus on recyclability and reusability through a manufacturer's take-back program. While this may not be as robust as a material passport, it is a step further in addressing your Scope 3 emissions. Manufacturers will collect used products or materials from consumers and reintroduce them to the original processing and manufacturing cycle.[29]

Zoning

Zones are locations in the building or within an office space that have different heating or cooling needs. The components and layout of mechanical air distribution can improve the comfort of occupied spaces and reduce energy use. This can be the result of a different activity within different spaces, different room occupancy or different loads on different spaces. When you implement zoning within your space, there is an opportunity to deliver the needed air changes and address indoor air quality. By grouping teams with similar office hours on the same floors, optimal equipment schedules could be established, especially for lighting and HVAC. Accurately gathering data about how occupants use the space can help landlords and tenants adjust the operations of their mechanical system and find opportunities to update their mechanical systems schedule. In addition to proper zoning of spaces, it should be noted that leaky ductwork can cause up to 40% of heating and cooling energy loss.[30] Addressing duct leakage should be a component in existing and new buildings that are commissioned.

By focusing on operations, buildings will be able to reduce Scope 2 emissions, which can prove to be beneficial for those reporting in alignment with the Science Based Targets Initiative (SBTi). The SBTi is "the global body enabling businesses to set emissions reduction targets in line with climate science".[21] As referenced, case study of White & Case demonstrate the feasibility of zoning in tenant spaces.[31]

Compartmentalization

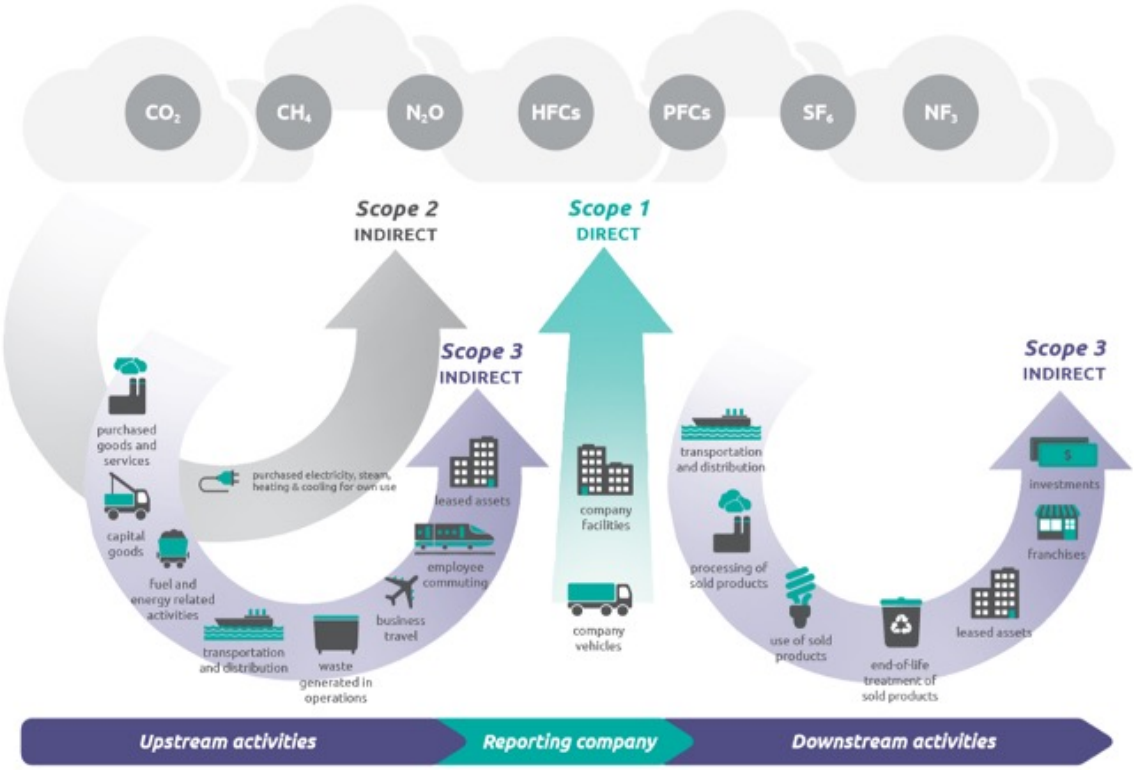
Compartmentalization minimizes air leakage between units and will require engaging general contractors and subcontractors that know the main sources of air leakage (i.e. electrical sockets, mechanical rooms, where the wall meets the floor or finish deck, windows). However, this concept can play a role in offices spaces to minimize exposure to indoor air pollutants and to drive down energy use. Landlords need to make this a criteria at the beginning of their projects and will oftentimes require completing multiple blower door tests to make sure the building air leakage.

More Than Your Energy Usage...

While tightening regulations have predominantly focused on Scope 2 emissions, there is another source of emissions that is neglected during initial design and construction conversations - embodied carbon. Embodied carbon can help address a portion of a company's Scope 3 emissions. Most companies set Scope 1 and Scope 2 emission targets, however, Scope 3 emissions are the largest contribution to a company's GHG emissions, accounting for about 80% of a company's footprint.[7] As a recap, Scope 3 emissions have both upstream and downstream activities. The main contributors to the commercial real estate Scope 3 emissions are: upstream purchased goods and services, employee travel, employee commuting mileage and waste generated in operations.[32,33] Emissions generated during construction will fall under "Upstream Purchased Good and Services".

In order to maintain your commitments to stakeholders and to maintain one's reputation as a contributor to solving climate change, Scope 3 emissions must be embedded within conversations to align with climate science. Unlike operational carbon, embodied carbon cannot be reversed; once emissions from materials and construction are released the opportunity has passed to address them. When materials are selected, energy and emissions are expended, so owners should set thresholds for design and construction team members to meet. Interestingly, leases signed for a shorter time period may be faced with a unique opportunity to consider material reuse and deconstruction methods.

While this section specifically focused on embodied carbon, it may behoove corporations to understand their main contributors to Scope 3 emissions, gather data and develop a plan to reduce them on an annual basis. This can be completed through Quantis Scope 3 Emissions Evaluator created by the GHG Protocol.[8]



Source: Corporate Value Chain (Scope 3) Accounting and Reporting Standard[6]

Addressing Scope 2 Emissions During Design and Construction

	GOOD	BETTER	BEST
Deep Renovations	Identify your corporations total Scope 2 emissions and communicate the threshold to design team members. Complete an energy audit. Brainstorm with your facility management team for opportunities to reduce energy use.	Incorporate design team members that can complete thermal bridging calculations and include them within your energy modeling requirements. Pursue Passive House design standards.	Form partnerships with nonprofits that address energy poverty in your community/ supply chain.
New Construction	Procure green power and carbon offsets for 100% of your energy use.	Focus on directly impacting your operations to reduce energy use. Design to Net Zero.	Use virtual power purchase agreements to support a community gain the skills needed for a green economy.

Key Terms

Scope 2 Emissions:
"GHG emissions associated with the purchase of electricity, steam, heat, or cooling ." Think of it as the organization's energy use.[34]

Energy Audit:
"An assessment of your building's energy use which helps you determine how much energy is used, where energy is wasted, and which problem areas and fixes should be prioritized to make your building more efficient and comfortable."[35]

Virtual Power Purchase Agreement:
"A contract between an energy buyer and the developer of a renewable energy project...where the energy doesn't physically flow from the project to the buyer...The buyer continues to get their electricity from their utility company at their utility's rate."[25]

Design and Construction to Reduce Scope 3 Emissions - Product & Services

GOOD

Project owner/client should identify their corporations Scope 3 emissions for purchased goods & services.

Incorporate embodied carbon thresholds within their request for proposal (RFP) / contract with design and construction teams.

BETTER

Require design teams and construction teams to calculate a project's embodied carbon and align with the AIA 2030 Embodied Carbon goals or third party rating system.

Have check-ins at the 100% design document (DD), 50% construction documents (CD) and 100% CD phases of the project to assess embodied carbon.

Hire contractors that have pledged to Sustainable Building Practices.[36]

Require selection of at least one product that can be deconstructed and reused at the end of the project life.

Use products with a take-back program. Include this requirement within the specifications.

BEST

Use manufacturers that set GHG emission thresholds for their supply chain (i.e. Tier 1).

Support the use of local materials within fit-outs. Require at least two components within the design to be procured from the local community.

Complete an audit of your space to find opportunities to reuse materials. Encourage your team to think outside of the box (i.e. turn wood tables into a feature wall in your new space).

Engage in a partnership to address material passports and circular construction through data and research.

Key Terms

Embodied Carbon
"Embodied carbon is the carbon dioxide (CO_2) emissions associated with materials and construction processes throughout the whole lifecycle of a building or infrastructure. Put simply, embodied carbon is the carbon footprint of a building or infrastructure project before it becomes operational."[37]

Scope 3 Emissions
"Scope 3 emissions are the result of activities from assets not owned or controlled by the reporting organization, but that the organization indirectly impacts in its value chain". Examples include, but are not limited to waste generated in operations, purchased goods and services and capital goods.[38]

Material Passports
Sets of data describing defined characteristics of materials in products that give them value for recovery and reuse. [39]

Circular Economy
"Is based on three principles, all driven by design:
Eliminate waste and pollution...Circulate products and materials (at their highest value)...Regenerate nature." [40]

Circular Construction
"Aims to minimize (or even eliminate) waste and pollution by improving efficiency and keeping products and materials in use. For construction, this encompasses everything from the design phase through building, usage and eventually deconstruction and recycling." [41]

Tier 1 Supply Chain
"Companies with which the reporting company has a purchase order for goods or services (e.g., materials, parts, components, etc.). Tier 2 suppliers are companies with which Tier 1 suppliers have a purchase order for goods and services." [6]

Greenhouse Gas (GHG) Emissions
"At the global scale, the key greenhouse gases emitted by human activities are Carbon dioxide (CO2), Methane (CH4),. Nitrous oxide (N2O), Fluorinated gases (F-gases). Greenhouse gases trap heat and make the planet warmer. Human activities are responsible for almost all of the increase in greenhouse gases in the atmosphere over the last 150 years." [36]

Building Certifications / Frameworks

Starting with building certifications can be one way to stay on track for both your Scope 2 and Scope 3 emissions. Each of these rating systems has set stringent targets and can be a first step in requiring high performance buildings from designers and contractors. If you are unaware of where to begin, using one of these rating systems can be a stepping stone to help meet your internal corporate goals.

	Operational Carbon	Embodied Carbon	Carbon from Employee Commuting	Building Enclosure	Performance Based	Prescriptive Based	On-site Renewable Energy	Off-site Renewable Energy	Green Power	Carbon Offsets	Recertification	Timeline for Certification
ZERO CARBON CERTIFICATION	Req	Req	Not Req	Not Req	Yes	No	Opt	Opt	Req	Req	No	After 1 Year
ZERO ENERGY CERTIFICATION	Req	Not Req	Not Req	Not Req	Yes	No	Req	Not Allowed	Not Allowed	Not Allowed	No	After 1 Year
PHIUS / Passive House Institute	Not Req	Not Req	Not Req	Req	Yes	No	Req	Not Allowed	Not Allowed	Not Allowed	No	After Constr.
LEED Zero Carbon	Req	Not Req	Req	Not Req	No	Yes	Opt	Opt	Req	Yes, Every 3 Years	Yes, Every 3 Years	After 1 Year
LEED Zero Energy	Req	Not Req	Not Req	Not Req	No	Yes	Opt	Opt	Req	Req	Yes, Every 3 Years	After 1 Year
LEED v4.1	Opt	Opt	Not Req	Not Req	No	Yes	Opt	Opt	Opt	Opt	Opt	After Constr.

Req = Required
Not Req = Not Required

Opt = Optional
Constr = Construction

Sources: Zero Carbon Certification, Zero Energy Certification, Phius, LEED Zero Program Guide | U.S. Green Building Council, LEED v4.1 | U.S. Green Building Council[42,43,44,45,46]

Building Certifications / Frameworks

International Living Future Institute (ILFI) Zero Carbon Certification[42]

The Zero Carbon certification must achieve a targeted reduction in energy use intensity (EUI) and account for embodied carbon.

International Living Future Institute (ILFI) Zero Energy Certification[43]

Applies to new and existing buildings.

One hundred percent of the building's energy needs on a net annual basis must be supplied by on-site renewable energy.

No combustion allowed.

Passive House[44]

While the name can be a bit misleading, this certification can be applied to all building types. Passive House projects focus on designing and constructing an efficient building enclosure and adequate ventilation strategy. These are the principles that should be instilled within a design to achieve a high performance building and net zero energy.

LEED Zero Carbon[45]

Carbon Emitted is calculated from delivered energy and occupant transportation. Projects must calculate their emissions from their building operations and offset emissions by generating renewable energy, procuring renewable energy or investing in green power and/or carbon offsets.

Does not account for embodied carbon.

LEED Zero Energy[45]

The net zero energy balance is based on the quantity of source energy delivered and the quantity of renewable energy that displaces non-renewable energy on the grid.

HOLDING, OPERATIONS AND MAINTENANCE

Summary

Facilities management should work hand-in-hand with sustainability to influence GHG emissions. Developing a GHG Carbon Reduction program, complete with a vision, measurable goals, strategies and tactics is critical. Understanding baselines is also key. The Facilities Manager's impact is typically most notable in the areas of electricity, natural gas and water. There are many incentives and resources available to help companies reduce their GHG emissions. Since Scope 3 emissions are often greater than Scope 1 and 2 combined, supply chain vendor partners must be closely evaluated.[7] The communication of a GHG reduction program is just as important as the program itself.

Introduction

Sustainability is a core pillar of facilities management. Following best practices, the two work directly in parallel rather than as independent priorities. During the holding period, the Facility Manager has a significant opportunity to influence carbon emissions/reduction as well as general employee health and wellbeing related to sustainable best practices.

The built environment emits a significant amount of GHG emissions.[2] As direct operators of the built environment, scope 1 and 2 emissions are in the Facility Manager's direct control; however, scope 3 emissions are also well within their influence.

The Facility Manager's involvement in sustainability and the reduction of GHG emissions is paramount. The Facility Manager oversees building operations, engages with the landlord, partners with many stakeholders day-to-day and has high interaction with the employee population. Due to this, the Facility Manager is often the catalyst for driving impactful, scalable initiatives and ensuring their success. The Facility Manager must conduct continuous monitoring that provides actionable insights on how to improve building operational efficiency; an effective building management system is paramount in this effort.

Implementation - Strategic Planning

A Facility Manager may ask themselves, "where do I start?". Ultimately, sustainable practices are often done by optimizing what already exists, rather than starting from scratch.

> Developing a GHG carbon reduction program's structure is critical. Often, program development is best suited to begin with defining direction and vision first and goal setting second. Like anything else, a SMART goal cannot be set without a true understanding of current baselines and the outcome in mind. This allows for a clear understanding of what qualitative outcomes are expected, without setting possibly unachievable quantitative metrics. This also enables global programs the flexibility required given the vast differences of building operation, employee culture and local regulations.

Any initiatives or programs must first be aligned with company mission and vision to develop appropriate goals. Once goals are set, a strategic framework must be developed to clearly define the strategic approach and tactical actions to achieve it. This framework should identify areas of focus, key initiatives and metrics to allow for measurement and prioritization. If a portfolio consists of multiple sites, it may be most prudent to select a few to begin with. These sites should be selected with measurable criteria in mind, such as energy use intensity, lease length and type, facility size and any notable technical requirements.

Although Facility Managers are directly responsible for the built environment emitting scope 1 and 2 GHG emissions, scope 3 GHG emissions are still well within their influence. The external supply chain causing these scope 3 emissions can often be of a greater impact than scope 1 and 2 emissions combined. This includes the overall upstream and downstream impact from vendor partners and suppliers. Specific to scope 1 and 2 emissions, a Facility Manager's impact is typically most notable in the areas of electricity, natural gas and waste.

A GHG carbon reduction program is most notably smart business. In addition to providing a benefit to the environment, it provides benefits to corporations, often times where initiatives will pay for themselves. Strong business cases must be made to articulate these benefits to senior management.

Incentive and Resource Opportunities

As aggressive sustainability and carbon reduction strategies are pushed throughout New York City and State, resources are provided to support building owners, operators and tenants in their journeys. Although many sustainable best practices and a GHG carbon reduction program may be able to pay for themselves, they do sometimes come at a large upfront cost. The below programs offer opportunities for significant rebates and no cost scopes of work to help owners, operators and tenants the resources and funding to succeed. Please note, this list is not exhaustive.

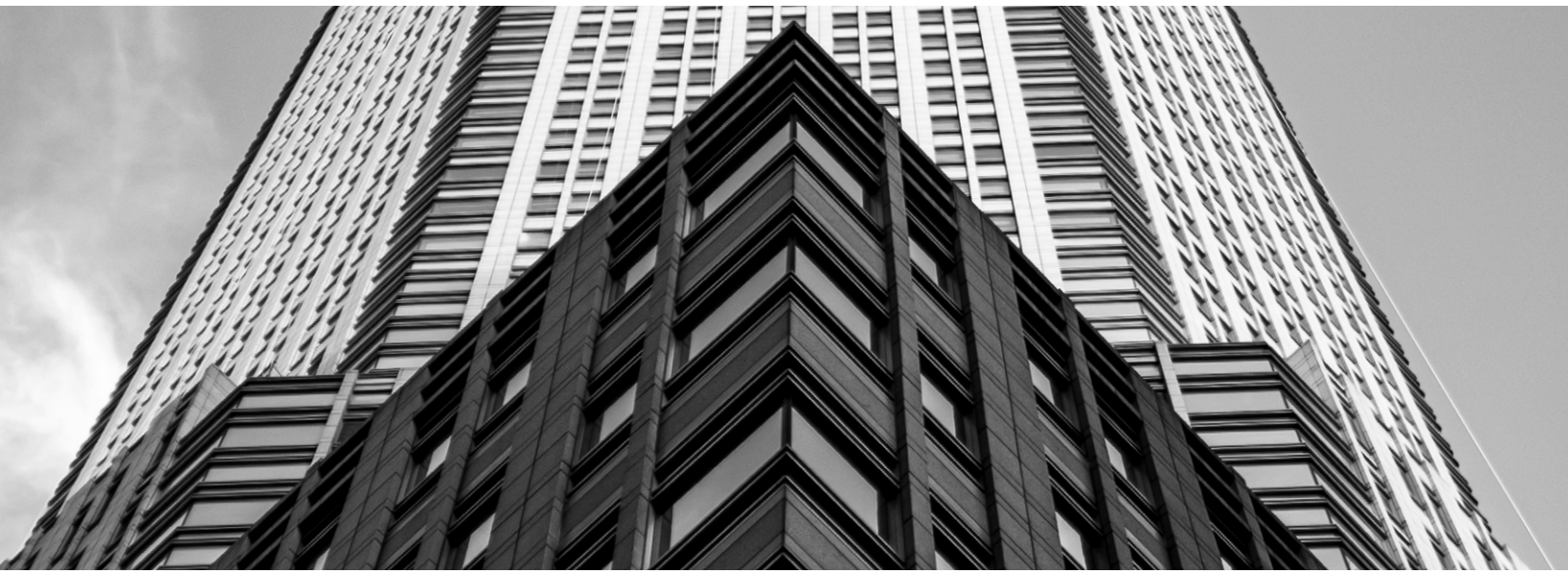
- Con Edison Instant Lighting Incentive Program - Offers reimbursements to replace inefficient lighting with LEDs as a discount on invoices.[47]

- NY Power Authority Incentives & Grants - The New York Power Authority (NYPA) provides clean energy solutions, incentives, grants and special programs to support energy efficiency projects. The NYPA Incentives and Grants team can be contacted here for more information.[48]

- NYSERDA - The New York State Energy Research and Development Authority (NYSERDA) offers a multitude of resources to support energy efficiency.

    - Real Time Management (RTEM) Program - NYSERDA can potentially cover up to 33 percent of all eligible costs including hardware, installation and three years of ongoing support from energy experts.[49]

    - Strategic Energy Management Program - Training your facilities management team may prove to be beneficial. NYSERDA provides you with the tools to manage energy in a coordinated and strategic way across your organization. Two training options are offered that teach businesses how to establish and implement best practices that empowers and motivates workforces to contribute to energy strategy and goals.[50]



Actions - Strategic Initiatives

Understanding a facility's current baseline is critical to the success of any sustainability/carbon reduction program. Measurement is necessary, and if something cannot or is not currently measured, that gap must be filled prior to the successful implementation of any program or initiative. Additionally, a thorough assessment of both internal and external aspects is critical. Examples of internal aspects include building operations, hard services, soft services, employees and end users, while exterior aspects include vendor partners and the supply chain.

Some key strategic initiatives include:

Scope 1 Emission Strategies

MEP Infrastructure Reviews
- HVAC, lighting, controls
- Electrification of gas equipment
- Plug load reduction
- Energy Audits

Waste Optimization
- Composting, recycling, eWaste
- Waste stream and signage audits
- Bulk items vs single use items
- Employee / staff trainings
- Audits of all company provided amenities and supplies
- Hauler vendor review

Scope 2 Emission Strategies

Electricity demand response program participation

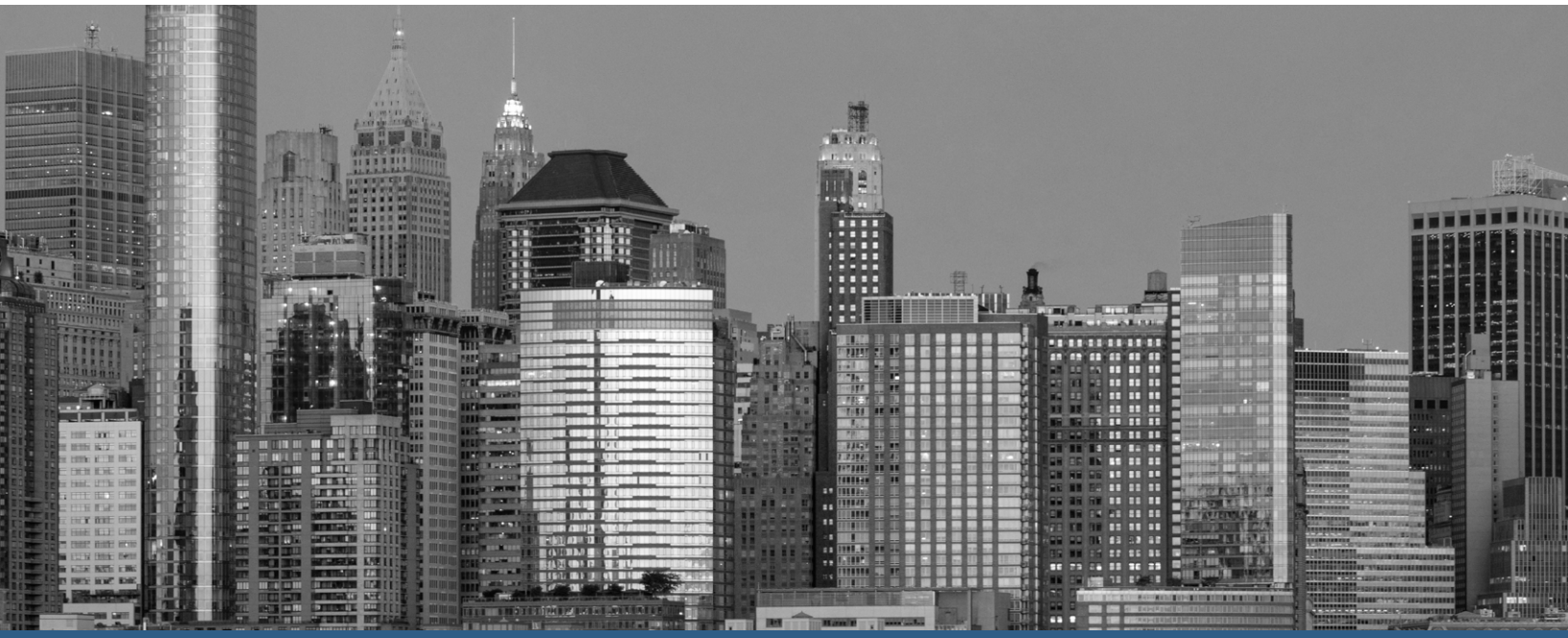
Utility Services - electricity, gas, waste
- Submetering (local law 132)[16]
- Monthly usage tracking and optimization
  - Plug Load Energy Management System
- Act on the "reporting clause" (see "Acquisition - Leasing" section)

Scope 3 Emission Strategies

Transportation
- Encourage alternative modes
- Provide ample bicycle storage

Vendor Partners - review their operations, incorporate requirements into RFPs, set targets for vendors where you have buying power

Supply Chain Review - CDP guidelines and questionnaires[22]



Zooming In - Supply Chains

Supply chain and vendor partners - Are you tied to these partners? Are you paying too much? Is there an opportunity for cost savings? Are these partners committed to corporate GHG targets and what are they doing to achieve these goals? These are questions you need to ask yourself in evaluation of your external partners. Supply chains make up Scope 3 emissions, which are often greater than Scopes 1 and 2 combined; it is essential to evaluate these services with a close eye.[7] Facility Managers contract with countless external partners and have an incredible opportunity to minimize GHG emissions in this process, and in doing so, can often reap rewards of cost savings. We list some examples that are often are provided via the base building. Note, a Facility Manager still has influence even if a lease requires these partners to be used.

- **Janitorial**

  Your janitorial partner plays a large role in the success of any GHG program. Although vendor flexibility here is not often available, there is still opportunity to enhance your existing service. Is the staff properly trained, specific to your facility's needs? Are green cleaning products being utilized? Are waste bins being emptied at the optimal times and without excess utilization of liners? Does the janitorial staff understand how to evaluate the appropriate waste stream for a provided product?

- **Waste Haulers**

  These partners are often tied to the building, and sometimes the Facility Manager has influence to adjust. Contracts and invoicing are often not very well understood or scrutinized, leaving potential savings and improvements to sit idle. It is often not possible to accurately project waste hauling needs upon move in to a facility; however, this is a necessary service from the onset of a facility's operation. As a facility evolves over time, more often than not their need for waste hauling services changes and must be reevaluated. Is the hauler's program "right-sized" to your waste volumes? Are opportunities for savings around improved diversion rates explored? Is all waste stream data accurately captured and reviewed on a monthly basis? Where is the waste haulers final destination for these waste streams, and thus, is that the most appropriate hauler for you to be partnered with?

- **Composting**

  Composting is a great first step in any waste optimization program. Oftentimes, you can find local compost partners that support the local economies, donating the compost. Composting programs engage the employee base, support a reduction of generated waste and can support an increased waste stream diversion rate.

Measuring and Communicating Success

A GHG carbon reduction program's success depends on how it is measured and communicated. Having accurate baseline data is necessary to measure performance against. This must be regularly reviewed to allow for an accurate understanding of program progress, what is working and what needs to be adjusted. As discussed in the "acquisition and leasing" section, any reporting clause that is implemented within a lease must be actioned on to help support this measurement effort.

The communicating of a GHG carbon reduction program is just as important as the program itself. Facility Managers have close and frequent interaction with the employee population, an incredibly positive position to be in. Employees need to be engaged and provide proactive, clear communications that resonate with them and help to empower them to act as good stewards inside and outside of our facility walls. Clarification of the program's goals must be provided with the "why" defined and the drivers behind decisions clearly identified. This is necessary to foster buy in of the program and reduce resistance. Without this, the most powerful initiatives can be implemented, but will still not be fully effective.

A strong communications strategy should be developed to proactively inform the facility management team, leadership and employees of the program's objectives and progress. This awareness is paramount, especially given that a typical GHG carbon reduction program comes with change and many factors will ultimately rely on the behaviors of employees within the facility. There will be growing pains, but communicating the right messages solves a lot of those problems.

Holding, Operations and Maintenance

	GOOD	BETTER	BEST
Scope 1	Submeter and track all natural gas and electricity usage. Conduct preventive maintenance programs for lighting and HVAC equipment and controls.	Regular energy audits. Explore electrification of all existing gas equipment. Upgrade lighting to LED. Implement and maintain a BMS system. Monitor and adjust temperature setpoints.	Implement plug load management software.
Scope 2	Explore utility provider opportunities.	Demand response program participation.	Virtual power purchase agreements. Engage in a VPPA that supports training of marginalized communities in green technology while still reaping the benefits for RECs.
Scope 3	Waste signage and training programs. eWaste program Implementation. Single use item removal.	Waste hauler assessment. Audit of all provided supplies.	Conduct regular waste audits. Composting. Circular supply chain program. Supply chain carbon pricing.
Foundational	Facility operations engagement during design of new space. Roadmap development for reducing GHG emissions via energy use reduction.	Regular engagement with corporate sustainability team. Landlord partnership and engagement.	Employee engagement and trainings. Local community Engagement and support. ESG and CSR.

Key Terms

SMART Goals
"SMART is an acronym that stands for specific, measurable, achievable, Relevant and time-based. Each element of the SMART framework works together to create a goal that is carefully planned, clear and trackable." [51]

Energy Use Intensity (EUI)
"Essentially, EUI expresses a building's energy use as a function of its size or other characteristics. EUI is expressed as energy per square foot per year. It's calculated by dividing the total energy consumed by the building in one year (measured in kBtu or GJ) by the total gross floor area of the building (measured in square feet or square meters)." [52]

Supply Chain Management
"The management of a network of interconnected businesses involved in the provision of product and services packages for end customers." [53]

Composting
"Compost is organic material that can be added to soil to help plants grow. Food scraps and yard waste together currently make up more than 30 percent of what we throw away, and could be composted instead. Making compost keeps these materials out of landfills." [54]

CONCLUSION

Key Takeaways

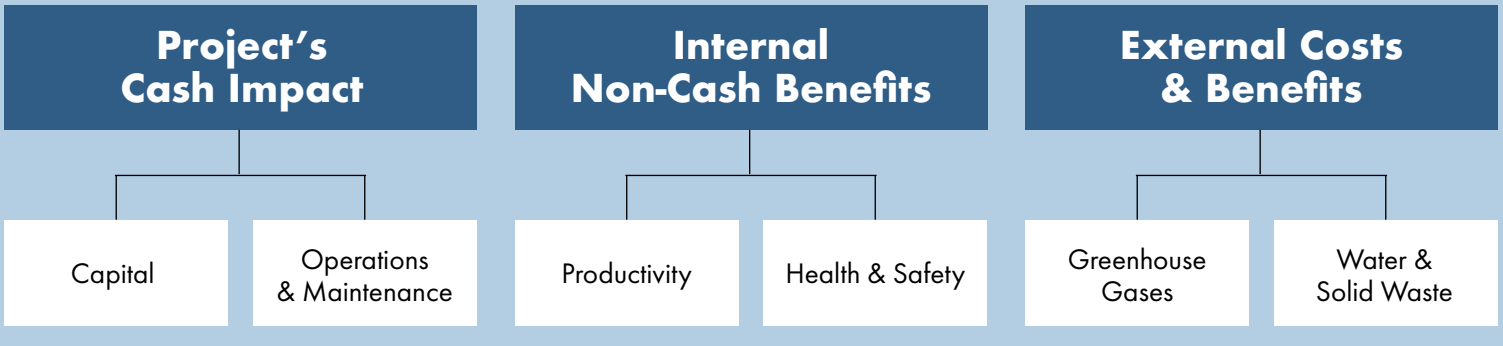
This playbook has predominantly focused on how to reduce your GHG emissions directly through your interaction with the built environment. We encourage our audience to take the action items outlined in each section during various phases of the project's lifecycle. It's time to start challenging the current approach to addressing GHG emissions, which is oftentimes pushed to the backburner. Make your goals clear during acquisitions and leasing, maintain your commitments throughout design and construction and follow through with your facilities team and occupants.

As you begin implementing the strategies outlined above, we hope that the commercial real estate industry will gain insight into how their decisions will impact individuals outside their immediate boundaries. The dynamics have changed around how to discuss and represent climate related risks. Oftentimes, companies are trying to identify metrics for abstract consequences of climate change and in order to do this, you need to understand the sustainable return on investment. This allows decision-makers to weigh all costs and benefits of an action—and to compare alternatives—using the common metric of money.

Regardless of the ESG framework used by your company to track environmental, social and governance practices you must always identify and clearly communicate its outcomes. After collective data, we need to take it one step further by explaining what it means in a larger picture, which encompasses your decisions on your communities and supply chains.

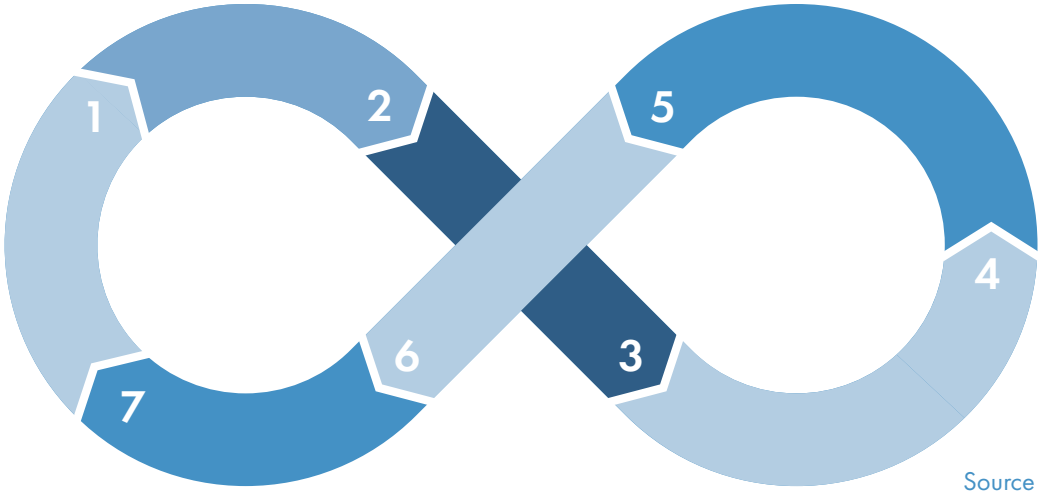
As leaders in the commercial real estate sector it is imperative that you ask suppliers to enhance transparency and emissions reductions. While setting up governance structures for your supply chain is out off the purview of this playbook; I encourage all readers to ask themselves; "how can I start engaging the supply chain to address my GHG emissions?".

Sustainable Return on Investment



Source: Measuring the Sustainable Return on Investment (SROI) of Waste-to-Energy, pg 5 (modified from)[55]

The overall impact of GHG emissions needs to extend beyond the life cycle cost assessment. The ability to "see" the impact of climate change on your supply chain, assets and communities is imperative to comply with forthcoming changes in regulations. To complete this type of assessment, you need to look at what's considered the sustainable return on investment. This extends beyond the purview of this playbook but should be a part of your ESG reporting and future assessments.



Source :Sheryl Owen[11]

1. Identify your design/proposed solution
2. Quantify its GHG emissions in operations & supply chain
   Scope 1
   Scope 2
   Scope 3
3. Check that it's in alignment with climate science
4. List all the social impacts within the local community & supply chain
5. What is the alignment with UN SDGs
6. What is the ROI?
7. How does it align with long-term organizational goals?

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GHG Emissions Reduction & Commercial Real Estate Playbook

Aligning your corporate sustainability goals
with your real estate portfolio

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