Washington, D.C. Sustainability

A ULI Advisory Services Panel Report

July 21–26, 2019

Urban Land Institute
Advisory Services

Washington, D.C. Sustainability

D.C. Vision 2050: An Effective Strategy and Plan for Real Estate Owners to Achieve D.C.'s Sustainability Goals

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Urban Land Institute
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uli.org

About the Urban Land Institute

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 region, with members in 80 countries.

ULI's extraordinary impact 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 2018 alone, more than 2,200 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 the ULI Center for Sustainability and Economic Performance

THE ULI CENTER FOR SUSTAINABILITY AND ECONOMIC PERFORMANCE is dedicated to creating healthy, resilient, and high-performance communities around the world. Through the work of its Greenprint, Building Healthy Places, and Urban Resilience programs, the Center provides leadership and support to real estate and land use professionals to invest in energy-efficient, healthy, resilient, and sustainable buildings and communities. More information is available at uli.org/sustainability.

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About ULI Advisory Services

THE GOAL OF THE ULI ADVISORY SERVICES program is to bring the finest expertise in the real estate field to bear on complex land use planning and development projects, programs, and policies.

Since 1947, this program has assembled well over 700 ULI-member teams to help sponsors find creative, practical solutions for issues such as downtown redevelopment, land management strategies, evaluation of development potential, growth management, community revitalization, brownfield redevelopment, military base reuse, provision of low-cost and affordable housing, and asset management strategies, among other matters. A wide variety of public, private, and nonprofit organizations have contracted for ULI's advisory services.

Each panel team is composed of highly qualified professionals who volunteer their time to ULI. They are chosen for their knowledge of the panel topic and are screened to ensure their objectivity. ULI's interdisciplinary panel teams provide a holistic look at development problems. A respected ULI member who has previous panel experience chairs each panel.

The agenda for a five-day panel assignment is intensive. It includes an in-depth briefing day composed of a tour of the site and meetings with sponsor representatives, a day of hour-long interviews of typically 50 to 100 key community representatives, and two days of formulating recommendations. Long nights of discussion precede the panel's conclusions. On the final day on site, the panel makes an oral presentation of its findings and conclusions to the sponsor. A written report is prepared and published.

Because the sponsoring entities are responsible for significant preparation before the panel's visit, including sending extensive briefing materials to each member and arranging for the panel to meet with key local community members and stakeholders in the project under consideration, participants in ULI's five-day panel assignments are able to make accurate assessments of a sponsor's issues and to provide recommendations in a compressed amount of time.

A major strength of the program is ULI's unique ability to draw on the knowledge and expertise of its members, including land developers and owners, public officials, academics, representatives of financial institutions, and others. In fulfillment of the mission of the Urban Land Institute, this Advisory Services panel report is intended to provide objective advice that will promote the responsible use of land to enhance the environment.

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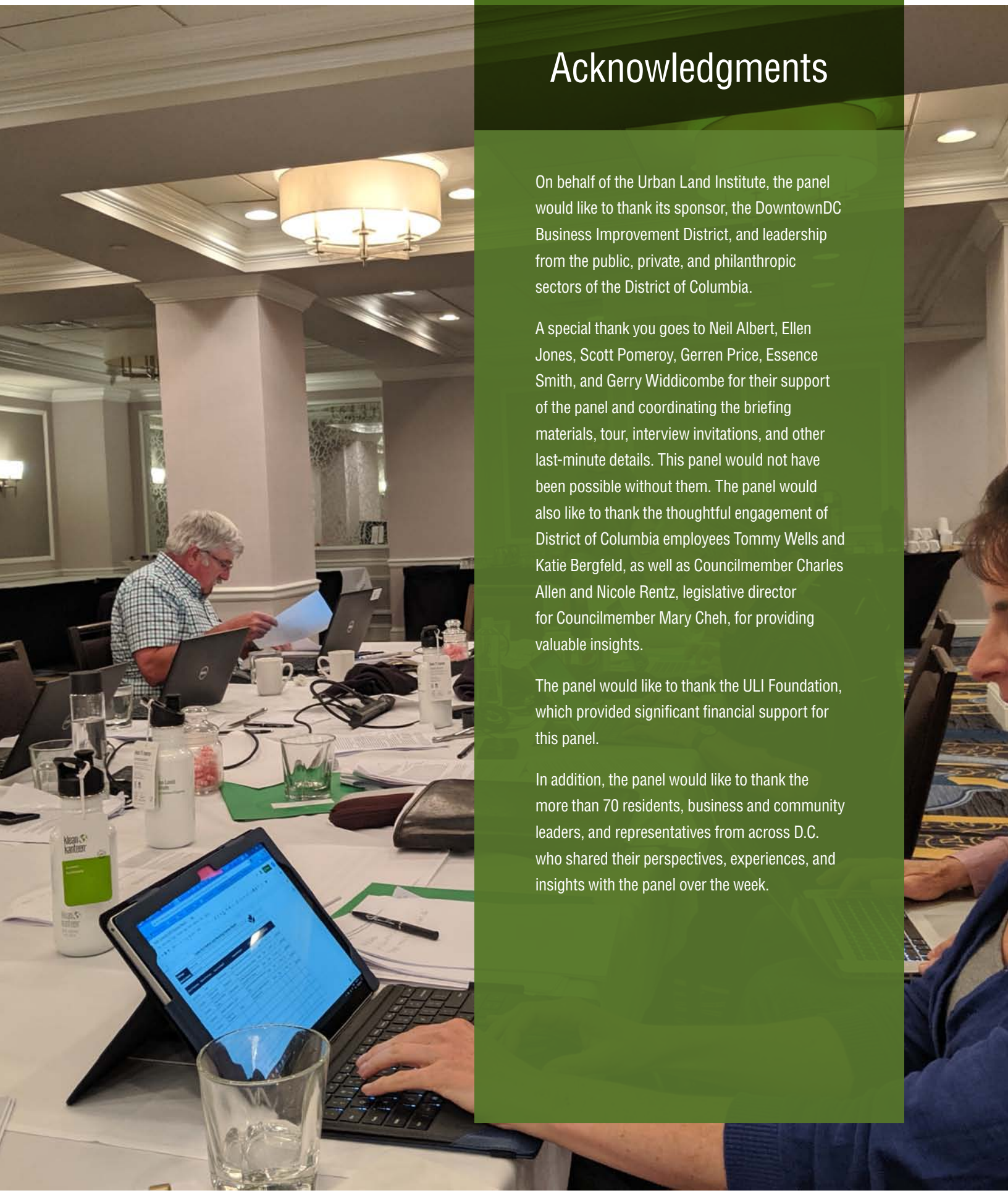

Acknowledgments

On behalf of the Urban Land Institute, the panel would like to thank its sponsor, the DowntownDC Business Improvement District, and leadership from the public, private, and philanthropic sectors of the District of Columbia.

A special thank you goes to Neil Albert, Ellen Jones, Scott Pomeroy, Gerren Price, Essence Smith, and Gerry Widdicombe for their support of the panel and coordinating the briefing materials, tour, interview invitations, and other last-minute details. This panel would not have been possible without them. The panel would also like to thank the thoughtful engagement of District of Columbia employees Tommy Wells and Katie Bergfeld, as well as Councilmember Charles Allen and Nicole Rentz, legislative director for Councilmember Mary Cheh, for providing valuable insights.

The panel would like to thank the ULI Foundation, which provided significant financial support for this panel.

In addition, the panel would like to thank the more than 70 residents, business and community leaders, and representatives from across D.C. who shared their perspectives, experiences, and insights with the panel over the week.

MARTA SCHANTZ/ULI

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ULI panel members.


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DowntownDC BID Background and the Panel's Assignment

WASHINGTON, D.C., HAS A VISION of being the world's leading green economy by reaching net-zero energy (NZE) use and carbon emissions by 2050. Achieving this goal will require unprecedented market transformation. To achieve D.C.'s goals, it is essential that the implementation of the recently passed Clean Energy DC Omnibus Amendment Act gets off to a strong start in the very near term.

Accomplishing the 2032 goals of the act in the built environment is no small task. Success depends on all stakeholders—D.C. agencies, building owners, business improvement districts (BIDs), and many others. At this moment, an opportunity exists to inform D.C.'s rulemaking and implementation of the act and ensure that relevant stakeholders across the built environment are prepared to collaborate and partner to achieve the ultimate goals in a fair and economically feasible way. This panel report explores just those solutions.

The DowntownDC Business Improvement District

The DowntownDC BID began operations in November 1997. This special district, where property owners have agreed to tax themselves to fund services, encompasses a 138-block area of about 543 properties from Massachusetts Avenue on the north to Constitution Avenue on the south, and from Louisiana Avenue on the east to 15th and 16th streets on the west. The DowntownDC BID covers one square mile of D.C.'s 61 square miles of land (1.64 percent) and one square mile of the total D.C.-Maryland-Virginia region's 6,250 square miles.

The DowntownDC BID regularly convenes its members and stakeholders to seek solutions to common problems. The main programs the DowntownDC BID focuses on include clean and safe, homeless services, marketing and communications, parks and places, transportation, economic development, and public space. The DowntownDC BID has been working for more than

The DowntownDC BID.

10 years with its members and stakeholders on sustainability initiatives such as benchmarking energy consumption with the U.S. Department of Energy's Better Buildings Challenge. Partnering with ULI on this sustainability-focused Advisory Services panel continues this work in a very important area.

The DowntownDC BID receives a supplemental property tax on commercial, hotel, and apartment properties. The DowntownDC BID's total budget for fiscal year 2019 (October 1, 2018–September 30, 2019) is $13.8 million, including a $1.7 million contract with the D.C. government to run a daytime services center for individuals experiencing homelessness.

Real Estate in the DowntownDC BID

The built space in the DowntownDC BID totals 97.4 million square feet, with eight remaining ground-up development sites that will hold about 3 million square feet upon full buildout. Office uses account for 77 percent of the built space in the DowntownDC BID, or 74.5 million square feet, of which 17 million square feet is owned by the federal government and another 5 million is leased by the federal government. Other significant land uses in the DowntownDC BID are housing (7 percent, or 6.5 million square feet), hotels (6 percent, or 5.7 million square feet), retail (4 percent, or 4.2 million square feet—but no large stand-alone retail buildings), museums (2 percent, or 2.4 million square feet), and the convention center (2 percent, or 2.3 million square feet). Entertainment, higher education, and performance venue spaces total 2 percent, or 2.5 million square feet.

The DowntownDC BID has ground-up development capacity of 2.5 million square feet under current zoning. Outside the DowntownDC BID, D.C. has the development capacity of 100

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Chinatown in Washington, D.C.

million to 120 million square feet under current zoning that restricts building height to 12 stories in the high-density areas of D.C. and much lower elsewhere. Of that total development capacity, as much as 50 million to 60 million square feet is zoned for office use.

Employment

The DowntownDC BID is home to 24 percent of D.C.'s employment and is the largest employment submarket in the region with 6 percent of the region's employment. The DowntownDC BID had an estimated 190,000 employees at the end of 2018. Employment in the DowntownDC BID grew by 1,700 in 2018 mainly owing to new office and hotel employees.

From 1995 through 2006, the DowntownDC BID experienced significant growth in jobs (from 118,000 to 174,000—an increase of 56,000 jobs, or an annual growth rate of 3.96 percent), but from 2006 to 2019, the DowntownDC BID's job growth has been more moderate (from 174,000 to 190,000—an increase of 16,000 jobs or an annual growth rate of 0.7 percent).

Annual D.C.-wide job growth has averaged 1.4 percent over the past 10 years but slowed recently to 0.4 percent annual growth (0.8 percent private-sector growth as federal employment has declined). Regionally, the area is also experiencing below-average employment growth of 0.8 percent per year. Today, the DowntownDC BID's 190,000 jobs represent 24 percent of D.C.'s 792,000 jobs and 5.7 percent of the region's 3.3 million jobs.

The federal government remains the largest employer in the DowntownDC BID, with an estimated 63,200 employees who make up 33 percent of all DowntownDC BID workers. The second-largest employer in the DowntownDC BID is the D.C. government. Law firms, government relations offices, and nonprofits are the major private-sector employers in the DowntownDC BID with a growing technology/growth company sector. The top two nonfederal and nonlocal government employers in the DowntownDC BID are Fannie Mae (1100 15th Street, NW) with 3,500 employees and the Inter-American Development Bank (1300 New York Avenue, NW) with 2,500 employees.

Economy

From 1995 through June 2019, the DowntownDC BID experienced an economic revival with an increase of 72,000 jobs and $15 billion in development. This renaissance was assisted by about $550 million of D.C. investment. Starting in the mid-2000s, the downtown D.C. renaissance spun out to the rest of D.C.'s neighborhoods, supported by additional strategic D.C. government investments.

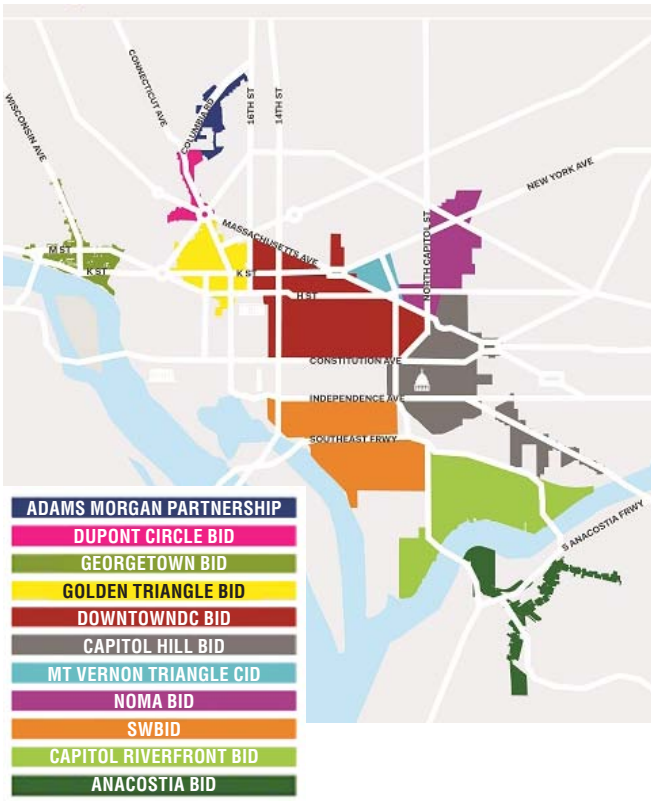
The DowntownDC BID and D.C.-wide growth increased D.C.'s tax revenues from $3.5 billion in 2002 to $7.8 billion in 2018, or 5.1 percent per year (well above inflation). The average annual income for downtown D.C. is $149,549, compared with the $119,531 average income for D.C.

The unemployment rate in D.C. ranged from 5.4 to 5.7 percent over the past 18 months—the lowest rates since the early 1990s and 2008. The latest data available, for May 2019, show an unemployment rate for D.C. of 5.6 percent. This is an increase from six months earlier (November 2018), with a rate of 5.3 percent. Overall, the unemployment rate has been dropping since 2011.

The DowntownDC BID's Residential Footprint

The DowntownDC BID's population of 10,290 residents is only 1.46 percent of D.C.'s 702,455 population and a tiny fraction of the region's 6.3 million residents. The DowntownDC BID's population more than doubled from 2003 to 2008 as about 4,000 multifamily units were built, which increased the DowntownDC BID's total multifamily unit count to 7,000. Only 720 units have been built since 2008. Today, office and hotel developers outbid residential developers for the little land available.

D.C. has also experienced strong population growth from 572,059 residents in 2000 to 605,085 residents in 2010 to 702,455 in July 2018—1.9 percent growth for the last eight years. Suburban population growth in 2018 outpaced D.C.'s growth after the suburbs had trailed D.C.'s growth rate from 2000 to 2017. Multifamily housing starts in D.C. have averaged



Washington, D.C., business improvement districts.

5,000 to 6,000 units per year over the past few years, with 12,800 units under construction in 2019.

D.C.'s Business Improvement Districts

Currently, D.C. has 11 established BIDs, which provide programs that address commercial District-wide issues such as cleanliness, maintenance, safety, promotion, economic development, and other collective business issues in their coverage areas. Collectively, members of the 11 BIDs spend $30 million dollars per year to help manage and enhance neighborhoods that are home to 70 percent of the D.C. employment base and 40 percent of D.C.'s tax base.

This panel's recommendations are highly relevant to all the BIDs in D.C. Each of the BIDs in D.C. has building members that are required to take action under the Clean Energy DC Omnibus Act and are in a prime position to provide guidance and support in their compliance.

The Panel's Assignment

D.C.'s real estate industry includes many sustainability experts and experienced leaders. However, D.C.'s sustainability goals are very ambitious—requiring innovative solutions and major investments to achieve the desired results. Private-sector owners and developers have not yet determined how they can collaborate with the public sector to meet all the requirements and goals that have been established by D.C. while providing a safe, healthy, and productive environment for their tenants that also meets their triple-bottom-line objectives (financial, social, and environmental).

The ULI panel was asked to consider the following questions with the purpose of providing the DowntownDC BID and its partners with effective short-term measures as well as a long-term road map for cost-effectively achieving D.C.'s ambitious energy and sustainability goals. These questions guided the panel's ultimate deliberations and recommendations:

- How can building owners achieve the Clean Energy D.C. Omnibus Act's goals of 50 percent greenhouse gas (GHG) reductions from 2006 levels, 100 percent renewables, 5 percent solar, and resilience in 12 years? What are the best investments for reducing GHG emissions in both existing and new buildings?
- What are the top 10 short-term actions for both building owners and the D.C. government to support building owners in achieving those goals?
- Are D.C.'s goals physically and financially feasible, given current technology and current capital sources?
- What are the impediments to overcome to realize the levels of investment needed to achieve D.C.'s goals?
- What role can D.C. play (a revolving loan fund? direct rebates? floor/area ratio and density bonuses? or other incentives?) to make building to net-zero energy cost-effective for real estate?
- What role can the DowntownDC BID play in facilitating D.C.'s progress toward these goals?
- How can these investments drive real estate value (net operating income and net present value) and create economic value for the DowntownDC BID and for D.C. overall?
- How can building owners bundle investments during the disruption of a renovation to achieve the greatest value?
- What opportunities exist for property owners to implement mutually beneficial green leases with building clients?
- Is the D.C. government effectively organized to partner with the federal government and the private sector to achieve its climate change and sustainability goals?

- What is missing from the D.C. government's plans, laws, and regulations that could help it meet its goals?
- How could DowntownDC BID members and stakeholders cost-effectively achieve these sustainability goals together? Can they use shared investments (microgrids and community solar), shared strategies (a localized cap-and-trade program), or shared financing (a districtwide rollout of Property Assessed Clean Energy, known as PACE, or a green bond)?
- How should building owners engage with D.C.'s Department of Energy and Environment (DOEE) as it analyzes how to set D.C.'s newly mandated building performance standards? What are the major factors to consider? For setting absolute goals? For setting relative improvement goals for both low-scoring and high-scoring buildings?
- How will the likely sustainability investments required by D.C.'s new goals and building standards affect a building owner's competitive position? For the building owner that competes on employer amenities to maximize workforce attraction and retention? For building owners that compete on price, particularly given recent increases in real estate taxes and other costs caused by D.C. government policy?

The timing of the ULI Advisory Services panel was opportune. The D.C. government enacted the Clean Energy DC Omnibus Act in early 2019 and completed several plans regarding clean energy and sustainability with aggressive energy goals that require D.C.'s DOEE to set performance standards for D.C.'s buildings by January 1, 2020. An opportunity now exists for the D.C. government to work with existing building owners (federal, nonprofit, and privately owned) to determine the best path forward.

Key Recommendations and Takeaways

The panel believes that the Clean Energy DC Omnibus Act's sustainability goals for 2032 are achievable. The journey beyond 2032 is more speculative and probably more difficult. The panel's main takeaways are as follows, with details on stakeholders' roles for success shared later in this report:

- Actions must be taken immediately to achieve D.C.'s building performance goals within the prescribed timeline. Immediately and until 2032, building owners must focus on the steps they need to take to get their buildings to reduce energy use and thereby do their part in reducing GHG emissions. The panel believes that D.C.'s overall energy and sustainability goals are achievable and will help both D.C. and the majority of building owners reduce their environmental impact while creating value. At the same time, specific components of D.C.'s Clean Energy Plan will be a challenge for some DowntownDC BID owners to implement: achieving 100 percent compliance with the Building Energy Performance Standards (BEPS) phases, the 2026 target of net-zero energy for new construction, and support of the D.C. goal of up to 10 percent local solar.
- Broad and frequent communication is essential among the D.C. government, the DowntownDC BID, and building owners. Many building owners and their service providers are far less knowledgeable and will need assistance from others or will struggle mightily to determine the best projects to undertake and the best way to proceed and thus will risk not meeting the sustainability targets. D.C. agencies, industry organizations, and the BIDs are well positioned to assist these building owners.
- Everyone must be engaged, collaborating and working to achieve solutions that are fair and motivating to everyone. Success depends on all stakeholders—D.C. agencies, building owners, all the D.C. BIDs, and many others. Everyone must feel and act as though they are in this grand initiative together. Everyone must feel that achieving the goals is good for them. Everyone must be prepared to listen to, and truly try to understand, the issues and challenges faced by each stakeholder and be willing to collaborate and work to help and support others to reach the goals in a fair and economically feasible way. The DOEE and D.C. broadly play a pivotal role in ensuring that every stakeholder in D.C. is engaged and excited about this opportunity and is working together in a collaborative partnership to achieve benefits for all.

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Understanding D.C. Local Government, Sustainability Goals, and the Market's Ability to Comply

THE D.C. REGION IS THE SIXTH-LARGEST metropolitan region in the country, with employment of about 3.3 million and a population of 6.3 million. It is the second-largest regional office market in the country with about 366 million square feet of privately owned office space and millions of square feet of federal, state, and local government-owned office space. It also has a very strong hospitality market.

The region comprises D.C., plus parts of two states, Maryland and Virginia. Virginia is the most business-friendly of the three regional jurisdictions with lower commercial and individual income tax rates and a less stringent regulatory environment (minimum wage requirements and others). D.C. has the highest general land costs and rents in the region. The other local jurisdictions all have a range of land prices and rents, with the highest prices generally located near the region's Metrorail stations.

The federal government (excluding the Department of Defense) accounts for 11 percent of the region's employment. D.C. is home to the headquarters of most federal agencies. Suburban Maryland is home to the National Institutes of Health and other science-related federal agencies. Northern Virginia is home to the Pentagon and the Central Intelligence Agency and many related defense agencies. Because of the federal government's outsourcing of work, the government contractor business has been a major contributor to regional growth, particularly in Northern Virginia.

The region has one of the highest annual median household incomes in the country at $99,669. D.C. has an annual median household income of $82,372 compared with a U.S. average of $60,336.

Recently, the region's employment and population growth have trailed that of the rest of the country, and analysts attribute this situation to the high cost of doing business and the high

cost of housing in the area. The concern is that millennials and others are leaving the region to find a lower cost of living in other parts of the country. The D.C. region recently received a major boost when Amazon announced in November 2018 that it would locate part of its HQ2 in Crystal City (in Arlington County, Virginia), which will further diversify the region's economy from reliance on the federal government and federal contractors and increase the presence of tech tenants in the region.

D.C. Local Government

D.C. government achieved limited self-governance in the mid-1970s. Its budget and laws are still subject to congressional review. Federal law prohibits a commuter income tax. D.C. does not have voting members of Congress, though it does have a nonvoting member of the House of Representatives, Delegate Eleanor Holmes Norton. D.C. government is composed of the Mayor and the D.C. Council. Mayor Muriel Bowser was first elected in 2014 and reelected in 2018. The D.C. Council has 13 members.

D.C. government has been working with its private and federal partners for many years to reduce D.C.'s risk of climate change damage. It has established a practice of collaboration and joint investment and "reasonable regulation." The current ULI panel is being asked how the D.C. government and its partners can continue to move forward in reducing D.C.'s contributions to climate change.

In addition to the DOEE, the D.C. government's sustainability efforts have been led by the D.C. Department of Consumer and Regulatory Affairs (DCRA), which monitors construction and building code compliance, and the D.C. Department of General Services (DGS), which builds, renovates, and manages buildings owned by D.C. The Green Building Division, part of the DCRA, is responsible for regulating construction in D.C. that falls under the regulations of the Green Building Act, the Green Construction Code, and the Energy Conservation Code. The division is responsible for plan reviews, building inspections, certificate of occupancy reviews, training, and education as well as collaborating with sister agencies, the building industry, and the community to further efforts to build a more sustainable D.C.

D.C. Sustainability Goals

D.C. has made great strides in reducing, and planning to reduce, energy use in its buildings and is committed to continuing to lead in this area. D.C. has shown over a decade of sustainability leadership through its Leadership in Energy and Environmental Design (LEED) for Cities work and more than eight years of mandatory energy benchmarking reporting policy.

"As the nation's capital and a city of 700,000 people, Washington, D.C., has a unique obligation to lead on and push for bold actions that keep us on track to meet the goals of the Paris Climate Agreement. The District is already committed to acting with urgency, and with this support from the Bloomberg American Cities Climate Challenge, we can accelerate our progress toward a carbon-neutral and climate-resilient future. Cities around the world are leading the fight against climate change by thinking globally and acting locally, and Washington, D.C., is proud to lead the way."

—D.C. Mayor Muriel Bowser, October 2018

With 75 percent of D.C.'s greenhouse gas emissions resulting from energy use in its buildings, D.C. has focused on building energy management, and D.C. has led the nation in the following categories for several years: Energy Star–certified buildings, LEED certifications per capita, square footage of installed green roofs, and D.C. government clean power purchasing agreements.

D.C.'s achievements are owed to a collaborative and progressive approach by the D.C. government, a progressive federal approach, and progressive private building owners and developers who have proactively responded to D.C.'s adoption of progressive building codes and legislative requirements by making smart investments in their buildings.

Despite D.C.'s leadership, some of these goals are further from being achieved than others. D.C.'s Energy Star scores are well above national average, but a big spread exists between the leaders and the laggards. D.C. has only one NZE building so far. Only 1 percent of D.C.'s electricity is being supplied by solar sources (less than 1 megawatt). To accomplish the goals for 2032 will require unprecedented market transformation.

ENERGY STAR FOR COMMERCIAL BUILDINGS

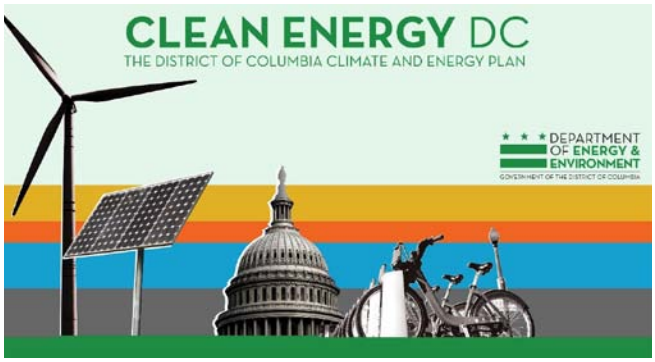
Energy Star is a voluntary U.S. Environmental Protection Agency (EPA) program that helps businesses and individuals protect the environment through superior energy performance.

ENERGY STAR® PortfolioManager®

EPA's energy performance score system offers building managers a standardized, comparable metric for building energy efficiency. Building managers can enter building operating characteristics and a year of utility bills into EPA's online benchmarking tool, Portfolio Manager, to receive a 1 to 100 score to indicate how the building compares to similar buildings nationwide—similar to the miles per gallon rating for automobiles.

- A score of 50 indicates that the building is performing at the nationwide industry average (based on a 2012 building survey).
- A building with a score of 75 or higher is eligible to earn the Energy Star certification label.

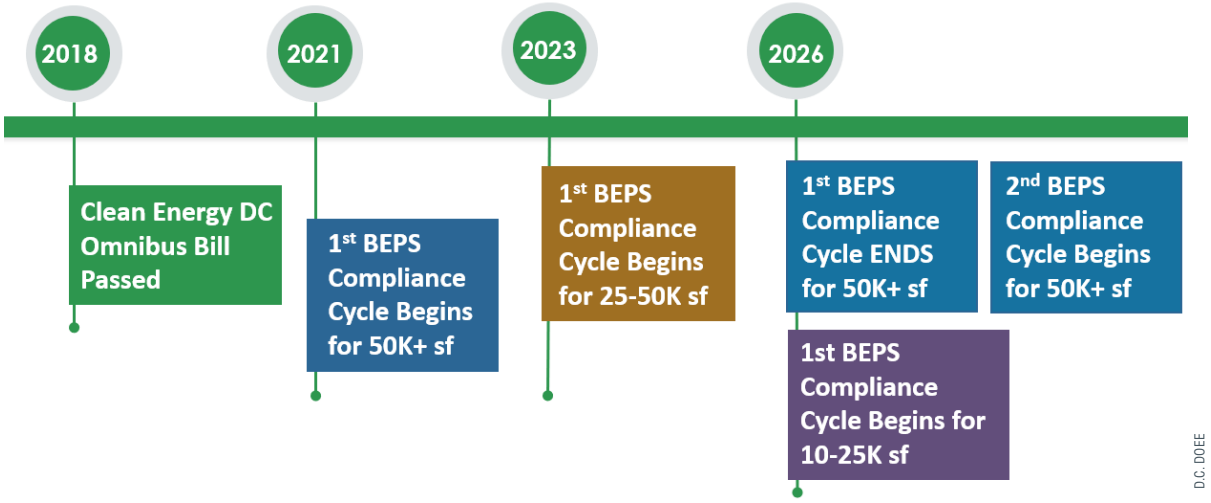
D.C. requires that owners of all private buildings larger than 50,000 square feet annually benchmark their energy and water efficiency and report the results to DOEE for public disclosure. The benchmarking is conducted using Energy Star Portfolio Manager. D.C. has enacted this requirement to increase the energy performance data available to owners and to the market and to drive efficiency improvements.



D.C. DOEE

Although much has been achieved, much more investment is clearly needed to achieve D.C.'s climate goals. As a result, in the past year, D.C. has released several strategic plans and passed legislation that moves aggressively to guide such investment. D.C. passed some of the most ambitious clean energy legislation in the country: the Clean Energy DC Omnibus Amendment Act of 2018, which became law in March 2019.

Mayor Muriel Bowser has announced a broad array of goals for her second term in office, among them increasing affordable housing, improving public education, and reducing violent crime. In signing the Clean Energy DC Omnibus Act, she codified D.C.'s status as the nation's preeminent leader in clean energy and climate action with ambitious goals to reduce D.C.'s emissions to 50 percent below 2006 levels by 2032 and achieve carbon neutrality by 2050. The act passed unanimously, indicating the entire D.C. Council sees these goals as a priority it will stand behind. DOEE has the full support and commitment of D.C. government to fully implementing the Clean Energy DC Omnibus Act.



D.C. DOEE

DOEE-provided BEPS compliance timeline.

Goals and Commitments

D.C.'s Clean Energy DC Omnibus Act legislation includes several important provisions for D.C. real estate owners, including an energy efficiency performance standard for existing buildings over 50,000 square feet and an NZE standard for new construction starting in 2026.

Although the panel's assignment focused specifically on how this act affects the buildings sector, the act affects much more—reduced transportation emissions, increased funding for local sustainability initiatives, and 100 percent renewable electricity from the utility. Because 74 percent of D.C.'s carbon emissions come from its buildings, the real estate sector is a significant area for the panel's focus.

A new energy efficiency standard—D.C.'s Building Energy Performance Standards:

- Under BEPS, starting in 2021, all D.C. buildings that fall below the median energy efficiency performance level in their building class will have until 2026 to take one of the following actions:
  - Improve their energy performance by 20%,
  - Execute a yet-to-be-determined prescriptive pathway of building energy efficiency upgrades, or
  - Pay a fine of a yet-to-be-determined amount.
- The 2021 BEPS will apply only to buildings over 50,000 square feet, but buildings over 25,000 square feet will start on a similar compliance pathway in 2023, and all buildings over 10,000 square feet will have a compliance pathway by 2026.

Net-zero-energy building code:

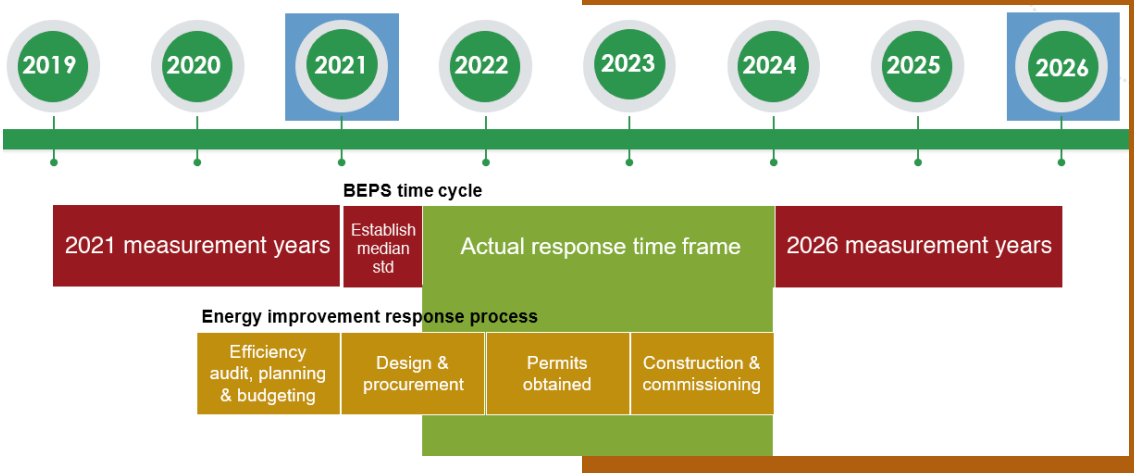
- By 2026: Update the D.C. building code for new construction to require net-zero energy.

A TIGHTER BEPS COMPLIANCE WINDOW THAN IT MAY SEEM

Upon reviewing the fine print of the Clean Energy DC Omnibus Act, the panel discovered that the compliance window is much more aggressive than it seems from the legislation. Each BEPS compliance window is closer to 2.5 years instead of five, and buildings are already being measured for their first performance baseline. This should create a sense of urgency for both the DowntownDC BID and building owners to get started on energy efficiency improvements immediately.

While at first it looks like buildings are not "starting" their BEPS compliance cycle journey until 2021, they are already being measured right now; whether they are above or below the median will be determined by an average of their 2019 and 2020 Energy Star scores. The determination of above/below the median thresholds will not be finalized until the Energy Star scores are confirmed and evaluated by DOEE, so buildings will not know if they are subject to a compliance pathway until summer 2021 or later. Buildings will be measured on their 20 percent improvement based on the average Energy Star scores from 2024 and 2025. To achieve compliance with the 20 percent BEPS performance improvement in time, building owners will need to start planning investments now, so that any major retrofits can make it through design and construction before the end of 2024. Otherwise, the energy savings will not be fully accounted for due to the two-year measurement period.

Buildings' compliance for BEPS phase one "ends" in 2026, but they will again be measured on their average Energy Star score from 2024 and 2025 in preparation for BEPS phase two, so phase two baseline BEPS measurement actually begins January 1, 2024—two years earlier than it seems.



Panel's determined actual timeline for BEPS phase one compliance.

Programs and Financial Resources to Support Compliance

DC Green Bank (officially named the Green Finance Authority): Green banks leverage public and private funds to invest in clean energy technologies and infrastructure. The Clean Energy DC Omnibus Act legislation funds the DC Green Bank at $15 million per year for fiscal years 2020 and 2021 and at $10 million annually for fiscal years 2022 to 2025.

DC PACE: DOEE created the DC PACE financing program in 2012 to provide affordable, long-term funding for building upgrades that reduce utility bills and operating expenses. PACE financing is secured by a voluntary property tax assessment. The assessment is simply repaid on the owner's property tax bill, much like other tax assessments routinely used to finance infrastructure upgrades. DC PACE has financed $38 million across 26 projects. DC PACE will become a program of the new Green Bank.

DC Sustainable Energy Utility (DCSEU): DCSEU funding comes from the Sustainable Energy Trust Fund (SETF), which is financed by a surcharge on all electric and natural gas utility ratepayers in D.C. The DCSEU receives $20 million from the SETF annually for energy efficiency investments.

- In 2017, the DCSEU designed new options for the commercial and institutional market by offering enhanced rebates to small and medium-sized businesses for qualified LED lighting, parking garage lighting products and fixtures, variable frequency drives, and combinations of fixtures and sensors.
- DCSEU also created investment options for larger energy users that now allow it to offer funding over more than a one-year period and not have to return "unspent money" to D.C.

DC Green Building Fund: Created by the Green Building Act of 2006, the funding is sourced from construction permit fees—$7 million to $8 million per year. The fund's purpose is to streamline green building administrative processes, improve sustainability performance outcomes, build capacity for development and administrative oversight professionals in green building skills and knowledge, institutionalize innovation, overcome barriers to achieving high-performance buildings, and continuously promote the sustainability of green building practices in D.C.

D.C. Real Estate Market's Ability to Absorb the New Sustainability Regulations

The D.C. office and apartment markets are strong, relative to both national and regional benchmarks. Given the relatively low cost of compliance the panel expects in implementing the first phase of BEPS requirements under the Clean Energy DC Omnibus Act, the panel believes that the real estate market can absorb any additional expense and remain strong (assuming demographic and macroeconomic factors supporting a robust D.C. rental market continue).

State of the Downtown D.C. Office and Residential Markets

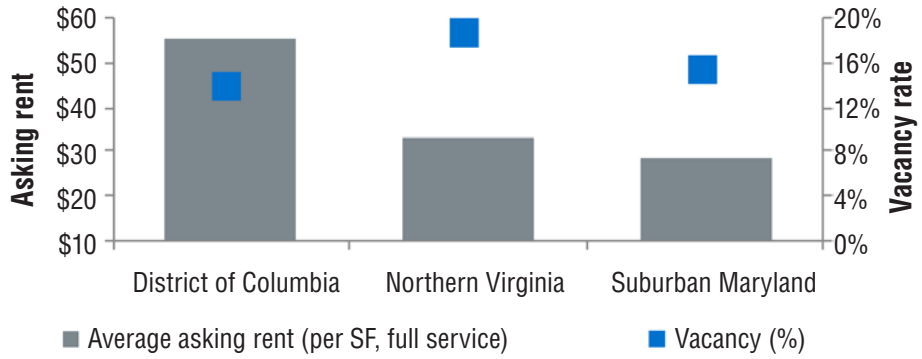
Based on CoStar data, the DowntownDC BID office market is currently at 12 percent vacancy, slightly greater than the

Top Markets by Rent per Square Foot, Vacancy Rate, Monthly Rent, and Cost of Living

Market	Annual gross direct asking rate per sq ft	Vacancy rate	Market	Average monthly apartment rent	Cost of living (US = 100%)
New York, NY	$78.87	7.9%	New York, NY	$4,120	120%
San Francisco Bay Area, CA	$68.88	6.1%	San Francisco Bay Area, CA	$2,856	163%
Washington, DC	**$42.22**	**16.9%**	Long Island, NY	$2,243	126%
Los Angeles, CA	$41.28	14.5%	Los Angeles, CA	$2,239	129%
Miami, FL	$39.76	11.3%	Boston, MA	$2,164	120%
Boston, MA	$39.36	13.0%	Orange County, CA	$2,082	147%
Austin, TX	$37.62	9.3%	San Diego, CA	$1,954	128%
Seattle, WA	$37.53	9.4%	**Washington, DC**	**$1,754**	**117%**
San Diego, CA	$36.09	9.9%	Newark, NJ	$1,716	118%
Orange County, CA	$35.52	9.4%	Seattle, WA	$1,694	137%

Source: CBRE.

Market Analysis of 2019 D.C., Northern Virginia, and Suburban Maryland
Asking Rent and Vacancy Rates



Source: Newmark Knight Frank.

vacancy rate in 2015 (11 percent). Asking rents are up from $54.74 per square foot in 2015 to an all-time high of $56.20 in the second quarter of 2019. The total office market has grown 4 percent in square footage since 2015.

According to the 2019 CBRE Tech Talent report, the D.C. office market is one of the top-five most expensive in the country, ranking third behind San Francisco and New York. Real estate is a local market, and D.C. is competing with Maryland and Northern Virginia on office and housing rental rates. But on a national basis, D.C. rates are relatively inexpensive—office rents in D.C. are half those of San Francisco, and D.C.'s housing rental rates compared to other markets on a national basis are also relatively inexpensive.

Neighboring Markets

D.C.'s rent and vacancy rates are stronger than those of neighboring submarkets. Suburban Maryland averages far lower asking rents with a similar vacancy rate to D.C., and Northern Virginia is currently seeing both lower rents and higher vacancy rates. Although D.C. is always concerned about the threat of driving commercial and residential development out to the suburbs, evidence indicates that D.C. residential and office markets remain strong relative to their local peers.

D.C. Office Market by Class

According to CoStar, the class A office vacancy rate in D.C. as of April 2019 is 12 percent. Although "trophy" class A office new construction appears to be performing very well in the D.C. market, some owners are concerned that current class A buildings will become "commodity class A" or "class A–" and begin seeing a higher vacancy rate than their new class A peers—and that this market softening may be hidden in vacancy rates by class. While evidence presented to the panel on this softening was mainly anecdotal, these building owners remain concerned that any new regulations may hurt their net operating income (NOI) at a time when they are finding it hard to compete with other new construction projects in downtown D.C.

Class C office properties are performing very well in D.C., down to a 4.2 percent vacancy rate as of the first quarter of 2019, indicating that the owners know what they need to do to keep their spaces leased. Class B office properties are also performing fairly well, at 9 percent vacancy. Tenants

D.C. Class A, B, and C Commercial Office Space in First Quarter 2019

	Inventory				Occupied space			Vacant space			Base rent (direct)	
Class	Number of buildings	Square feet (million)	1 yr change (MSF)	% change	Square feet (million)	1 yr change (MSF)	% change	Square feet (million)	Total %	Direct %	$ per sq ft	% change
Class A	317	87.29	2.48	2.9	76.07	1.23	1.6	11.2	12.0	12.8	$56.77	4.6
Class B	945	57.81	–1.06	–1.8	52.33	–0.93	–1.7	5.5	9.0	9.5	$49.61	6.0
Class C	1,102	10.2	–0.06	–0.5	9.74	–0.04	–0.4	0.5	4.2	4.5	$35.20	–5.4

Source: CoStar.

Breakdown of Washington, D.C., Employment Market

	Employed 2018	Growth 2013–2018	Average wage	Growth 2013–2018
Total tech occupations	**253,660**	**2.2%**	**$112,735**	**9.4%**
Software developers and programmers	75,850	-8.0%	$116,004	10.0%
Computer support, database and systems	142,550	10.5%	$103,446	8.6%
Computer and information systems managers	18,220	0.9%	$173,470	15.8%
Technology engineering related	17,040	-8.8%	$110,948	10.4%
Total non-tech occupations	**39,920**	**7.5%**	**$64,338**	**10.0%**
Sales	41,920	35.4%	$86,118	6.5%
Administrative and office support	213,990	3.0%	$42,719	10.1%
Business operations and finance	93,320	3.0%	$90,841	6.7%
Marketing	49,990	22.4%	$89,139	8.0%

Source: CBRE.

have options, and the lower vacancy rates in B and C office properties indicate owners are being realistic in rents. Still, these classes offer no significant threat to office top-line revenue—and consequently NOI.

Employment

One of the big drivers of real estate office and multifamily demand in most markets is job growth. Since 2011, the federal sector saw a net job loss of 8.2 percent (17,558), and jobs increased by 17 percent in the private sector (80,633). Employment as a demand driver supports stable rents and NOI.

Wages have also seen significant growth in D.C. Private-sector wages and salaries showed very strong growth as well (37.9 percent) since 2011 compared to the federal sector (9.2 percent). Professional and technology jobs showed the highest increase during this time period for the region as a whole. D.C.'s percentage of regional tech jobs is significant at 11.5 percent as of March 2019.

Top Tech Office Space Deals in 2019 in D.C.

Tenant	Address	Square feet
CACI	1099 14th St. NW	77,300
Facebook	575 Seventh St. NW	73,800
EverFi	2300 N St. NW	58,000
Diligent	1111 19th St. NW	34,900
Apple	700 K St. NW	29,000

Source: CBRE.

D.C. already has a significant pool of tech talent, as illustrated in lease deals completed in the first half of 2019.

Multifamily

Based on CoStar data, since 2013, D.C. has had 21,000 multifamily units built and absorbed. The vacancy rate of 7.8 percent in 2013 dropped to 6.3 percent in 2015 and has come back to 6.7 percent in 2019. The average rental rate is a little bit above inflation. Compared to both national and regional averages, D.C.'s rental housing market is very strong.

Tax Revenue

One of the largest sources of revenue for D.C. is from property taxes: real property taxes were 33 percent of D.C.'s tax revenue in 2018. The percentage is stable through 2021, after an expected bump in 2018.

Overall D.C. Market Takeaway

By most measures, D.C.'s real estate market is strong relative to both regional and national peers. Given the relatively low cost of compliance for the early phases of BEPS, the market seems likely to be able to absorb any costs associated with this regulation. Given the significantly tougher compliance hurdles for NZE new construction in 2026, and significantly tougher BEPS requirements for existing buildings by 2032, predicting how these longer-term regulations will affect the health of the D.C. real estate market is much more difficult.


MARTA SCHANTZ/ULI

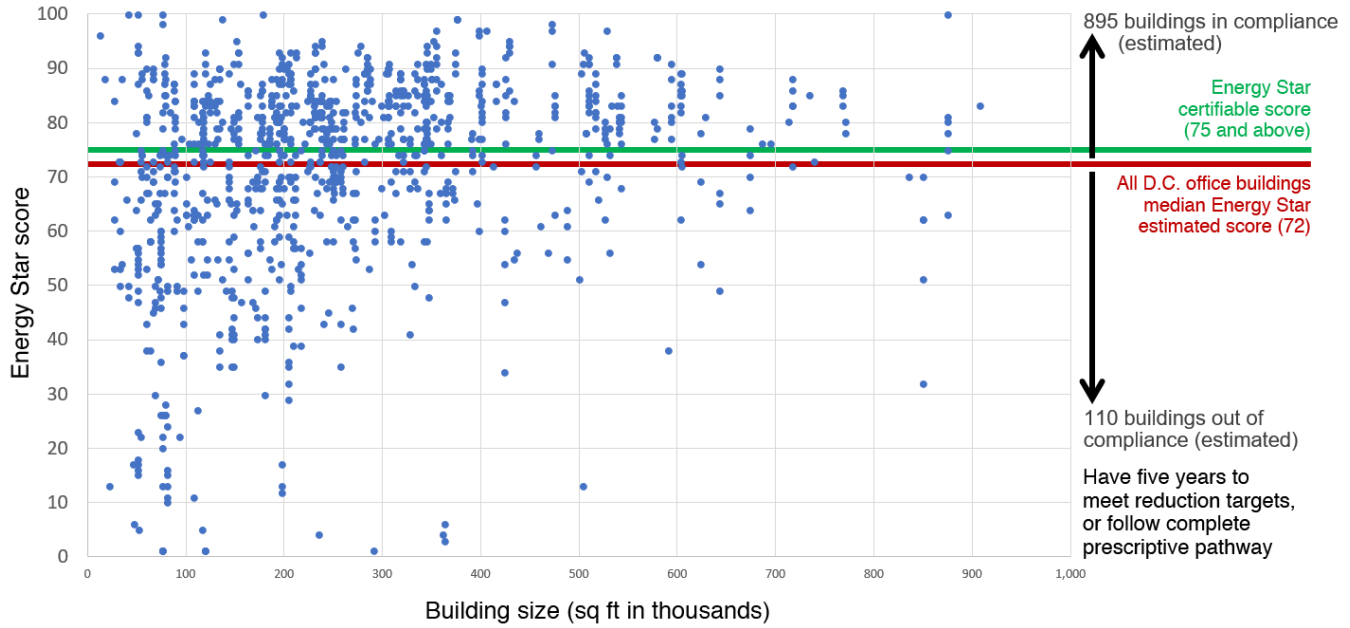
Are the Goals Financially and Physically Feasible?

THE PANEL BELIEVES THAT D.C.'S OVERALL ENERGY AND SUSTAINABILITY GOALS are achievable and will help both D.C. and the majority of building owners reduce their environmental impact while creating value. At the same time, specific components of the Clean Energy DC Omnibus Act will be a challenge for some DowntownDC BID member owners to implement: achieving 100 percent compliance with the phases of the BEPS, the 2026 target for NZE new construction, and support of the D.C. goals of up to 10 percent local solar will require a mix of early education and engagement, low-cost financing options, changes to D.C.'s permitting and zoning laws and processes, and some flexibility from DOEE in the timing and level of penalties for buildings working to meet the first compliance requirement under BEPS.

D.C.'s major goals of providing 100 percent clean electricity and reducing GHG emissions by 50 percent, both by 2032, appear to be quite feasible. Providing 100 percent renewable electricity to D.C. buildings will primarily be the responsibility of PEPCO and wholesale power producers in the Pennsylvania, New Jersey, Maryland energy market, and based on interviews with PEPCO, DOEE, and key stakeholders, the panel believes this can be achieved at little or no net additional cost to real estate owners. Based on what the panelists heard in interviews and have seen with D.C.'s progress on long-term renewable energy purchased as well as long-term GHG reductions, D.C. is more than on track to hit these goals, and the real estate industry will be able to do its part to help meet them. Achieving a GHG emissions reduction of 50 percent from the buildings sector also appears achievable, given the fact that D.C. has achieved a 31 percent reduction from a 2006 baseline by 2018. The GHG emissions reductions will primarily come from decarbonizing the electrical grid, and the energy reductions that result from the first phase of BEPS.

The policies in the Clean Energy DC Omnibus Act that will have the greatest impact on the real estate industry are the BEPS starting in 2021 and the NZE new construction requirement starting in 2026. BEPS phases two and three, as well as the solar energy carve-out, are of even greater concern over the longer term.

D.C. Downtown Office Energy Star Performance



An analysis of D.C. downtown office building reported 2018 Energy Star scores.

Sources: Billy Grayson and Alan Razak/ULI.

BEPS Phase One

BEPS requires that buildings with an Energy Star score below the median for their property type reduce their energy consumption by 20 percent or follow a prescriptive set of requirements, all within five years. Every five years the median will be reset and the new set of buildings that fall below the median will have to reduce energy consumption by 20 percent or follow the prescriptive pathway. Industry experts agree that the majority of poorer performing buildings in the first cycle should be able to reduce their consumption by 20 percent fairly cost-effectively, given access to inexpensive energy audits, financing options, training and education, and enough time to integrate these technologies and strategies into their buildings. The DCSEU and DGS have already identified a wide range of building upgrades and facility management strategies that achieve more than a 20 percent reduction across building types with a payback of under four years.

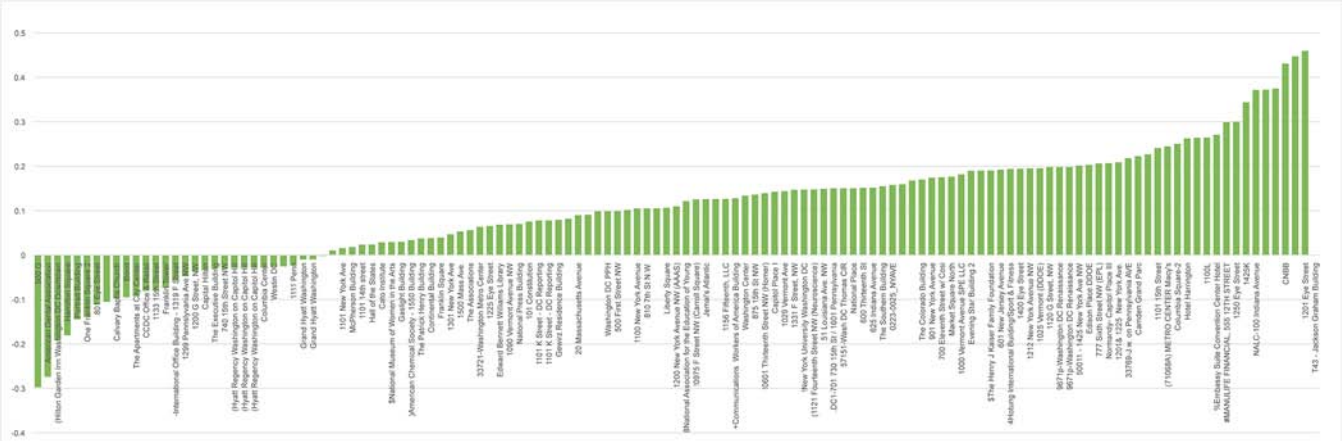
Likelihood of Achieving Compliance

Although BEPS phase one is possible for many buildings to achieve cost-effectively, the timeline for implementation under BEPS will be challenging for a large population of buildings, because the effective amount of time for achieving a 20 percent reduction for those below the median Energy Star score is effectively two and half to three years (as described earlier in this report). The final BEPS compliance pathways will be determined by the median Energy Star score for 2019 and 2020, and 2020 data will not be available until at least the second quarter of 2021. Compliance with the 2026 target date for BEPS will be measured based on energy efficiency averaged over 2024 and 2025, effectively giving building owners until January 2024 to put the technologies and management strategies in place to drive a 20 percent reduction. Only if owners opt for the yet-to-be-determined alternative compliance prescriptive pathway will they have five years to implement the measures required, as that pathway will not be dependent on the 2024/2025 measurement years.

Looking at the DowntownDC BID's data from the U.S. Department of Energy's Better Buildings Challenge Program, some properties have improved energy performance dramatically in the past five years, whereas others have gone backward on energy use intensity.

Another potential concern is that some multifamily properties and class B and C office properties will have difficulty complying, particularly buildings of 10,000 to 49,999 square feet. The panel has no idea what their energy efficiency performance is because of the lack of benchmarking data available, and as such the panel does not know how hard a 20 percent reduction in consumption will be to achieve. The panel believes that if the DowntownDC BID and DOEE provide sufficient resources to these sectors early in the process, they

DowntownDC BID Buildings' Energy Use Intensity Percentage Improvement from Baseline Year



Source: D.C. DOEE.

will be able to achieve compliance with BEPS's phase one goals. Such resources should include the following:

- Broader and more intentional communication as soon as possible about BEPS to all building owners and the broader real estate community, including local lenders, brokers, tenants, and the design and services community. DOEE and the DowntownDC BID should partner on these communications, but the DowntownDC BID should not wait for DOEE. Key communications include making sure all buildings have completed their benchmarking and done it correctly and making sure all owners are aware of their current Energy Star score and the likelihood they will need to complete a compliance pathway starting in 2021.
- Launch of a massive outreach and training program (owners, property managers, facility managers, consultants, design professionals), driven by the recently established High Performance Building Innovation and Training Hub (hereafter the Hub), a nonprofit intended to develop and operate a program to provide training, capacity building, and technical assistance to the building industry to achieve D.C.'s ambitious green building and climate goals, DCSEU, and DOEE, on how to cost-effectively achieve a 20 percent energy efficiency improvement or complete the alternative compliance pathway. As with awareness building, the DowntownDC BID should not wait for DOEE and others to launch these trainings, but should take proactive steps to begin a training program as soon as possible.
- A campaign to build awareness of funding resources for compliance with BEPS. This funding needs to be available on day one of the BEPS requirement. All owners should know that if they are committed to compliance with BEPS, they will receive free energy audits and consulting support from the Hub and financing (if needed) that will make all investments to get a 20 percent reduction cost-effective for their building.
- An effort to remove some key regulatory and process barriers (building code, zoning, landmarks, breaks for greater than 50 percent renovation, faster permitting, etc.) to energy efficiency improvements before 2021.
- Development of a tenant education program and resources for tenant engagement to support building energy efficiency and renewable energy goals.
- Setting noncompliance penalties in a way that is reasonable (fines based on how far an owner was from hitting compliance goals, and phased in over three years, at a level that will be meaningful but not necessarily set based on a number that is higher than the cost of compliance).

Recommendations to Achieve Compliance with BEPS Phase One

DOEE and the DowntownDC BID

- The DowntownDC BID and DOEE need to start now in providing the awareness, technical assistance, financing, and streamlined permitting necessary for buildings likely to be below the median to hit these goals.
- D.C. should develop fines that recognize the challenge of this timeline and are phased in over three years of

noncompliance (starting low in 2026 and increasing over time if performance does not continue to improve).

Individual building owners

- Any buildings that are near the median should get to work as soon as possible so they can be above average.
- Anyone who falls below the median should probably take the prescriptive pathway (at least that way they will actually have close to five years to get it done).

The most challenging components of the Clean Energy DC Omnibus Act are to prepare for and execute what will be the undefined (but likely very difficult) energy efficiency goals for BEPS phases two and three, and the new requirement that all new construction be net-zero energy starting in 2026.

BEPS Phases Two and Three

As described previously, every five years the median for BEPS is reset, and the 20 percent reduction cycle recurs. The unpredictability of the increasingly stringent targets and the uncertainty in the law as to whether buildings will be required to reduce energy or carbon in the later phases will be a challenge for both building owners that either had to comply or were not required to comply under BEPS phase one. During the first phase, building owners will not know whether they will need to reduce in the second phase, and if so what they will need to achieve, so they will not be able to plan ahead. Also, it is much less clear that the buildings that will have to reduce by 20 percent two or three times in a row or the buildings that are good performers but might still be required to reduce their energy in the later phases will be able to do so cost-effectively. Some definition of "good enough"—when buildings can exit the endless cycle of reductions—will need to be established.

Recommendations for DOEE on compliance with BEPS phases two and three:

- Try to project the BEPS phase two median value, so that owners can start planning for 2031 in 2019.
- Begin incentivizing NZE retrofits now, with an eye toward this as a compliance pathway through 2050.
- Provide a GHG emissions reduction pathway that includes green power for 2031.

2026 Net-Zero Energy Code

The NZE code for new construction by 2026 is quite challenging but should be achievable if it is reasonably defined in the rules and extensively promoted through pilots and education. As of 2019, D.C. has only one NZE building, and the characteristics of most buildings in the DowntownDC BID (10 to 14 stories, small roofs, dense occupancy) make them especially challenging for NZE without some allowance for off-site renewable energy.

Between 2021 and 2026, DOEE will provide support to help the real estate industry prepare for this new code. A draft code is available now for comment, and money is available ($80,000) for feasibility assessments of NZE buildings, as well as financing options for NZE projects. To meet the advancing BEPS benchmark requirements, buildings will need to be close to NZE by 2036 anyway. D.C. will likely need to provide more funding than currently designated for feasibility studies and pilots, and provide significant incentives for early NZE projects as well as existing building NZE retrofit projects.

The Hub, the DowntownDC BID, and other entities, such as AIA or the universities, will need to provide training for the design community (architects and mechanical, electrical, and plumbing engineers) on how to build such buildings cost-effectively. D.C. will also need to subsidize and promote (through tours, case studies, and lessons learned) a first generation of NZE pilot projects of the various major building types (office, multifamily, etc.) to convince owners, builders, and the design community that such buildings are realistic and affordable. Finally, D.C. government should lead with its own pilots on public buildings, but it will need to do it in a way that shows it can be economical for the private sector as well, for example, by hiring design teams with a proven track record of delivering cost-effective NZE projects.

Solar Carve-Out

Finally, the requirements for 5 percent and 10 percent of overall building energy to be provided by in-D.C. solar are likely not to be achievable through purely geometric constraints, given the size of D.C.'s rooftops plus required setbacks and other beneficial uses of rooftop space. At this point, only 1 percent of D.C.'s electricity is being supplied by solar (less than one megawatt). Solar is also likely to be a more expensive strategy than energy efficiency or importing clean energy, so it might waste valuable economic resources unnecessarily. But luckily it is not needed to achieve D.C.'s goals, so perhaps this requirement could be relaxed.

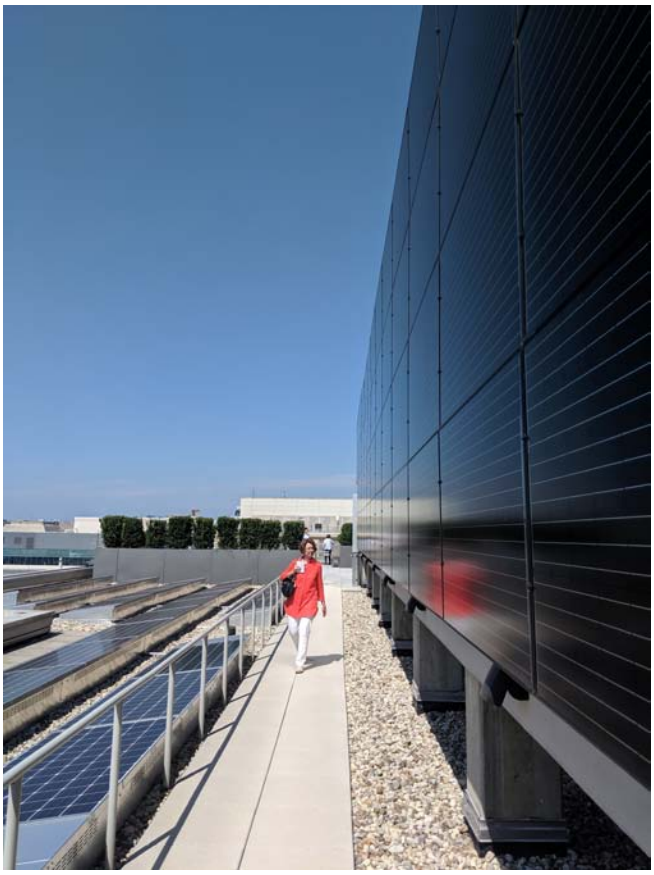
HICKOK COLE

American Geophysical Union net-zero energy building.

D.C. has one of the best renewable energy credit markets in the country. D.C. has some of the best solar prices and yet, especially for office buildings, it has not figured out a way to squeeze enough solar onto enough buildings. A back-of-the-envelope calculation of how much solar would be needed to actually hit this 2032 goal with setbacks, height restrictions, and competing roof priorities, indicates that 122 million square feet of solar panels would be necessary to hit a 5 percent goal—that is 49 DowntownDC BIDs, which likely is not feasible.

Setbacks, height restrictions, and competing roof priorities (green roof, penthouse, mechanical equipment, bocce court) make maximizing solar a challenge. There are ways to accelerate solar, and the American Geophysical Union provides a great example of what some of those are. The American Geophysical Union has a giant solar array that cantilevers over its height restrictions. The building obtained a setback waiver and was able to maximize its solar potential. The historic preservation group and the neighborhood association all supported this outcome because they knew it was good for the community. D.C. needs more solar that looks like this. It may be the only way that building owners can move forward toward those goals. It will be important for permitting and zoning to think about how serious D.C. is about hitting the solar goal and to change the rules accordingly so that we can make solar like this happen.

D.C.'s solar renewable energy credits are financially attractive, and community solar programs provide an alternative pathway to support solar in D.C. for building owners. Another example of accelerating solar in D.C. is through the local initiative run by New Partners Community Solar. Three of D.C.'s top office owners (Washington REIT, Brookfield Properties, Oxford



MARTA SCHANTZ/ULI

Community solar on Brookfield Properties' rooftop.

Properties) have recently set aside valuable square footage on the rooftops of downtown buildings for solar panels and are donating the clean energy they produce. The owners do not receive the energy from the panels to power their buildings, but instead they donate it to the grid and it is given to low-income D.C. residents in the form of credits that reduce their electric bills.


MARTA SCHANTZ/ULI

Impediments to Overcome to Achieve D.C.'s Goals

THE CLEAN ENERGY DC OMNIBUS ACT PROGRAM presents significant opportunities for the building community to improve the performance and long-term value of properties. In both the short term and—particularly—the long term, it also presents challenges for property owners to achieve its goals. Although the panel is comfortable under current conditions that the market supports implementing these requirements, potential risks exist. These impediments can be broadly grouped into three categories: regulatory, market, and physical challenges.

Regulatory Challenges

Regulatory challenges largely stem from uncertainty and conflicting directives.

Regulatory Uncertainty

Investors dislike uncertainty, and until the full details of how the plan will be implemented are rolled out, owners do not know for sure how they will be affected by the act. This factor is important because of timing; stakeholders need time to react and plan their approach, which will require significant lead times for planning, design, investor approvals, permitting, and the like before actual installations and construction. More certainty on 2032 requirements by 2020 would help owners plan longer-term investments (especially electrification and mechanical equipment replacement).

For the below-median buildings in the first BEPS compliance phase in 2021, this is particularly important. Although owners should be able to estimate based on current D.C. benchmarks and the Energy Star score their building will need to hit, the alternative compliance pathway is still undefined and the subsequent phases of meeting standards are impossible to predict; the uncertainty will make longer-term investment decisions difficult for building owners and investors. Ironically, for a building that is currently performing just above or below the median score, the problem is worse: first, the uncertainty as to whether the building will "make the cut" and what would be

needed to achieve compliance; and second, the unattractive alternative of investing a likely substantial sum to achieve 20 percent improvement and guarantee that the building complies. This will be especially hard for owners who may need to decide whether to replace their gas-fired HVAC and boilers or choose to convert to all electric. The parameters of noncompliance will determine the choices property owners make and therefore the speed with which the act achieves its goals. Noncompliant building owners who opt for fines because they are less costly or less difficult than improving performance by 20 percent or more will not be contributing to the real goal of greenhouse gas reduction. A companion effect could be a flight of investment capital.

Owner Frustration with D.C. Government

A number of interviewees expressed concern about D.C.'s commitment, saying that historically the government has tended to enact ambitious initiatives on multiple fronts but failed to follow through effectively on implementation. Some perceived the act as possibly the last straw, one of a recent barrage of new initiatives expected to be paid for largely by D.C.'s business community. Coupled with this concern were some reservations about whether the regulations will be fairly, accurately, and timely deployed—not necessarily through intention.

The perception is also widespread that the building community was not given sufficient opportunity to participate in the legislative process or provide input, and in the instances when input was provided, it was not seriously considered. Despite general support of the act's overall goals, these reservations, along with the cited uncertainty, tend to lead to misunderstanding and resistance. This can be corrected in the process of developing the BEPS regulations, understanding that the D.C. government is starting from a place of some distrust.

The Real Timing Window: 2.5 Years for BEPS Compliance

As discussed earlier, based on how the BEPS legislation is written, buildings that fall below the median energy performance level really have only two and a half years to come into compliance—not five years. Their initial compliance score is an average of the prior two years (i.e., 2019 and 2020 scores are averaged), which is measured against the average of the two years starting in years four and five after the initial benchmark is established. This means the improvements necessary to achieve compliance when the score is calculated in 2026 have to be in place by 2024 (compliance year four) to affect the results. This time frame is a much shorter one in which to execute an improvement program than it at first appears.

The program to help real estate exceed these standards is slow to roll out. Energy audits need to happen this year (2019), and the DCSEU and Green Bank need to start deploying retrofit capital as soon as possible if the building ownership community is expected to hit 2024–2026 reduction targets.

Organizational Inefficiency

The skepticism about commitment and implementation was frequently linked by interviewees to D.C.'s sprawling, balkanized agency jurisdictions and time-consuming approval process. The sheer number of groups and individuals with some role in defining and implementing the act (DCSEU, Chief Resilience Officer, DOEE, DCRA Green Buildings, D.C. Office of Planning, the Hub) increases the prospect of gaps, duplication, circuitous workflows, and protracted time frames for decisions and approvals.

The permitting process needs to speed up and cost less. Currently, it can take as long as 12 to 14 months to obtain a building permit in D.C. District officials told panelists that they are making improvements in processing times, but these improvements have not been noted by the design and building community yet. Permitting time frames this long will exacerbate the two-and-a-half-year challenge of BEPS. Clearly, time frames for approvals and permitting will have to be meaningfully shortened to enable the improvements many buildings will need to make for compliance with the act in a relatively short period. Front-of-line permitting for projects to comply with the Clean Energy DC Omnibus Act would be a good start to address this issue.

Property Tax

Because real estate assessments in D.C. are based on replacement cost, installation of improvements required under the act could lead to increased assessments and higher property taxes, a disincentive to compliance.

New Construction vs. Renovation Definitions

In some buildings, the cost of energy improvements coupled with other upgrades could exceed 50 percent of the building's assessed value, which under D.C. code would be classified as "new construction," which could trigger an array of unrelated and unplanned work to the building. The cost of this work in total could exceed the value of some buildings, but even if this is not the case, it discourages deep investments in energy efficiency and renewable energy in a retrofit (e.g., high-

efficiency windows and dynamic glass, on-site renewables, and super-efficient heating and cooling systems).

Misalignment of Building Code with Council's Goals

D.C.'s building code is not keeping up with the act or with other changes in standards and District policy and therefore is out of alignment with the goals of the clean energy program. The building codes need to adapt to the new D.C. sustainability priorities, not block them. Currently permit review is still being done in accordance with the 2013 Building Code because changes promulgated since then have not been enacted. If the building code is inconsistent with requirements of the act, it can complicate the review and permit process, affecting the turnaround time for obtaining approvals.

Market Challenges

The act establishes a compliance benchmark based on the median Energy Star score every five years. As D.C.'s buildings comply by improving energy performance, the median benchmark will inevitably shift upward. Because this cycle is currently designed to repeat every five years, building owners, investors, and tenants are faced with the prospect of a perpetual cycle of disruptive and costly work with progressively diminishing returns.

Commercial Buildings

In existing commercial buildings, timing significant improvements is always a planning exercise centered on tenancy. Buildings requiring major work to comply with the act face timing issues, since doing major work, if required, is considerably less complicated and expensive in a vacant or largely vacant building than in an occupied building. For most buildings, the first phase of BEPS compliance can probably be accomplished without significant disruptive work, but for later phases this is likely to be a bigger problem. Because tenants have rights to undisturbed occupancy, landlords must be careful to not lose tenants if the required work is disruptive. This challenge is exacerbated by D.C.'s soft office market, where vacancy is currently 15 to 20 percent. Since tenants have ample space choices, they can easily opt to leave a building (and potentially D.C.) rather than endure construction. This soft market reduces the ability—and the incentive—for owners to reinvest, especially in class B and C buildings.

This is not a far-off phenomenon; it is affecting building owners right now. According to interviews, the act's coming requirements are already negatively influencing cap rates (an industry measure of building value) and investor/developer interest in the D.C. market. These indicators reflect the effects of uncertainty about the details of the act's implementation, as well as concern about the softness of the D.C. market.

Multifamily Properties

In multifamily properties, achieving compliance is a more granular, complicated tenant- or unit owner–driven process than for office buildings. These challenges can be seen now in multifamily projects' generally lower benchmarking scores.

Because mechanical systems in residential projects are typically distributed, self-contained systems in each unit, modifying or replacing HVAC is a logistically challenging, disruptive, and expensive project. Once a unit is occupied, it is difficult to access, and in current hot multifamily markets, projects are typically fully occupied.

At the same time, investment margins on residential projects are generally lower than in office or other commercial sectors, which makes unplanned spending harder to fund. The costs generally cannot easily be financed because owners cannot pass the costs through to tenants either individually or collectively. Underscoring the difficulty, tenants do not seem to pay much more for a high-performing, green space than other just as new, but non-green space.

From the property management angle, tenant energy consumption behavior is difficult to control in a residential project, which is significant because residents account for 70 percent or more of energy use.

In condominium projects, a further challenge is the long time frames required to get condominium homeowner associations (a group of volunteers, it should be pointed out) to scope, approve, and execute an energy efficiency project.

Owner-Occupied Buildings

Funding improvements in commercial buildings is an investment decision, but for nonprofits, funding capital costs for building improvements can be crushingly difficult. Many nonprofits find that donors are increasingly reluctant to contribute to building campaigns or those costs that are not perceived to be directly "on mission." Further, technical

management expertise to understand and plan for the implications of the act's requirements may be lacking in many nonprofit building owners' organizations. Financing programs are most critical for this constituency.

Physical Challenges

Generally, the physical barriers and challenges in achieving BEPS compliance with energy efficiency goals will be specific to each building.

Solar Carve-Out

The 5 to 10 percent solar carve-out is the one requirement of the act that may not be physically possible in D.C. under current building regulations. The height limit, setback requirements, and conflicts with other rooftop requirements (equipment, green roof, tenant amenities) do not provide enough physical space for installing solar panels cost-effectively in efficient configurations; vertical installations do not perform well enough to justify the cost.

Grid Renewable Energy

Although the 100 percent renewable energy requirement is expected to be the responsibility of the utilities and not individual building owners, those owners who have already entered into long-term power purchase agreements could find themselves negatively impacted by this requirement if the power purchase agreement power source is noncompliant with the act, whether because of its renewability or its provenance.

MARTA SCHANTZ/ULI

MARTA SCHANTZ/ULI

Examples of buildings in the DowntownDC BID.

MARTA SCHANTZ/ULI

Impacts to Net Operating Income

REAL ESTATE INVESTMENT DECISIONS by owners are driven by a combination of the profitability of their buildings (measured in net operating income, or NOI) and the long-term value of their buildings over time (measured in net present value, or NPV). In evaluating the impact of the regulations under the Clean Energy DC Omnibus Act, real estate owners want to know how these new goals and compliance pathways will affect NOI and NPV.

The panel determined that for most buildings in the DowntownDC BID, the first phase of BEPS compliance will have little or no impact on NOI and NPV. More than half of all DowntonDC BID buildings will have no compliance requirements under BEPS phase one, because they are already performing better than the median D.C. office or multifamily buildings. For those that fall below the median, dozens of examples (including several in the DowntownDC BID) exist where buildings made investments to improve energy efficiency by 20 percent over five years using strategies that were cash-positive and accretive to value. Although the BEPS alternative compliance pathway has not been finalized, it is expected to be designed in a way that will have a reasonable return on investment (ROI) for building owners who decide to pursue it; moreover, D.C. will likely make low-interest financing available to those who need it. The biggest unknown will be the magnitude and size of fines for buildings that do not comply by achieving a 20 percent energy reduction or by following the prescriptive pathway—any building that has to pay a fine will see a decrease in NOI and NPV, and if fines are high enough this could pose a significant risk to the profitability of the building.

Whereas BEPS phase one (2021–2026) will likely have no impact on NOI for the majority of buildings in the DowntownDC BID, BEPS phase two (2026–2032) and the NZE new construction code could require significant investment by building owners in major building upgrades that may have a

positive ROI, but may require significant capital outlays and have a very long payback period. As a result, these investments could have a significant short-term impact on NOI for a large number of buildings. To reduce the negative impact on NOI of these longer-term regulations, D.C. (through its Sustainable Energy Utility and Green Bank, and possibly in partnership with PEPCO) should offer low-interest long-term financing as soon as possible for major building investments to move buildings toward net-zero energy. Given the right financing terms, an investment with a major capital outlay and a 10-year payback could be structured in a way that is cash positive for the building owner and have a positive impact on NOI.

How BEPS Will Drive Investment Decisions

BEPS has the most immediate and direct impact on buildings in the Clean Energy DC Omnibus Act. It measures the progress toward D.C.'s goals. It recognizes those buildings in terms of their commitment to energy efficiency and sustainability, identifying those owners already aligned with the D.C. vision. And it specifically calls for action by others to achieve the vision.

After the first rollout (BEPS phase one) for buildings 50,000 square feet and larger, two additional tranches by building size will be phased in. The DOEE should carefully monitor the steps taken by property owners falling below the threshold to remediate, enhance, accept fines, or sell. By the time the third BEPS compliance tranche is rolled out, prior decisions by owners triggered by other BEPS tranches or escalations might call for modified action to maintain properties in service and on the tax rolls.

For those owners who have built, maintained, or renovated properties that exceed the BEPS thresholds now (and in the future), savings in terms of reduced energy costs are already embedded in their NOI.

Data show that those owners with buildings exceeding the BEPS threshold (above the D.C. median Energy Star score identified in 2021) will have better-performing buildings—multiple studies across building types and markets show that Energy Star–certified buildings (buildings scoring a 75 or better, likely well above the BEPS phase one compliance requirement) have lower operating expenses, lower vacancy rates, and higher rents—all leading to a higher NOI and higher asset value.

In addition, in the commercial real estate space, because of the NOI impact, these higher-performing properties attract wider lender interest at more competitive pricing. Further, many long-term investors (especially from overseas) require them for additions to their investment portfolio.

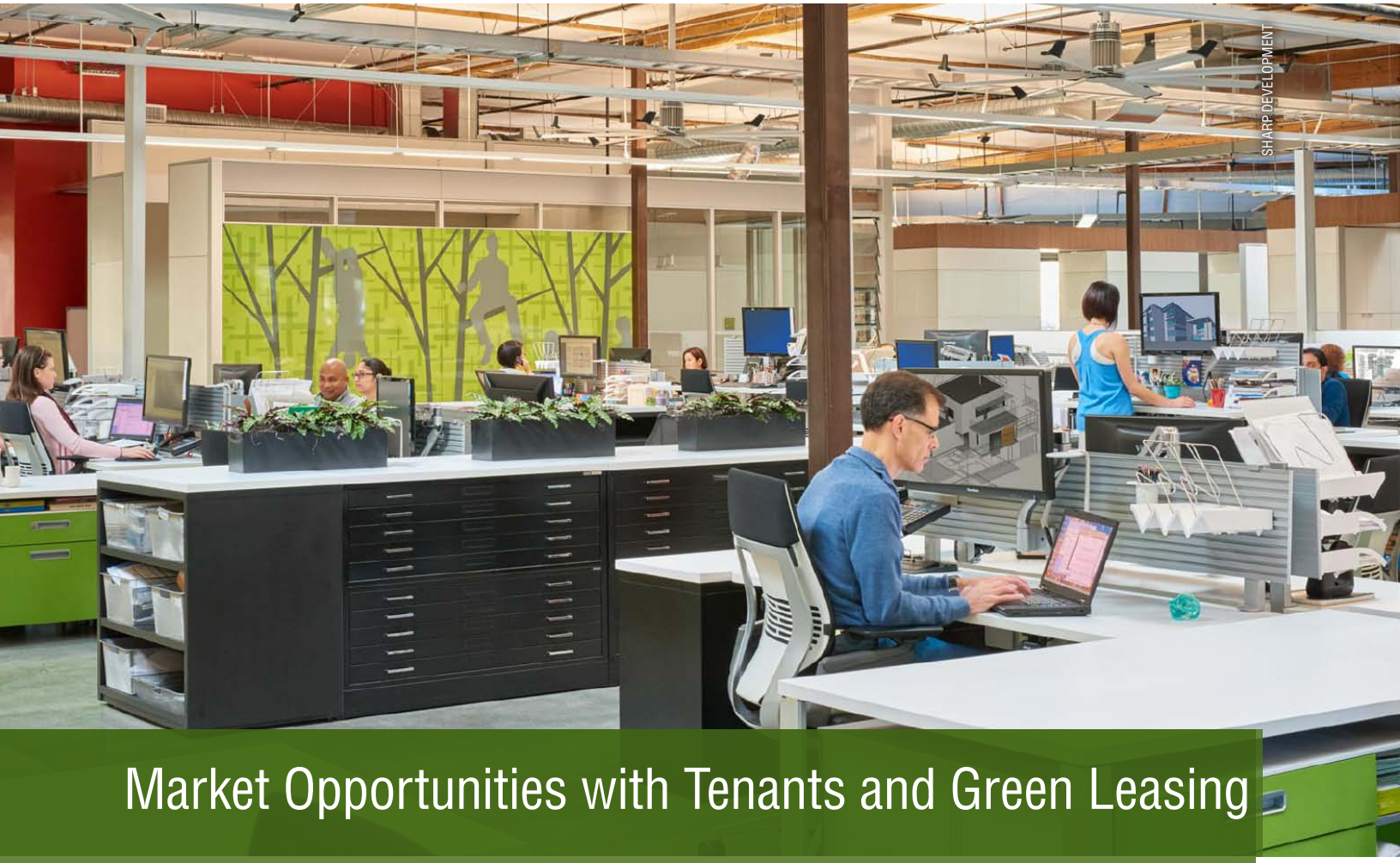
For some owners and investors, the cost to meet (or strategically exceed) the BEPS thresholds will not be acceptable, given their circumstances and other investment alternatives. In such cases, a sale to another owner/investor group with different expertise or goals will be appropriate. Buyers will base their offer on their own vision for the property, including the cost of renovation for compliance. This could include conversion to other property types (office to residential).

NZE Impact on New Construction

Although the BEPS phase one compliance hurdle may be a low bar for most building owners, D.C.'s requirement for all new construction to be net-zero energy starting in 2026 could have a dramatic impact on the cost of new construction. Developers and investors will need to plan investments for these projects early in the development process and may need support from the DC Green Bank, the DCSEU, and commercial lenders to reduce upfront construction costs (by moving investments in on-site renewable energy off balance sheet, and finding low-cost, long-term debt to finance super-energy-efficient mechanical equipment and advanced building envelope technology). If the upfront cost of building to net-zero energy does not come down, it could have the unintended consequence of making new, energy-efficient construction in D.C. difficult to build and create a market advantage for energy-efficient (but not NZE) existing buildings.

Deep Investments to Meet BEPS Phase Two

The next round of building energy efficiency under the Clean Energy DC Omnibus Act (BEPS phase two) will also likely require deep investments in energy efficiency for existing buildings. To ensure buildings can meet these goals, all existing buildings will need to work deep energy efficiency retrofits into their capital plans. For these buildings, making a major energy efficiency investment will be easiest and least expensive at the point when buildings are bought or sold (when capital is cheapest) or when a major tenant moves out (and major investments are likely to be the least disruptive to tenants). For the DowntownDC BID, this will be a critical time to build awareness about the regulations in the Clean Energy DC Omnibus Act, catching current and future owners at the right moment, either directly or through brokers, property managers, and others who will be involved in these transactions and major renovations.


SHARP DEVELOPMENT

Market Opportunities with Tenants and Green Leasing

TENANTS REPRESENT MORE THAN 50 PERCENT of the energy consumption in buildings today. Without their active participation in energy efficiency, buildings that fall below the median Energy Star score will have no hope of achieving BEPS compliance goals.

As the nation's capital region, D.C. depends heavily on government activity, with the government sector accounting for 22 percent of total employment and 23 percent of total gross metropolitan product. The region's economy is becoming increasingly diversified. D.C.'s largest tenant is still the General Services Administration (GSA). Thankfully for D.C. office owners, the GSA has a statutory commitment to energy efficiency and a policy to lease only Energy Star–certified buildings in most markets (those scoring above an Energy Star score of 75, well above the median score required under BEPS phase one). With a commitment to achieving superior energy efficiency in GSA leased space, GSA tenants will be more likely to work with landlords on investments and building management strategies to maintain an Energy Star–compliant score, as they have been doing for at least the past decade.

Although the GSA is the top tenant in D.C., the region's economy is becoming increasingly diversified. Over the past 10 years, D.C. has increasingly become a tech hub and now ranks as the fourth-largest tech hub in the country. Tech companies are virtually at war to attract and retain the best talent in the country. One of the most effective ways tech companies differentiate themselves is through the quality of design and construction of their office environments. Their offices have come to embody the company's culture and aspirational goals and define the manner in which they value their employees. Consequently, they have developed robust policies dealing with

health and well-being, energy efficiencies, sustainability, and resilience.

D.C.'s real estate also continues to be a strong market for professional services, especially consultants, lobbyists, and law firms. While these tenants may not be seen as being as progressive as tech tenants, many of these firms are looking to reinvent their office environments with a focus on health and wellness and environmental sustainability. A graduate of Georgetown University Law School, for example, could be comparing what differentiates D.C. law firms from each other, which is in part the company culture and workspace. Offices showcase culture and reflect how employers value their employees: it is all about the tenant space and tenant improvements. Building owners can leverage these interests to encourage energy-efficient sustainable spaces and green leases.

In response to these shifting market dynamics, landlords and tenants are collaborating to improve office spaces that reflect the environmental, sustainability, and governance requirements of both parties. Although owners are the primary party responsible for meeting or achieving the Clean Energy DC Omnibus Act goals, tenants have a major role to play, since as much as 50 percent of energy loads and GHG emissions are a result of tenant work and operations.

Green Leases

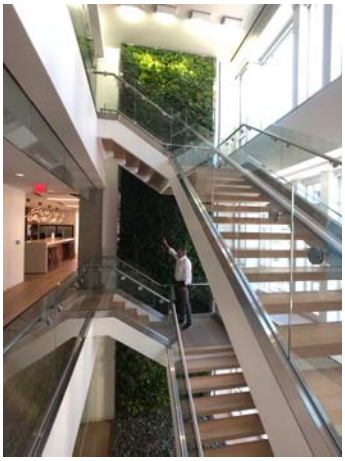
As a market anchored by the GSA, as the fourth-largest tech market, and as a healthy market for professional services tenants, D.C. is already well positioned to continue to successfully compete for new business tenants.

Because these tenants are interested in energy efficiency and environmental sustainability, they will increasingly be open to signing leases that allow owners and tenants to work together to improve energy efficiency and to share the financial benefits of investments that make the building more efficient (and more likely to meet the Clean Energy DC Omnibus Act regulations). They are also more likely to be open to working with landlords and design firms to ensure that their space fit-out is executed in a way that maximizes energy efficiency for their operations.

The BEPS requirements provide a unique opportunity to introduce energy use and efficiencies into all lease negotiations between owners and tenants. Examples of how these targets can be met on a competitive, cost-effective basis are of paramount importance to landlord and tenants, providing owners and tenants with resources demonstrating the requirements can enhance value and drive down operating costs.

PROJECT PROFILE: NIXON PEABODY OFFICE RELOCATION

A relevant example of this landlord-tenant collaboration is Nixon Peabody's leased office relocation to 799 Ninth Street, N.W., in Washington, D.C., owned by Brookfield Properties. Nixon Peabody is one of D.C.'s major law firms. Its primary goals for the office relocation were to reflect its brand, demonstrate its commitment to sustainability, and promote the well-being of its employees. The landlord and tenant shared values and aligned interests. Working with Brookfield, Nixon Peabody's ambitions were realized through several design and engineering solutions. A three-story living wall that reuses mechanical unit condensate water for irrigation was included in the design as well as construction of a three-story interconnecting stairway. The stair also supports employee communication, health, wellness, and mobility.

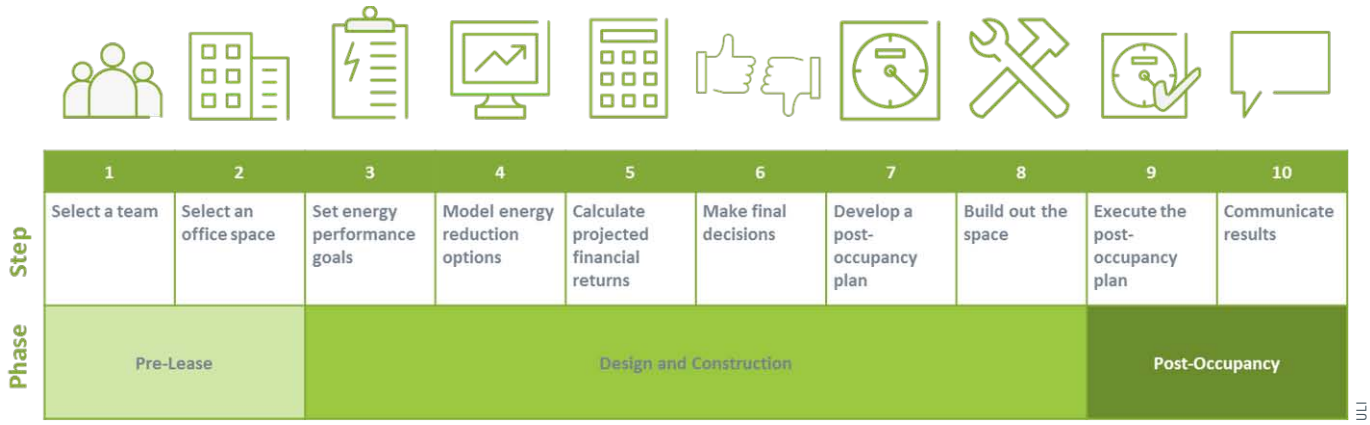


ALAN RAZAK/ULI

Nixon Peabody living wall and interconnecting staircase.

The design provides a total connected lighting load that is 35 percent better than D.C. Building Code requirements. The team used glass office fronts, daylight harvesting, lighting controls, and motorized shades to maximize natural light and reduce the need for electric light; 100 percent LED fixture specification and control sequencing were also integral to reducing the lighting load. The design reduces HVAC energy costs by 21 percent and supports a 35 percent reduction in water use through 1.5 gallon per minute faucets on pantry sinks and low-flow fixtures in restrooms. The project achieved a LEED Platinum certification under the Commercial Interiors rating system.

The panel recommends that the DOEE develop a prototype green lease and as of 2026 require all property owners use a green lease in their new and renewing tenant leases. In the absence of a DOEE requirement for green leases, the DowntownDC BID should make prototype green lease language available to all building owners and hold regular education sessions for owners and tenants on how to execute a green lease. Green leases help turn energy efficiency investments into a win-win for both owners and tenants by overcoming



The 10-step Tenant Energy Optimization Program process.

split incentives, which occur when the stakeholder paying for the energy improvements is different from the stakeholder benefitting from the resulting savings. Green leases also set building rules of operation that prioritize energy-efficient facility management, and tenant space operations and fit-outs that meet reasonable energy efficiency guidelines.

The panel also recommends that DOEE require an energy efficiency standard for tenant fit-outs in BEPS phase two (2026–2032) and begin educating and incentivizing energy-efficient tenant fit-outs through the new Hub as soon as possible. As with green leases, if DOEE does not include this in its regulations or future engagement through its Hub, the DowntownDC BID should work with landlords and tenants to provide education on how to execute a sustainable tenant fit-out and resources to help them achieve improved energy efficiency in the fit-out process.

Office Tenant Improvements

The ULI Greenprint Center for Building Performance has a 10-step process called the Tenant Energy Optimization Program (TEOP) that can help reduce tenant energy use 50 percent, which is free and available at tenantenergy.uli.org.

TEOP is a returns-driven, 10-step process to facilitate decisions while creating energy-efficient spaces during the design and construction process.

TEOP is a free and open program with a proven track record of success. It has piloted 10 tenant fit-out programs resulting in payback periods ranging from three to five years, energy savings ranging from 30 to 50 percent, and average internal rates of return of 25 percent. The program has been so successful that many institutional landlords require all tenants to follow this process; the Empire State Building adopted this policy for all its fit-outs almost a decade ago.

TEOP Fit-Out Case Study Examples

Company	Leased area (sq ft)	Added cost (per sq ft)	Energy reduction	Total savings	ROI	Payback (years)
Bloomberg	20,000	$3.06	10.5%	$173,880	140%	2.5
Coty Inc.	80,000	$0.71	30.7%	$716,148	328%	2.7
Cushman & Wakefield	7,500	$3.25	47.5%	$87,862	359%	1.7
Estee Lauder Companies	10,000	$1.29	12.1%	$15,862	42%	3.7
Global Brands Group	137,000	$0.98	11.8%	$438,090	126%	4.6
LinkedIn Corp.	36,000	$2.63	31.3%	$153,000	23%	6.4
NYSERDA	15,200	$2.42	39.0%	$188,017	179%	3.6
Reed Smith	117,000	$1.31	44.5%	$1,126,498	410%	2.2
Shutterstock	8,600	$2.63	22.9%	$369,897	40%	6.1
TPG Architecture	40,000	$2.01	21.6%	$275,372	162%	3.2

Source: ULI.

ENERGY STAR

U.S. EPA Energy Star Tenant Recognition Program

The U.S. Environmental Protection Agency piloted a recognition program for energy-efficient tenant spaces starting in the fall of 2017 called Energy Star for Tenants. Under the Energy Efficiency Improvement Act of 2015, tenants that met design criteria set by EPA were eligible for recognition.

Fifty-one Charter Tenants were recognized for meeting the five energy efficiency criteria set by EPA: estimate energy use; meter energy use; light efficiently; use efficient equipment; and share data. The program will roll out for the full market in the first quarter of 2020 and could be leveraged in green leases and tenant fit-outs to encourage more energy-efficient leased spaces. More information on the program is available at https://www.energystar.gov/buildings/tenants/about_tenant_space.

U.S. DOE Green Lease Leaders Recognition Program

The U.S. Department of Energy (DOE) partnered with the Institute for Market Transformation to launch the Green Lease Leaders program, a leading authority on green leasing best practices with a number of tools and resources available online. Green Lease Leaders recognizes forward-thinking companies and real estate practitioners who break down barriers to high-performance buildings by revolutionizing leases to incorporate energy efficiency and sustainability. Tenants and landlords can apply for Green Lease Leader recognition at the silver or gold level, based on the following requirements:

- Silver Level (Foundational):
  - Show required policies and best practices are in place in your organization.
  - Show compliance with both prerequisites and at least five credits in the criteria outlined in the Green Lease Leaders reference guides for landlords and tenants.
  - Documentation may include:
    - Standard lease;
    - Standard work letter;
    - Corporate guidelines or policies;
    - Template tracking documents.
- Gold Level (Implementation):
  - Show policies and practices executed in lease transactions.
  - Show compliance with both prerequisites and at least five credits in the criteria listed in the landlord and tenant reference guides.
  - Show implementation of both prerequisites and credits pursued in at least one executed lease.
  - Documentation may include:
    - Executed lease;
    - Executed work letter;
    - Corporate guidelines, standard operating procedures and policies;
    - Completed tracking documents (e.g., energy, water or staff training);
    - Documentation of information requested or provided between landlord and tenant (e.g., emails or letters between tenants and landlords).

More information on the program is available at https://www.greenleaseleaders.com/.

U.S. DOE

SUMMARY GUIDE TO DRAFTING GREEN LEASES

Developing green leases should be an interactive process between owners and tenants. Any lease can be made green by adding clauses or addendums. Memorandums of understanding, letters of intent, and building rules and regulations offer pathways to promote and formalize sustainability practices when initiating lease negotiations or at the lease renewal date. Areas of focus in drafting a green lease include the following:

Pass-through clauses: Allow lease language to pass through energy-efficient investment costs to tenants.

- Gross vs. triple-net leases—dealing with the split incentive when the entity paying for energy improvements is not the entity benefitting from the energy savings.
- Allowing capital cost pass-through from energy efficiency investments to tenants enables cost recovery for building owners.
- Can be justified if the capital cost investment has the impact of reducing operating expenses. In modified gross leases or triple-net leases, this capital cost pass-through might be incorporated into tenants' monthly operating expenses.

Operations clauses: Incorporate lease sections that allow the building to operate more efficiently and/or reduce environmental impacts. Examples include the following:

- Establish design criteria for tenant improvements to conform with BEPS.
- Establish recycling and waste practices.
- Set formal building operating hours and temperature ranges. The latter may require submetering to be monitored and enforced. Some of these items may also be appropriately listed in the building rules and regulations instead of in the formal lease document.
- Submeters are required for office space 5,000 square feet or greater.

Sustainable purchasing: Establish rules about the types of materials that can be purchased for improving tenant spaces and common area spaces. Link to design established criteria. Examples include:

- Energy Star–qualified office equipment, electronics, appliances;
- Products containing preconsumer and postconsumer materials;
- Products containing rapidly renewable materials;
- High-efficiency, LED lighting;
- Low or no volatile organic compound (VOC) furniture; and
- Low or no VOC paints, adhesives, or solvents.

Reporting: Sharing data on building energy use and progress toward goals through benchmarking or other systems agreed on between the landlord and tenant. BEPS will establish benchmarks using Energy Star or other metrics and can leverage the Energy Star for Tenants program as a way to share tenant-level energy performance data. Multiple types of reporting forms are already in use; D.C. needs to adopt or adapt a form.

Building Owners' Plan of Action: Path to Net-Zero Energy

AS PART OF THE CLEAN ENERGY DC OMNIBUS ACT, all new construction will be required by code to be net-zero energy starting in 2026. Major renovation projects in existing buildings may trigger the NZE code starting in 2026 as well. While not every building will be able to achieve NZE on site, new technologies and new methodologies for energy efficiency now make NZE possible and profitable for a wide range of buildings (including both new and existing).

The panel recommends that all DC building owners (both existing and new construction) begin exploring a pathway to NZE. Although new construction will need to achieve NZE sooner, under the incrementally ratcheting BEPS median thresholds, most existing buildings will likely need to be close to NZE by 2032. To remain competitive with the new construction market after 2026, existing buildings will also need to pursue deep energy efficiency retrofits, both for improving the economics of operating expenses and for avoiding fines associated with BEPS performance medians in 2032 and beyond.

Key Steps for NZE New Construction

When planning to develop a new construction NZE building cost-effectively, the following steps will help ensure a successful project.

- Map out building orientation to maximize renewable potential and minimize building heat gain: For buildings in Washington, D.C.'s climate, this means enhanced shading and glazing for the south-facing side of the building and a roof that allows for the maximum capacity of south-facing solar panels.
- Build a super-efficient envelope: Key components of an NZE building envelope include low-e, electrochromic

DEFINING NET-ZERO ENERGY

The World Green Building Council (WorldGBC) defines net zero as a building that is highly energy efficient and fully powered from on-site and/or off-site renewable energy sources.

WorldGBC recognizes that in most situations, true NZE buildings (i.e., buildings that generate 100 percent of their energy needs on site) are not feasible. Therefore, buildings that are energy efficient and supply energy needs from renewable sources (on site and/or off site) are a more appropriate target for the mass scale required to achieve global emission reductions at scale.

The panel's understanding is that D.C. plans to follow this guide for defining NZE for its new construction code, encouraging as much energy efficiency as possible, offset by as much on-site renewable generation as possible, supplemented by off-site renewables from the same utility grid.

or tinted windows, enhanced wall and roof insulation, well-sealed doors and entryways (including, for most commercial buildings, a revolving door), and a white roof.

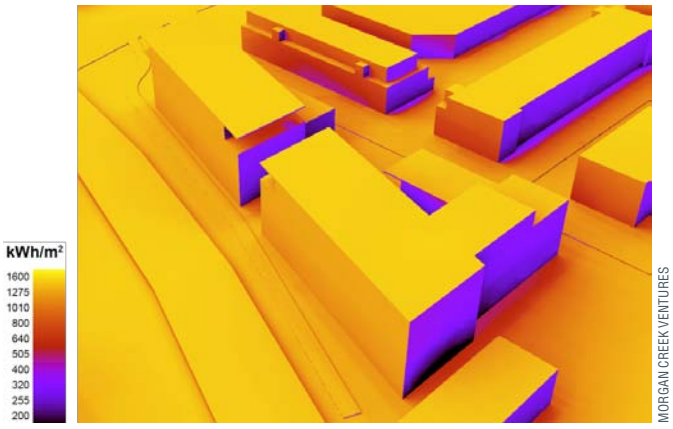
- Capture free heat and leverage free cooling: Use thermal mass from mechanical equipment and other building heat sources for supplemental free heating, and ceiling fans and operable windows for free cooling and fresh air.
- Ensure tenants are fitting out leased spaces for an NZE building: Work with tenants to install efficient lighting, supplemental HVAC, and plug load management systems to reduce their impact on overall building energy use.
- Install super-efficient mechanical equipment: After reducing mechanical load through the design strategies listed previously, invest in high-efficiency mechanical equipment right-sized for the building's projected (lower) energy consumption.
- Build a network of sensors and smart controls to optimize system performance: Connect new mechanical equipment to a network of smart sensors and controls, and leverage this network to optimize building performance through a sophisticated building management system.
- Leverage all available opportunities for on-site renewables: Look to maximize solar energy production from the building's roof (and possibly envelope), through solar cladding and photovoltaic (PV)-enhanced curtainwall, as well as other site-appropriate renewable options (including ground-level geothermal, micro wind, and energy recovery systems in pumps, elevators, and other mechanical equipment).

MORGAN CREEK VENTURES

Maximizing solar energy production through solar cladding.

Key Steps for NZE Retrofits

When planning to renovate an existing building to NZE cost-effectively, the following steps will help ensure a successful project.



MORGAN CREEK VENTURES

NZE thermal imaging analysis.

SHARP DEVELOPMENT

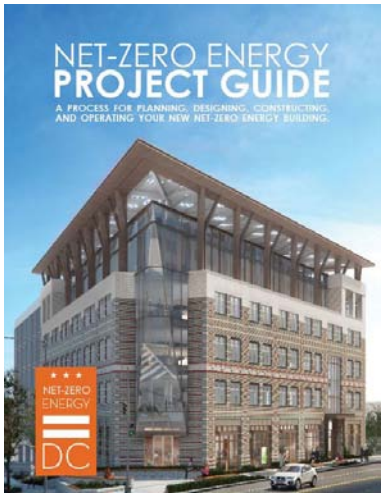
NZE retrofit building.

D.C. NET-ZERO ENERGY PROJECT GUIDE

D.C.'s Department of Consumer and Regulatory Affairs published a *Net-Zero Energy Project Guide* as a recommended process for planning, designing, constructing, and operating a new NZE building.

DCRA illustrates how the steps to achieve NZE are different from a traditional building development process, and its project guide explains those differences and provides a framework for planning any NZE project. It contains resources and checklists to inform a process of gaining stakeholder support, selecting a qualified design team, managing the design and construction process, occupying an NZE building, and verifying an NZE result.

The DCRA goal is to equip the design and construction community with the education and tools to achieve NZE buildings to meet these targets as they become part of the energy code in the future. More information is available at https://www.buildgreendc.org/net-zero-energy-information.



D.C. DCRA

The most efficient, cost-effective pathway to an NZE renovation is through a holistic, bundled approach to a building renovation, rather than by looking at various building materials and methodologies individually and deciding whether or not the payback period meets investment criteria. By combining various methods and materials in a way that maximizes their efficacy, the sum of the parts results in a significantly more cost-effective system upfront, with better long-term energy savings than if each were implemented in a silo. Examples of this approach are given at the end of this section.

Assess Immediate and Long-Term Efficiency Opportunities through an Energy Audit

First, buildings should perform an energy audit, to see where opportunities exist for reductions of energy use, both immediately and through low-cost and investment-grade upgrade opportunities.

An energy audit often uncovers immediate opportunities to enhance a building's energy performance, starting with the following no- and low-cost activities:

- Facility management strategies: Often opportunities abound to manage buildings more effectively, through staged building startup and shutdown, maintaining efficient temperature setpoints, controlling fresh air intake, and tuning up mechanical systems.
- Enhance tenant/resident engagement on efficiency: Owners can enhance occupant energy efficiency through automation (programmable thermostats, smart power strips, and occupancy sensors) and other nontechnology engagement strategies (signage, messaging, and email and verbal reminders to shut equipment off at end of day).

Identify Low-Hanging Fruit

Through the energy audit, owners should be able to determine how efficiently the building is currently running, and where the energy savings will be most easily achieved. Many of the operating systems and components of the building may already be in good shape or need very little work. This will help identify what areas need to be addressed most urgently and where the greatest opportunities for savings are.

For many commercial and multifamily buildings, this low-hanging fruit can include the following:

- Lighting upgrades (from fluorescent, incandescent, and HID to LED);
- Enhanced controls (programmable "smart" thermostats, CO_2 sensors, and enhanced energy and water metering throughout the building);
- Enhanced mechanical equipment (variable frequency drives for major HVAC systems, fans, cooling towers, and pumps); and
- Building envelope enhancements (wall and ceiling insulation, window films, additional weather-stripping and sealants).

These methods reduce energy consumption by as much as 20 percent in most buildings and can be a prescriptive path to meeting the BEPS requirements while also putting the building on a path to NZE over time. The payback period is typically two to three years, and (as a stand-alone investment) can offer an internal rate of return (IRR) of 33 percent or more. When pursued as part of a deeper retrofit program, leveraging these enhancements first can help enhance the ROI of larger investments in upgrading the building envelope and mechanical systems.

Drive a Deep Retrofit

After enhancing facility management and occupant engagement and identifying the low-hanging fruit for energy efficiency, owners will need to work with a design and construction team to identify and pursue the deep/major retrofits. This step is critical to obtain real-time design feedback on both efficiencies and costs, so that decisions can be made in a way that results in both the most efficient and the most cost-effective system. This team usually includes an electrical and mechanical engineer, general contractor, architect, solar contractor, mechanical subcontractor, the owner/developer, and the structural engineer (if doing a major retrofit). This team will evaluate the steps to drive down the energy use intensity (EUI; the amount of power that it takes to run the building per square foot) as much as possible and then to offset the remaining load with either solar/renewable energy generation, the purchase of clean power, or a combination of the two.

Typically, the right timing to execute this type of retrofit, from a financial standpoint, is when a building is bought or sold, which is when capital for major retrofits is the cheapest because future owners can underwrite major investments into their capital plan, or current owners can quickly capture the long-term value of their investment in the sale price of a building (based on its enhanced NPV post-retrofit). However, if a capital reserve plan is in place, and adequate capital is available, many of these methodologies are nonintrusive and can be done while the tenant is in occupancy.

Holistic Design Approach Summary

To take a holistic approach, a design and construction team will need to pursue the right retrofits, in the right order, to achieve maximum efficiency at the lowest cost. Rather than looking at each investment in isolation, a design team should do the following:

- Weave multiple methodologies and materials together.
- Start with the building envelope to reduce load on future mechanical systems.
- Capture free heat through exposed thermal mass.
- Integrate passive cooling strategies to enhance comfort efficiently.
- Right-size lighting and plug loads efficiently for the new building systems.
- Right-size mechanical systems for the new overall building energy load.
- Enhance the efficiency of the new building through enhanced sensors, controls, and a building management system (BMS) to ensure the entire system runs more efficiently.
- Identify and integrate as much renewable energy from as many systems as possible on site, including active systems (on-site solar and wind, flywheel and brake energy capture systems for elevators) and passive systems (ground-level geothermal).

When these investments are done in concert with each other and as part of a whole building renovation, their overall payback can be in the five- to six-year range, with an IRR of 15 percent or more. Given the strong return, this type of investment would meet the criteria for most debt financing, including the programs being enhanced or launched by the D.C. Government under the Clean Energy DC Omnibus Act (the DC PACE program and DC Green Bank).

EXAMPLE OF HOLISTIC NZE APPROACH

SHARP Development has used this holistic approach for its redevelopments. The following is an example of how that works for a holistic HVAC retrofit as part of an NZE project.

HVAC is the largest single energy load in a building, one of the largest line items on the construction cost breakdown as well as on the operating expense and replacement reserve budgets. By coordinating wall and ceiling insulation (both very inexpensive), with the optimization of the existing HVAC equipment (controls, sensors, variable air volume boxes, variable frequency drives), a renovation team can often lower HVAC energy use by 50 to 60 percent. With the savings generated through insulation and controls, the renovation team can add low-e and electrochromic glass on the appropriate building elevations to further insulate the high-performance shell. To enhance building performance and reduce HVAC load even further, the renovation team can add ceiling fans, install operable windows for clean air exchange and night flushing, and expose the existing thermal mass (free) to absorb human and computer heat in the summer, which drives down energy use and the need for HVAC equipment to 20 to 30 percent of its energy consumption pre-renovation. This not only reduces the power bill, but also reduces the first cost for new (smaller) HVAC equipment and reduces the size of the solar array needed to get the building to NZE. Because the renovated building is primarily performing air exchange naturally for indoor air quality, and indoor temperature variances have narrowed significantly, the equipment is actually running much less frequently and for shorter durations. This, along with the need for less equipment in general, significantly reduces maintenance costs and all but eliminates the need for replacement reserves to be taken out of cash flow. By bundling very simple, readily available materials properly, the owner ends up with a system that is extremely cost-effective and saves both first cost and operating cash flow on multiple fronts.

Owners can then apply this approach to lighting loads and plug loads to further reduce energy consumption. With lighting, combine highly efficient LED lighting with sensors tied to the building management system, strategically placed skylights and window treatments, and task lighting to maximize the reduction in artificial lighting loads inexpensively.

When installing solar panels on the roof, owners can typically also replace the roof membrane with an insulated foam roof with a reflective coating. This further increases the efficiency of the shell and can often be included as a part of the cost of the solar installation, thus qualifying for the investment tax credits and accelerated depreciation that go along with solar.

SHARP DEVELOPMENT

SHARP DEVELOPMENT

Tune-Up Payback Calculation

HVAC tune-up	=	30 percent reduction: controls, sensors, variable frequency drives, variable air volume boxes
+ **High-performance envelope**	=	50 percent reduction in HVAC use: wall and ceiling insulation, low-e and dynamic glass
+ **Ceiling fans**	=	unknown reduction: provide air movement to lower the perceived temperature for occupants
+ **Operable windows**	=	unknown reduction: allows night flushing and air exchange
+ **Exposed thermal mass**	=	unknown reduction: very efficient heat sink that will absorb human and computer heat
+ **Building management software**	=	unknown reduction: coordinates all of the above
Results	=	75 percent reduction in HVAC use: lower first cost, reduced maintenance cost

KEVIN BATES, SHARP DEVELOPMENT


ALAN RAZAK/ULI

Stakeholders' Roles for Success: DowntownDC BID and DOEE

ACHIEVING 50 PERCENT REDUCTION BY 2032 in GHG emissions from buildings in D.C. is no small task. Immediately and until 2032, building owners must focus on the steps they need to take in their buildings to reduce energy use and thereby do their part in reducing GHG emissions. Many owners of larger buildings in D.C. have already made significant progress implementing energy efficiency projects. However, many more building owners and their service providers are far less knowledgeable and will need assistance from others or will struggle mightily to determine the best projects to undertake and the best way to proceed and thus will risk not meeting the BEPS targets.

D.C. agencies, industry organizations, and the BIDs are well positioned to assist these building owners. The panel has specifically focused on the near-term actions the DowntownDC BID should undertake to support the building owners in its district. The panel has also included recommendations of actions D.C., the DOEE, or the recently established Hub should undertake to support building owners throughout D.C. so they successfully reach the goals in a timely and efficient way.

Recommended Near-Term Actions for the DowntownDC BID

For more than 20 years, the DowntownDC BID has played an important role in transforming downtown D.C. into an economically vibrant destination and continuing to make downtown cleaner, safer, and more attractive for all D.C. residents. As D.C. embarks on a new, greener strategy D.C.-wide, the DowntownDC BID can play a key role in helping its members achieve the Clean Energy DC Omnibus Act goals. Building owners in the DowntownDC BID will benefit from strong outreach, education, and training. Appreciating that D.C., DOEE, DCSEU, and the Hub plan to eventually provide this support, the DowntownDC BID can serve its members well by providing to them early, high-quality programs customized to its members' needs. Moreover, members advanced in energy efficiency practices in the DowntownDC BID may be better positioned to mentor and share best practices through the DOEE.

When the DowntownDC BID finds that programs that meet its members' needs are being offered by others, the local DowntownDC BID programs could be sunset. However, if the members find strong benefits for continuing the local programs, they may continue. The DowntownDC BID has often been a leader in D.C. Developing these programs to assist members during this enormous new effort and sharing the program formats with other BIDs would provide a tremendous service to D.C.

The DowntownDC BID should launch a six-month "get ready for energy efficiency" campaign immediately, which should include the following:

- Outreach to all DowntownDC BID buildings not complying with the current D.C. benchmarking law as soon as possible, to help them get their utility data into Energy Star Portfolio Manager and provide early outreach to the buildings that will need to start benchmarking in the next two years (under 50,000 square feet);
- Individual follow-up to every DowntownDC BID member this fall, to help them understand their current Energy Star score and what it will likely mean in terms of their BEPS compliance requirements;
- A checklist with simple, no-cost strategies that DowntownDC BID members and their tenants can take to start improving energy efficiency immediately;
- A checklist of low-cost, high-return investments building owners can make to improve their performance quickly and cost-effectively;
- Resources for members to get a low-cost (or free) energy audit, coordinated through D.C.'s Sustainable Energy Utility;
- Resources postaudit to finance energy efficiency upgrades through the DC Green Bank this year; and
- A training program to "learn from the leaders" that gives awards to DowntownDC BID buildings with superior energy efficiency performance (office and multifamily) and trains other DowntownDC BID members how they can achieve similar success in their buildings.

Getting Set

It is important to start now.

1. **Leadership first: DowntownDC BID sustainability leadership and accountability** (Appoint immediately for a long-term position.)

   The DowntownDC BID needs to appoint someone internal from the organization immediately to a long-term position who is going to be a strong, experienced professional current on energy efficiency at the building level, who is able to coordinate the efforts of all of these recommended tasks and provide leadership, someone who is going to take ownership of the program within the DowntownDC BID and have the authority to move forward with urgency. This individual should be in charge of the DowntownDC BID's programs relating to the Clean Energy DC Omnibus Act and other sustainability initiatives.

It is important to start now.

2. **Communications** (Begin immediately and continue throughout.)

   Communications are key. The building community's current level of awareness and understanding of the law and its impacts is fairly low. The panel found from interviews that a lot of people are simply unaware of the coming requirements, so the DowntownDC BID can help get its membership informed. Accurate information will be needed about the BEPS requirements and their implementation, and the DowntownDC BID could be that trusted source. This could reduce the resistance to the ordinance caused by misinformation and misunderstandings.

Appoint a DowntownDC BID sustainability leader.

Communicate to all DowntownDC BID members about enactment of the Clean Energy DC Omnibus Act and the current understanding of the 2032 energy goals and how they will be measured and enforced. Explain the impact of these goals on individual building owners. Indicate the timeline for further information on BEPS compliance and how the DowntownDC BID will participate in developing these goals. Design a program that ensures that all building members are aware and engaged. Create community social engagement within the DowntownDC BID membership group by convening and volunteer roles to assist one another in achieving goals. Recognize winners, volunteers, and progress. Explain clearly the benefits of the Clean Energy DC Omnibus Act goals to D.C., to the building owners, and to the occupants—get them excited! Get building owners to attend DOEE task force meetings and to speak up. Ensure the DOEE "hears" constructive ideas from DowntownDC BID members.

3. **Data and analysis** (Provide as soon as possible.)

   Provide all DowntownDC BID members with analysis of currently available data on the buildings in the DowntownDC BID in terms of GHG emissions and Energy Star ratings. Indicate current performance against the most recently available Energy Star rating District median. Identify the buildings that need to spring into action, and provide suggestions of the actions they can take to achieve the required targets.

   The panel's efforts to review basic DowntownDC BID member Energy Star data, which has been reported for the DowntownDC BID by DOEE as part of the U.S. DOE's Better Buildings Challenge for more than five years, made pretty clear that no one at the DowntownDC BID is regularly looking at these data or using the data to help its members make energy efficiency decisions or even comply with current benchmarking laws.

Member Awareness and Preparation

The DowntownDC BID must use that communication pathway to educate the building owner membership about what is coming. The DowntownDC BID should offer ongoing peer-led workshops on specific energy efficiency technologies, facility management strategies, and tenant engagement strategies for DowntownDC BID staff (property managers, engineers, and others interested in energy management), where leading buildings within the DowntownDC BID (those with Energy Star scores over 75) share some of the secrets to their success in optimizing building energy performance for office and multifamily properties, and work with tenants and residents to achieve leading energy efficiency in the region. A focused awareness and education campaign by the DowntownDC BID will offer all its members the best chance to exceed the median energy performance for their building type and avoid the first set of BEPS compliance requirements. For those who fall below the median, the DowntownDC BID awareness and education campaign will help them hit the ground running and be prepared for the ambitious energy reduction and prescriptive pathway requirements of the BEPS program.

4. **Energy efficiency education** (Begin awareness and early education now, and evolve offerings as implementation occurs.)

   Start early and evolve those offerings through the long life cycle of the program. This is not a five-year undertaking. This is a 15- to 20- to 30-year undertaking, and the DowntownDC BID has a role to play during that entire period. Recognizing that the greatest educational need is for owners of older, small to medium-sized class B and C office properties, develop education and training for these building owners. First provide education on the requirements, measurements, and timing. Then provide training on energy audits, energy efficiency solutions, cost/benefit analysis, and decision-making. Make this education and training relevant to the audience. Provide both in-person classes and webinars. The owners of large, class A buildings are already knowledgeable and ready to act. They should be called upon to share their knowledge and experiences. Volunteer to work with the Hub and its contracted provider to educate, mentor, and share case studies.

   Based on the DowntownDC BID's benchmarking data and analysis, identify below-median properties, then target with further assistance. This includes energy benchmarking assistance, helping members find out what their score is and what the likely median is going to be. For those members who are likely to fall right on the edge or below the median, help them start to plan for meeting the requirements. Part of that is energy audit support to plan the approach. Doing an energy audit can inform members about what their building needs to do for the actual implementation process.

5. **Toolkit of possible energy initiative projects** (Begin development of toolkits now, exploring availability in the industry first.)

Develop a toolkit of possible energy initiative projects. Provide example energy retrofit initiatives and timelines for various property types, sizes, and ages. Again, larger, more experienced building owners and their service providers will be able to help develop these.

6. **Workforce training** (Begin developing programs now, and continue until other programs supersede the need.)

   It is very difficult today to find people such as janitorial staff, building management staff, and building superintendents who are qualified to run buildings. As they implement these energy Initiatives, buildings are going to become even more sophisticated and systems more complex. Many property managers, building engineers, and janitors do not have the knowledge to operate the building in its current state on the most efficient basis, for example, correctly setting hours and temperatures for heat and cooling. With 78 full-time ambassadors and a large DowntownDC BID member workforce in the services industry, the DowntownDC BID has a unique opportunity to provide or support workforce development training for jobs in D.C.'s growing green economy. Training people to run high-performance buildings is a pathway to a career, and the DowntownDC BID can take a very important role in finding people, training them, giving them ongoing education, and creating a crop of skilled technicians, not only for the DowntownDC BID but for D.C. at large.

   As DOEE and other programs look to develop and staff their workforce development programs, the DowntownDC BID should offer training programs for its ambassadors and other service employees, providing courses directly or through other organizations. The DowntownDC BID should add more advanced classes about operating changes that will be necessary as new technologies are installed and find knowledgeable resources who can provide technical assistance to those who have questions or issues during implementation. As DOEE, the DCSEU, and the Hub stand up and expand their workforce training programs, the DowntownDC BID may elect to focus on publicizing these training opportunities over DowntownDC BID–generated courses, but it will be valuable for the DowntownDC BID to hold some of these evolving training programs inside the BID, to ensure easy access to trainings for DowntownDC BID ambassadors and other DowntownDC BID employees.

RECOMMENDED TRAINING COURSES

- A basic energy and sustainability certificate program to train workers in no-cost facility management and tenant/resident engagement in energy efficiency and sustainability. This short course could be taught pro bono by local energy and sustainability professionals in the D.C. area and include an energy and sustainability certificate upon completion.
- A more advanced Certified Energy Manager (CEM) course, which confers an important professional designation on participants who complete the program. Although this program requires relevant experience helping manage building energy systems, it does not require a college degree for eligibility. CEMs are authorized to do both energy audits and energy performance verification in D.C. and other municipalities, and because all D.C. buildings are required to perform verification of their energy performance, these professionals will be in high demand for this new market.
- The International Facility Management Association (IFMA) offers a training program that is more accessible to all than CEM certification. The IFMA collaboration with the Royal Institution of Chartered Surveyors (RICS) provides additional educational resources to help facility managers find proven solutions to industry challenges, increase their knowledge base, and stay informed about industry trends. These learning resources are available on www.fm.training. Additional continuing education resources online at www.fm.training offer opportunities for facility managers to accrue continuing education units, increase industry knowledge, and sharpen skills. Suite of Credentials and Professional Qualifications: Facility Management Professional (FMP); Certified Facility Manager (CFM); Sustainability Facility Professional (SFP); RICS Chartered Qualification (MRICS); RICS Associate Qualification (AssocRICS).

The DowntownDC BID should provide all member owners with a list and contact information of all the trainees who earn a new certification or complete a course, to help them get hired for new positions in the new green economy. This will connect these trained individuals, similar to the DowntownDC BID ambassador program, to organizations and buildings that can offer them positions appropriate to their training.

Implementation and Best Practices

7. **Case studies** (Begin outreach to find case studies immediately and continue as technologies evolve or others supplant need.)

Nothing is more compelling than the evidence of an actual peer building project. DOEE is already engaged to spend about $250,000 to do some case studies. The DowntownDC BID can supplement those case studies by creating case studies that are specific to the DowntownDC BID. Provide case studies of existing building energy retrofits at the small/medium and B or C class level. Offer opportunities to hear those involved in these case studies present directly and respond to questions. Sustainability officers of larger building owners in D.C. would be a tremendous resource for education, training, case studies, and mentoring. Sustainability experts are extraordinarily willing to share their knowledge and experiences. One place those case studies can be used is in forums for sharing best practices such as workshops that can be convened by the DowntownDC BID, tours of buildings that have already achieved BEPS compliance and are exceeding compliance, and online content like webinars—not necessarily created by the DowntownDC BID, but perhaps facilitated by the DowntownDC BID.

8. Qualified service providers

Provide a list of pre-vetted energy efficiency contractors, consultants, and service providers. Come up with a list of qualified service providers pre-vetted by the DowntownDC BID, such as designers, engineers, contractors, so that smaller owners in particular, who may not have a stable of vendors who are able to do this work, can hit the ground running with people who have already been vetted. Access to experienced, knowledgeable, proven vendors will reduce risks of falling short of expectations or incurring cost overruns. Members and leaders across the country can help develop and vet this list.

9. Connect members to investment sources

Although many DowntownDC BID building owners will have the resources to invest in cost-effective building upgrades themselves, some owners will benefit from the wide range of new financing products available for energy efficiency and renewable energy investments in their buildings.

The DowntownDC BID should offer a comprehensive list of D.C. financial resources, such as the new Green Bank, C-PACE, Fannie Mae Green Mortgage, and the like, as well as private sources that have funded similar projects for building owners. This is particularly important for smaller owners of class B and C commercial buildings. Capital is abundant now and relatively cheap for the big players, but for the smaller players, D.C. financial sources are important. The DowntownDC BID can assemble a forum to educate members about the availability of these financing sources and to make connections between owners and potential financing sources, that is, connections both up and down.

The DowntownDC BID should hold a "finance forum" in 2019 to help its members learn more about the financial tools available to them. All of these tools offer owners the opportunity to make the investments needed to comply with BEPS in a way that can be cash-positive from day one and can help owners more easily pass capital costs on to tenants (who will benefit from the energy savings). Holding a forum in 2019 will be especially important for owners to access capital from the DC Green Bank and the DCSEU, because early applications for projects will help ensure that DowntownDC BID buildings are "first in line" for these opportunities, in case the approval process is slow or these funding sources are oversubscribed.

The DowntownDC BID should continue to make owners aware of these financial programs through the BEPS compliance cycle on at least an annual basis and have DowntownDC BID members who have taken advantage of these programs help provide future trainings—walking other owners through the cash flow analysis that made these financed energy efficiency retrofits a good investment. Because the incentives from the DCSEU and renewable energy credit prices will change frequently, these refresher trainings will be an opportunity to get new incentive programs in front of DowntownDC BID members in a timely manner.

Engagement and Connections

10. Refine BEPS

The DowntownDC BID should participate as actively as possible in the refinement of BEPS, because the details have not yet been established. The DowntownDC BID can play a role in bringing its members to the table to participate in the development of those details to ensure things like an effective but not excessive set of penalties or fines for owners who do not meet the standards, especially in light of the two-and-a half-year effectiveness timeline, which is not a very long time for building owners to effect changes.

The DowntownDC BID should encourage its members to attend the working group meetings and encourage representatives from D.C.'s building owners to speak up. They can assist the DOEE to understand the effects of the proposed BEPS and any unanticipated potential consequences. Make sure that the prescriptive pathways are well crafted and take care of nuances, such as ensuring that changes in occupancy are properly reflected in the calculation of the performance score at the beginning and at the end of the performance evaluation periods. The DowntownDC BID should also ensure that the rules allow development of an energy efficiency trading scheme.

The DowntownDC BID can provide the DOEE with ideas for positive motivation approaches rather than penalties to motivate building owners to implement best practices in energy efficiency. Those who fall short of targets are least likely to be able to bear the penalties. The DowntownDC BID and its members should ensure that D.C. understands how punitive penalties could further erode the value of downtown real estate in an already soft market. The DowntownDC BID should be at the table to help D.C. develop a penalty structure that is stringent enough to promote compliance, but not so stringent as to erode value or cause building owners to flee the D.C. market. The DowntownDC BID may even want to go so far as to get out in front of this issue and propose a reasonable penalty structure. Such a structure will need to address the short timeline for the mandated improvements, which has been discussed previously. Since building owners may have as little as two and a half years to achieve their mandated reductions before they are measured, the penalties should be light for the first two years and kick in more seriously in the third year.

The DowntownDC BID should strongly register its support of D.C.'s absolute goals and weigh in on the feasibility of BEPS phase one. However, the DowntownDC BID should weigh in on some of the potentially problematic requirements of BEPS as well, including the feasibility of its second and third phases, especially the unpredictability of the increasingly stringent standards and the concern that some buildings may be required to undertake round upon round of improvements. The DowntownDC BID should advocate for the definition of "good enough"—the point at which a building has successfully completed its energy efficiency improvements.

With respect to the implementation of BEPS, the DowntownDC BID should be a strong advocate for a D.C. government organizational structure that is streamlined and has centralized accountability for all aspects of the implementation, from training to financing to enforcement. The DowntownDC BID should also advocate for a robust enough suite of supporting programs, be they run by D.C., catalyzed by D.C., or developed by others.

11. Business leader engagement with D.C. government

Given the nature of the business present in D.C., a close partnership has not existed between business leaders and D.C. government. Over the long run, the DowntownDC BID could play a major role in facilitating better communications about BEPS within the private sector and between the private sector and D.C. To be more effective, building owners will need to speak with a larger, collective voice. The DowntownDC BID, or the DowntownDC BID in association with the other BIDs, could be the convener and spokesperson, with the understanding that an ongoing dialogue with the membership will be needed as BEPS rolls out over time. It could also provide a forum for discussion between the DowntownDC BID membership (and perhaps other building owners) and D.C.

The Clean Energy DC Omnibus Act warrants every effort for business and the D.C. government to collaborate.

SUCCESSFUL MODEL FOR BUSINESS LEADER ENGAGEMENT

The Boston Green Ribbon Commission is a group of business, institutional, and civic leaders in Boston working to develop shared strategies for fighting climate change in coordination with the city's Climate Action Plan. The commission provides a forum for representatives of the private sector and the city to discuss, plan, and act on the opportunities, challenges, ideas, and requirements of preparing Boston to meet the imperatives of climate change.

BOSTON Green Ribbon COMMISSION

The panel acknowledges Boston's Green Ribbon Commission as a successful model and recommends the DowntownDC BID form a small group of C-suite executives available to confer with D.C. government leaders and the DowntownDC BID's clean energy champion to confer on a quarterly basis about major achievements, challenges, and any needed course correction.

12. Support tenant engagement

Give owners tools to educate and influence occupant behavior. Assist members with tenant engagement to educate and influence occupant behavior. Develop and share a model green lease and best practice tenant improvements, including Energy Star and other incentives.

Follow-Up

13. Implement continuous monitoring, feedback, and improvement

As a leading association of building owners, the DowntownDC BID and its membership could play a number of very positive roles in the rollout of BEPS. In the near term, the DowntownDC BID should be weighing in on the rules as they are developed and on the structures that will be necessary to support the implementation of the ordinance. Over the long term, the DowntownDC BID could lead in developing and maintaining communications channels within the private sector and between the private sector and D.C., including ensuring that D.C. and the private sector have a source of accurate information about the BEPS requirements and on the progress of BEPS. Throughout, the DowntownDC BID should be encouraging its membership to provide feedback to the DowntownDC BID leadership and to D.C. officials about the implementation of the BEPS. Provide feedback to the DOEE and BEPS task force on all issues encountered together with suggestions for remedies to improve processes and expedite building improvements. An early feedback and recommendation session with DOEE before BEPS and the Green Bank are finalized and launched would be beneficial to ensure more streamlined processes and reduce time and frustrations for building owners to undertake the needed initiatives to accomplish the Clean Energy DC Omnibus Act objectives.

Monitor and aggregate the experiences of the DowntownDC BID members in all phases of planning and implementing energy efficiency initiatives, for example, permitting, approvals, funding applications, incentives, and rebates. Keep members updated. Partner with task force members to produce annual reports on the progress of BEPS. The DowntownDC BID can conduct an annual awareness effort when Energy Star scores come out, recognizing the leaders and the buildings that made the greatest improvement in energy efficiency for the year with awards and visibility for their accomplishments, and highlighting cost-effective energy efficiency projects by DowntownDC BID members. Further, the DowntownDC BID can offer a program to welcome new members to the (green) DowntownDC BID, to make new owners aware of their buildings' past performance, and to offer opportunities and resources to help them drive performance improvement. New ownership will be the best time to think about financing major building improvements, starting to introduce green leases, and introducing a new building "culture" of energy efficiency and sustainability.

Recommended Near-Term Actions for DOEE and D.C.

The Clean Energy DC Omnibus Act is an inspirational and aspirational vision for D.C. It can result in D.C. being not only a world leader in addressing climate change and achieving the levels necessary to do its part in reducing global warming but also a significant driver of D.C.'s economy in the future. Becoming a green economy, fostering innovation, technology advancement, and the incubation and advancement of new technology companies can substantially affect D.C.'s economy. It can draw businesses to D.C. and provide jobs, jobs of the future, providing the citizens of D.C. with opportunity for themselves and their families.

Having announced this vision, successful implementation is essential. It will take everyone working together to achieve this green economy vision for 2050. The DOEE and D.C. play the pivotal role in ensuring that every D.C. stakeholder is engaged and excited about this opportunity and is working in a collaborative partnership to achieve benefits for all.

1. Communication and PR campaign

Develop and launch a public relations campaign to excite and engage all D.C. stakeholders (residents, businesses, investors, workers, etc.) in the D.C. 2050 vision. Communicate broadly, frequently, and with full transparency. Make the Washington, D.C., green economy

of 2050 the common vision of all. Explain to each constituency why the green economy benefits them.

2. Clean Energy DC champion

The panel heard from multiple stakeholders about a perceived lack of clarity about who in D.C. owns these initiatives. Transformational change requires a champion, a single individual who is a visible, passionate leader. D.C. needs to identify the D.C. government Clean Energy DC champion who is accountable for accomplishing the Clean Energy DC Omnibus Act goals on behalf of the mayor. That individual needs to evidence ownership and be a strong advocate, a good listener, and a visible decisive leader. The Clean Energy DC champion needs to have the authority and resources to successfully accomplish the goals. Likely within DOEE, the champion is someone who can be accountable to the mayor for accomplishing the goal as laid out in the Clean Energy DC Omnibus Act. Having that point person and being very clear to the building owners and to all the other stakeholders about who that individual is will go a long way in terms of supporting achievement of these goals.

3. Deployment of resources now

Although the panel's primary recommendation is that the initiatives are rolled out thoughtfully, the panel encourages a sense of urgency to progress as quickly as prudently possible. For example, the market's understanding of BEPS and how it will be specifically implemented, and the availability of Green Bank funds, will affect building owners' attention to the projects they need to undertake and the timing of launching them to accomplish the targets before the deadlines. Having encouraged moving forward expeditiously, the panel is still emphatic that the building community be consulted and heard during the development of BEPS, funding sources, and any thoughts on organizational structure and processes to ensure timely approvals.

4. Education and training

The panel is very impressed with the commitment that has been made to create the Hub for assistance, education, and training. To achieve the 2032 goals and beyond, the Hub will need to play a permanent role. Technologies will continue to evolve. Innovation will be essential to success. As progress occurs, the Hub will need to be the place to turn to for all participants to continue to improve and stay at the leading edge. D.C. needs to provide all the support needed for the Hub and its contract service provider to educate, train, and foster innovation. Ensure the contract service provider collaborates with building owners and BID representatives (universities and other experts) to share existing knowledge and best practices and to foster innovation and analyze the potential of new technologies. Support the Hub for the long term. The panel recommends examining what kinds of steps and resources are going to be necessary to allow the Hub to continue to play that role into the future. The panel understands that grant funding is available for a certain number of years and urges D.C. to think very carefully about what it will take for this entity to be able to sustain itself and continue to work productively with building owners and other stakeholders moving beyond that initial grant-funded period.

5. Expediting processes

Think about what D.C. can do to streamline, simplify, and speed up the processes that building owners have to go through to achieve positive motivation. The first BEPS compliance deadline, 2026, is rapidly approaching (and the measurement accomplishment year actually starts in 2024), thus streamlining the organizational structure, processes, permitting, and incentive applications will materially reduce risk and increase probability of successfully achieving goals. Building owners and BID leaders can inform the DOEE, BEPS task force, and others about the delays or roadblocks they encounter in processes. Immediate alignment of building codes with current laws and regulations, including the latest Clean Energy DC Omnibus Act laws, will help clarify to all parties what is allowable today. Coordination of all agencies, including DOEE, DCRA, and the D.C. Office of Planning, to streamline and simplify responsibilities will be key in making strong progress in the initial years (2020–2023) when most of the BEPS phase one retrofits need to occur for the 2024–2025 performance measurement period. The panel urges all D.C. stakeholders to create workflow plans and timelines for all approval processes. Making them as simple and unencumbered as possible and clearly communicating them to the building industry will expedite the entire program and demonstrate to the building owners the sense of urgency and importance D.C. attributes to this program.

6. Positive motivations

Building owners will be far more motivated to move forward if targets and time schedules are certain. When setting BEPS deadlines, eliminate as much uncertainty as possible and the possibility that goal posts will be changed at later dates. BEPS phase one will be fairly easily accomplished by larger assets. However, medium/smaller, older, class B or C assets may have more difficulty. In addition, knowing that after the first phase, the next round of targets may require more building efficiency initiatives, owners may hesitate, not knowing whether what they do in phase one will make economic sense after the second compliance round is announced.

The D.C. government is in a powerful position to offer incentives. Ultimately, positive incentives will be better motivators for faster and greater change than penalties for falling short. Along these lines, an award program to recognize strong performance of those who embrace this challenge and go above and beyond is an excellent step. Recognition of strong performance and wins will create competition and motivation in a positive, receptive atmosphere. The fines that D.C. develops should recognize the challenge of this BEPS compliance timeline and should be phased in over three years of noncompliance (starting low in 2026 and increasing over time if performance does not continue to improve).

As mentioned in the previous DowntownDC BID recommendation section, peer case studies provide the strongest evidence to building owners. The panel strongly recommends selecting a small number of energy efficiency projects of various property types, ages, and sizes to become demonstration projects, focusing particularly on smaller, class B or C properties, including multifamily and office. The DOEE, DCSEU, and the Green Bank should provide financial and experienced, knowledgeable technical support for these projects, including doing energy audits, developing energy efficiency project alternatives that range from the free/quick payback to deep retrofit and continue through execution and completion of the project. DGS can contribute technical experience and lessons learned as well. The panel is convinced that these projects can be completed at an acceptable ROI and will provide the compelling evidence that the final retrofitted building is in a stronger competitive position in the market, thus benefitting the building owner.

7. Funding

The establishment of the Green Bank is an important component of accomplishing the Clean Energy DC Omnibus Act targets. The panel is pleased that the plan is to grow the available funds to a significant level to support projects that are unable to source market funds. Larger, class A properties have access to plenty of capital in today's markets at reasonable, even low interest rates. The panel encourages the Green Bank to focus its funding where needed most: smaller buildings, class B or C buildings, affordable multifamily housing, or those with rent-controlled units. In addition, educating these types of building owners about all sources of funding, such as PACE financing, Fannie Mae green mortgages, and the like, will be of benefit.

MARTA SCHANTZOU

D.C. Partnerships with Federal Agencies to Achieve Goals

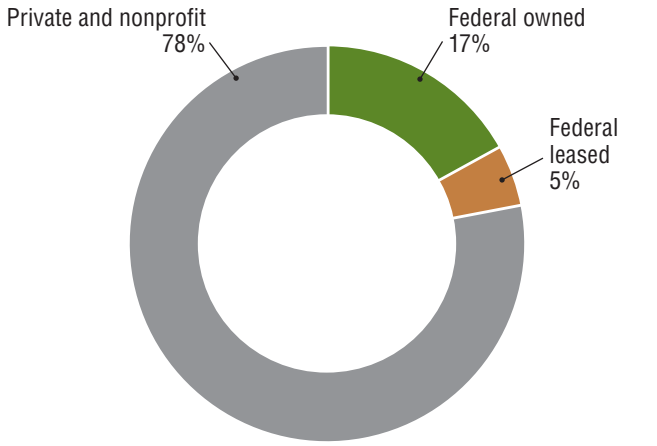
D.C.'S SUSTAINABILITY GOALS EXIST within a stakeholder ecosystem that includes federal agencies, local government, and the private sector. All share long-term goals related to building and participating in a green economy, and this alignment presents powerful opportunities to advance sustainability practices while supporting D.C.'s sustainability goals.

Because D.C. commands both state and municipal authorities, and because of the strong federal presence, D.C. has more opportunities than most cities to leverage the federal government in pursuit of its sustainability goals. To be a true international leader on sustainability, D.C. needs to demonstrate not only how to achieve its sustainability goals, but also how to achieve them with partnerships that can yield broad benefits such as information sharing, project collaboration, and reduction of market uncertainty.

Opportunities from the Federal Presence in D.C.

Although D.C. derives no property taxes from federal buildings and cannot obligate the federal government to comply with the Clean Energy DC Omnibus Act and other District requirements, federal buildings and lessees are nevertheless critical partners to D.C.'s sustainability efforts and can help support achievement of D.C.'s sustainability goals. Specifically, the federal government can reduce barriers to investment in green building technologies by performing research, scaling investments, and sharing information. This reduces risk and uncertainty for the private sector and helps facilitate private investment in green outcomes. However, this virtuous cycle is not automatic. It requires deliberate encouragement, coordination, and information sharing, and the D.C. government is uniquely positioned to support this collaboration. In the analysis that follows, the panel assumes that DOEE represents the D.C. government.

Ownership of Built Space in the DowntownDC BID



Source: DowntownDC BID.

As noted earlier, strong partnerships between D.C., the federal government, and the private sector are possible and could strongly support the achievement of sustainability goals. DOEE is a critical connector in this process and needs to structure itself to proactively facilitate collaboration with its cross-sector counterparts. DC's Clean Energy champion should serve as a node for information exchange and relationship formation, identifying ways to align private and federal interests with District priorities. The champion should therefore designate a relationship manager who is responsible for interfacing with private-sector partners and federal agencies and for providing regular updates to stakeholders within DOEE and beyond. The DowntownDC BID could represent the interests of building owners and coordinate private-sector collaboration with DOEE. Activities might include sharing information, gathering feedback, publicizing meetings and events, and sharing this information with other BIDs to maximize efficiency.

The federal government is the largest employer in both the DowntownDC BID (33 percent) and in D.C. as a whole (24 percent). The federal government owns 17 million square feet of space in the DowntownDC BID and leases another 5 million, for a total of 22 percent of total built space in the DowntownDC BID and almost 30 percent of office space.

The Positive Influence of the Federal Government on D.C. Sustainability

GSA is the federal government's property management agency, commonly referred to as the "government's landlord." It is responsible for all federally owned buildings and lease agreements and has been an early and aggressive adopter of sustainability measures. The GSA's National Capital Group is responsible for GSA buildings and leases within the DowntownDC BID. The GSA adopted LEED standards for its own buildings in 1999 and requires lessors to report their Energy Star scores. All federal leases over 10,000 square feet must be in buildings that earn an Energy Star label (scoring 75 or better). Given the substantial federal presence in D.C., the GSA's sustainability requirements have moved the needle on sustainability within D.C.'s office market and are one reason why Energy Star scores within D.C.'s office market are on the whole higher than in most cities in the country. Indeed, if all building owners and tenants approached energy efficiency like GSA, the state of sustainability in D.C. and other cities would be more advanced. Despite these aligned interests, staff turnover at DOEE has resulted in the GSA not being involved in discussions about the D.C. government's sustainability goals, particularly the Clean Energy DC Omnibus Act.

In addition to the GSA, other federal partners include DOE, which is a leading federal partner in sharing information about green leasing and whose substantial expertise in building energy efficiency can directly support D.C.'s sustainability goals. DOE's Green Lease Leaders, for example, serves as a clearing house for sustainability-focused leases and includes models, case studies, and technical assistance resources. DOE also runs the Better Buildings Challenge, in which the DowntownDC BID has been a participant for multiple years. And of course, EPA runs Energy Star. Bringing representatives from those programs and those agencies to the DOEE table and making them part of the process would contribute knowledge and resources and, specifically, they can be immediately helpful in terms of helping establish the parameters for BEPS for different building types. DOE also has substantial capacity to analyze building energy consumption and the impact of various sustainable technologies. Significantly, DOE could help establish parameters for BEPS for different property types, and the GSA could complement these parameters by sharing technological insights. As D.C. seeks to position itself as a national leader on sustainability issues, the partnerships it develops with federal agencies have the benefit of being able to scale to other cities.

Recommendations for DOEE and the DowntownDC BID to Engage

Opportunities abound for DOEE (and the DowntownDC BID) to engage productively with federal agencies. Examples include the following:

- Inviting their participation in task forces and other advisory bodies, such as the task force that will convene around BEPS and other energy conservation and renewable energy targets.
- Sharing models and information from work around the country to support private building owners' ability to adapt to sustainability targets.
  - The GSA owns 10 LEED Platinum and 49 LEED Gold buildings. These constitute 24 percent of GSA's owned portfolio, and nearly one-third are historic. GSA could share data or case studies about energy consumption within these buildings and about specific energy-saving technologies it has deployed.
  - The agency's Proving Ground program can also provide case studies and information that can benefit both DOEE and the DowntownDC BID. GSA's Proving Ground program works with third-party evaluators to test innovative pre- and early-commercial building technologies in federally owned buildings. GSA pilots and assesses building technologies, partners with DOE to assess their impact, and identifies those that have broad deployment potential. To date, GSA has identified 23 energy-saving technologies, deployed 14, and saved an estimated $7 million annually as a result.
  - The GSA's Pilot-to-Portfolio Program could also provide data and information to support the deployment of energy-saving technologies at different parts of the building life cycle, from new construction to retrofits and end-of-life replacement.
  - In conjunction with the Department of Defense and DOE, the GSA conducts a High Performance Building Certification System Review every five years, through which it assesses multiple building performance assessment systems, like LEED and the Living Building Challenge, and determines which systems to deploy across the federal government.
  - GSA regularly publishes sustainability-focused reports. It will be releasing a paper on grid-integrated high-efficiency buildings in the next few months and is planning a related pilot. It is also pushing a number of initiatives focused on health and well-being in federal buildings. DOEE can leverage GSA's research to educate building owners and support local sustainability goals.
- Facilitating local information exchange:
  - DOEE has local opportunities to engage GSA by sending speakers to events like GSA's bimonthly Thursday lunch forums. These meetings provide opportunities for DOEE to share information, seek feedback from, and grow relationships with GSA as D.C. develops rules, regulations, and pilots to support the achievement of its sustainability goals.
  - These local relationships also present opportunities for DOEE to share new developments with building owners and groups like the DowntownDC BID. For example, GSA is working to extend its leases for longer periods (five-year firm, 10-year full), which will affect local building owners.
- Partnering on local energy projects:
  - Because of D.C.'s unique authorities, the D.C. government has the ability to create micro-utilities, such as a neighborhood-level microgrid. Such a pilot would provide innovative opportunities to support renewable energy production goals by partnering with GSA, which could be an anchor customer and power purchaser. This is critical, because while the GSA's statutory authorities do not allow it to produce power, they do allow it to purchase energy from a utility. By leveraging the GSA's presence in the DowntownDC BID and its buying power, both DOEE and the DowntownDC BID could ensure the feasibility of a microgrid pilot.
  - Other opportunities for partnering around renewable energy generation could include turbines in storm sewers that use storm events to generate electricity. A federal partner's demand, expertise, and resources can help improve feasibility and reduce costs.

MARTA SCHANTZ/ULI

Additional Areas of Focus: Policy Touchpoints to Help Meet Goals

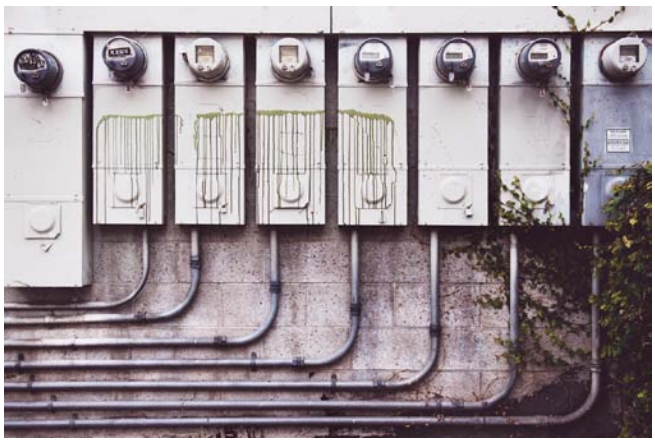
THE D.C. GOVERNMENT COULD FACILITATE BEPS implementation through a variety of means, including the development of ordinances, the creation of supporting structures, the improvement of its organizational effectiveness and communications, and the exploration of some more cutting-edge GHG emissions reduction strategies in the long term.

Near-Term Actions

Several laws and ancillary programs could be passed in the near term that would help new construction and existing buildings reduce their energy use and greenhouse gas emissions.

Tenant Spaces

One possible law could help reduce commercial tenant energy use, which constitutes 50 to 70 percent of the energy use in commercial office buildings and is difficult to address since it is not controlled by the building owner. Most commercial tenants in D.C. are not submetered, so they do not know how much energy they consume, nor do they pay directly for their



consumption. A bill requiring commercial tenant submetering for spaces larger than 5,000 or 10,000 square feet would provide tenants with information, and if D.C. could go further and require that these tenants be billed according to the submeter, they would then have a direct financial incentive to reduce their energy use. Submetering should be required at a minimum for new buildings and should be considered for existing buildings, as has been done in New York City.

Appliance Efficiency

Another law could address the plug loads, which have become an increasingly large part of a building's energy footprint. Cities and states are preempted from creating more aggressive standards on products for which the federal government has created mandatory energy efficiency standards (not to be confused with voluntary federal standards such as Energy Star). However, a number of products, notably computers, monitors, servers, and televisions, have no federal energy efficiency standards. California has created aggressive standards for these appliances, which D.C. could adopt. Many states are adopting California's standards, and the Appliance Standards Assistance Project is a great source for model ordinance language.

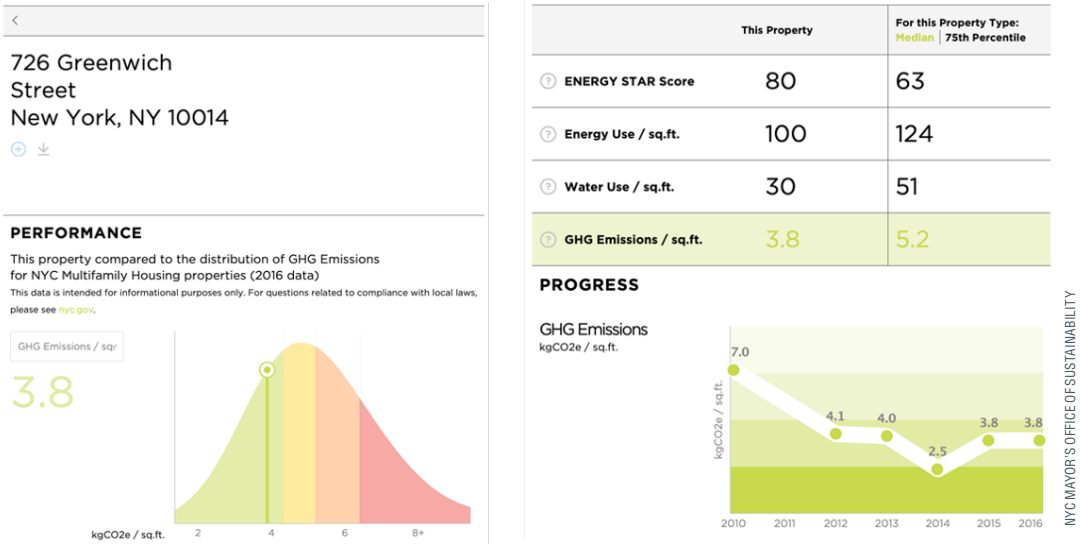
Steam Focus

D.C. has a fairly large number of steam-heated buildings, an older technology that is typically not addressed and that presents particular issues in reducing consumption and GHG emissions as well as in electrifying. Because GSA owns many of these buildings, D.C. should partner with the GSA to develop actionable information for owners of steam-heated buildings, and perhaps other resources.

Data Reporting

D.C. could support BEPS success through improving its reporting. How D.C.'s annual green building report will dovetail with the quarterly reports on the progress of BEPS that are mandated in the BEPS law is unclear. However these reports are ultimately packaged, D.C. should be providing far more analysis of D.C.'s building stock and how it uses energy and produces carbon. D.C. already creates an annual green building report. The panel understands that D.C. is going to be sending out performance cards in fall 2019 to owners of buildings larger than 50,000 square feet who reported benchmarking data. This is a great start and could be beefed up to provide more information to the industry about how D.C.'s buildings use energy and where some of the biggest opportunities are for improvement.

D.C. also has a website, which presents building-by-building benchmarking information. This could be enhanced to give more graphic information, such as in the bell curve shown at the lower left in the accompanying example graphic, which shows how a particular building relates to the cohort of its peers. The graph on the right shows the progress of energy use over time. The BEPS tracking report will need to have clearly defined indicators that are consistently tracked. D.C.'s benchmarking website should also be improved, including visualizations of each building's benchmarking history and how it compares to its peers. Over time, these kinds of graphs can help the industry understand how their buildings compare to others and whether they are making progress.



An example of benchmarking visualizations.

Codes and Zoning

Given D.C.'s building density, building sizes, current building codes, and available technology, it may be physically impossible and/or cost prohibitive for some buildings to achieve NZE solely with on-site renewable generation. To allow the maximum number of buildings to achieve NZE on site, and to provide an alternative compliance pathway for buildings that cannot, the panel recommends building owners and DOEE consider enhancements to the 2026 NZE new construction law.

D.C. should launch a working group to assess how D.C.'s codes and regulations could be upgraded to capture more energy reductions at the time of standard renovations and to remove impediments to efficiency upgrades from competing codes. This working group should address the various conflicting requirements for roofs, such as height limits, mechanical equipment setbacks, and requirements for green roofs, that are limiting the amount of solar that can be installed in D.C. Where possible, these conflicts should be removed. Then some projects could go further than they normally do and garner improvements from the natural cycle of renovations to foster more energy efficiency at the time of standard renovations. This includes creating policies that would enable the introduction of green technologies, such as batteries and fuel cells, so they can be introduced into projects.

Although the current building height limit in the DowntownDC BID has resulted in many buildings having maximum site density, for those that do not, allowing additional floor/area ratio (FAR) to help offset the additional cost of renovating to net-zero energy has been quite effective in other cities.

Enabling a property owner to rezone its property to a higher and better use can be another way to help offset costs.

Providing a mechanism for fast-track permitting for NZE projects can have a significant impact by helping the property owner reduce interest carry and increase rental revenue as a way to help offset costs. The panel suggests enabling prequalified contractors to pull permits for energy-efficient improvements, such as solar and battery installations, over the counter.

Currently rooftop solar is limited by a range of setback requirements, often reducing the amount of available roof space for solar to 10 percent of the overall roof. Allowing elevated and cantilevered solar canopies that extend beyond the building's roof (similar to the strategy used by the American Geophysical Union NZE building) will significantly increase the energy-generating footprint for solar, both reducing the cost per watt for installation and enabling buildings to offset a much more meaningful percentage of their electrical load. This will help the building owners come closer to meeting D.C.'s objectives, as well as give D.C. a more sustainable image.

HICKOK COLE

American Geophysical Union solar canopy.

To the extent that the buildings that are not historical are in need of reskinning, D.C. should enable property owners to insulate the exterior of the building without counting the exterior insulation as FAR.

Next Considerations

The proposals put forward thus far will be a tall enough order for D.C. and its building community to address in the near term, so some worthy strategies such as the following should be explored at a later date after the next 12 to 18 months.

Purchasing Consortium

D.C. should consider the development of a purchasing consortium for energy-efficient appliances, products, and services and clean power, which could bring down the cost of reducing energy consumption and GHG emissions for all buildings in D.C. Have this purchasing entity vet products through trusted industry experts, negotiate advantageous, high-volume pricing, and make them available to owners pursuing renovations. This can be a vehicle to drive economies of scale in purchasing power relative to commonly used energy-efficient products such as LED lights, task lighting, individual desk fans, solar panels, electrochromic glass, light sensors, controls, BMS software, and the like.

D.C. could catalyze the creation of such a consortium to be run by an entity that currently exists or a new one created for this purpose. This will enable the building community to band together with more negotiating clout to drive prices down. This purchasing power will save money as well as time for the owners, because they will not have to hire consultants to advise on or vet these products. This will also help level the cost playing field for the smaller building owners and make their retrofits more viable. It is going to especially benefit the smaller, weaker parties who have less negotiating power from the very beginning. The DowntownDC BID could develop such a consortium for its members as a pilot to help facilitate shared procurement for energy services, energy efficiency technologies, and on- and off-site renewable energy. Some of the most attractive shared procurement opportunities would include the following:

- Renewable energy procurement: Help all buildings in the DowntownDC BID lock in a baseload electricity rate at or below current wholesale power prices. This renewable contract would "float" across a large cross section of DowntownDC BID buildings, so that no buildings are financially punished because of vacancy or building turnover to new owners.
- On-site power purchase agreement: Several DowntownDC BID buildings could partner on a distributed power purchase agreement, solar lease, or community solar project. This would allow DowntownDC BID members to consolidate smaller on-site solar systems into a 500 kilowatt or 1 megawatt project—enough to secure better financing terms and to improve the ROI for solar (either through direct rent payment or through a share of the returns from the project).
- Master retro-commissioning (RCx) agreement: RCx is expensive, but studies show it can be one of the most cost-effective ways to improve building energy performance. A master RCx contract would reduce the cost for all DowntownDC BID buildings taking advantage of this valuable energy efficiency service.
- Efficiency-as-a-service contract: DowntownDC BID buildings could pursue contracts to upgrade high-ROI opportunities (like building controls, lighting, and residential appliances) with a contract that requires no upfront capital and includes full maintenance on the technology installed in the buildings. At the end of the contract (usually five to eight years), owners would get to keep the technology provided through this service contract and start seeing all the financial returns from their investment.
- Technology procurement: The DowntownDC BID could also explore a bulk purchase of energy efficiency technologies (LED lighting, building controls, insulation, high-efficiency windows, etc.), even for as few as two or three buildings going through construction or major renovation at the same time, to help reduce the cost of these technologies.
- Shared investment in next-gen construction: Currently D.C. has no deep-well geothermal buildings, but in many parts of the world this technology is the most cost-effective way to get to NZE buildings. D.C. owners could pool their resources to get one of these (very expensive) drills imported to D.C. for a big enough set of new construction and major renovation projects.

The Apartment & Office Building Association of Metropolitan Washington (AOBA) has demonstrated that shared procurement strategies can help building owners reduce their energy bills and lock in long-term price guarantees that reduce uncertainty: AOBA may be the organization best positioned to help broker these types of deals. D.C.'s public buildings, the GSA, or some of the larger real estate companies could also help anchor these procurement deals, bringing their neighbors into shared procurement contracts. If these organizations are unwilling or unable to provide these shared procurement programs to DowntownDC BID members, the DowntownDC BID should explore facilitating these programs itself, preferably through a contracted third-party supplier. Given all the near-term opportunities available to the DowntownDC BID and its members to accelerate energy efficiency downtown, the panel believes this shared procurement program should not be a near-term priority.

Tax Exemption for BEPS- and NZE-Related Upgrades

As an incentive to property owners to renovate and upgrade their property, the D.C. government should consider allowing all BEPS-related (and renovation to net-zero energy) costs to be exempt from D.C. capital gains taxes on sale. The lost revenue to D.C. would be minor. The owner would need to make the investments to qualify. D.C. would benefit from such investments in terms of meeting the clean energy goals and improving the quality of D.C.-wide building stock. Future BEPS lists likely will require yet more investment to meet standards. Weary owners who started the journey with D.C. to the ever

D.C. STORMWATER RETENTION CREDIT TRADING PROGRAM

D.C. has seen success with trading system models for compliance with sustainability goals through its Stormwater Retention Credit (SRC) Trading Program. Under the program, owners who can cost-effectively exceed the required stormwater management on site can receive stormwater retention credits (currently worth about $2 per square foot annually) to incentivize going above and beyond the law. Buildings can lock in an SRC sale price by selling to DOEE through the SRC Price Lock Program, or can sell SRCs in an open market to properties that have regulatory requirements for managing stormwater. Buildings that cannot cost-effectively meet D.C.'s stormwater laws can buy these credits from other buildings to meet their requirements. Overall the system has been a more efficient way for D.C. to achieve its stormwater goals and has provided an alternative compliance pathway for owners who could not physically or financially achieve the requirements of the D.C. stormwater regulations.

more sustainable and efficient future can pass their property torch with a small thank you.

Energy Efficiency Trading System

A second way to drive prices down for the community as a whole is to consider a DowntownDC BID–wide or, even better, a D.C.-wide energy efficiency trading system. This energy efficiency "cap-and-trade" program may be an attractive alternative strategy to drive compliance with BEPS. Buildings that have exceeded their efficiency targets can sell credits to buildings that are having trouble achieving their reductions, thereby allowing the market to find the least-cost way of achieving D.C.'s goals. If the credits are priced correctly and the cap is set at a level that ensures overall compliance with the BEPS energy efficiency goals, this type of market should be a more efficient and cost-effective way for D.C. buildings to collectively hit their energy efficiency goals. This not only helps D.C. fund the least-cost path toward the improvements it wants to see, but it also helps provide an additional incentive to building owners that want to go further faster because they can actually garner some extra financial benefits from "doing." A market that offers credits for "above and beyond" investments would also provide a financial incentive that may turn a long-payback, low-ROI project into something more financially attractive.

The panel recommends that the DowntownDC BID advocate for a DowntownDC BID–wide energy efficiency credit trading program, where buildings that achieve above-and-beyond energy efficiency performance improvement receive credits they can sell to buildings that are unable to achieve a 20 percent improvement or to execute the alternative compliance pathway. If the pilot is successful, the panel recommends that this credit program be expanded D.C.-wide and offered as an alternative compliance pathway in BEPS phase two in 2026.

Carbon Neutrality and Electrification

The panel also recommends enacting a legal requirement that all new construction be fossil free, which would ensure that new construction would automatically be carbon neutral when the grid becomes carbon neutral. This requirement would help new buildings avoid the cost of retrofitting to become carbon neutral at a future date, should that become a requirement for existing buildings. The current regulations are silent on building electrification (getting new and existing buildings and the grid off natural gas by 2032), but the panel recognizes this is an important part of any city's long-term decarbonization strategy. D.C. should phase out natural gas in new construction, possibly as early as 2026 (to align with the net-zero energy for new construction requirement). D.C. should set significant incentives for gas phase-out in existing buildings between 2026 and 2050, to help owners with this necessary but extremely expensive transition. The DowntownDC BID and the Hub should work to educate DowntownDC BID members on how to cost-effectively plan to phase out natural gas, to make this transition as smooth and cost-effective as possible.

NZE Incentives

D.C. could implement a wide range of efforts to help facilitate making NZE retrofits cost-effective and to help motivate building owners to drive their renovations in that direction. It is a major transformational effort to change the culture of the building industry to actually conduct NZE retrofits, as most do not have a clue about how to achieve NZE. Incentives that will help motivate owners to pursue deeper energy-efficient retrofits that D.C. can offer are as follows:

- As more building owners renovate their buildings to NZE, the demand for capable mechanical, electrical, and architectural design consultants will grow rapidly. To the extent that D.C. could help train or certify these design consultants to fill the new demand, it will help these types of projects move along more quickly for the building community and more smoothly for D.C.

SHARP DEVELOPMENT

A net-zero energy building.

- When building permit fees are calculated, do not include the cost of the energy-efficient improvements in the fee calculation.
- Subsidies from D.C. for design fees specifically related to energy-efficient designs would also help offset these costs.
- Create a 10-year tax abatement by not including the value of the energy-efficient improvements for property tax assessment purposes.
- Provide rebates or direct financial subsidies for qualified properties. These might be smaller buildings, which have limited financial resources and are likely to experience poor economies of scale on the cost of their retrofits.

Provide Off-Site Renewable Alternatives

D.C. could provide a cost-effective off-site renewable alternative, after a developer has done all it can to drive energy efficiency on site. Although D.C.'s NZE code should require deep investments in energy efficiency and expect developers to go beyond code in their energy efficiency efforts, once all cost-effective energy efficiency strategies have been executed, an alternative compliance pathway will be necessary for renewable energy for projects that cannot add enough on-site renewables to achieve NZE. Possible options for a compliance pathway could include requiring ownership of a renewable energy-generating asset in the D.C. region or the broader Pennsylvania–New Jersey–Maryland utility region, or requiring an owner to purchase renewable energy through the grid (or renewable energy credits) commensurate with the net energy consumption of its near-NZE building. At minimum, D.C. should clarify in the NZE regulations that D.C. community solar is a viable alternative compliance pathway for buildings that cannot generate enough renewable energy on site to meet NZE.

Longer-Term Considerations

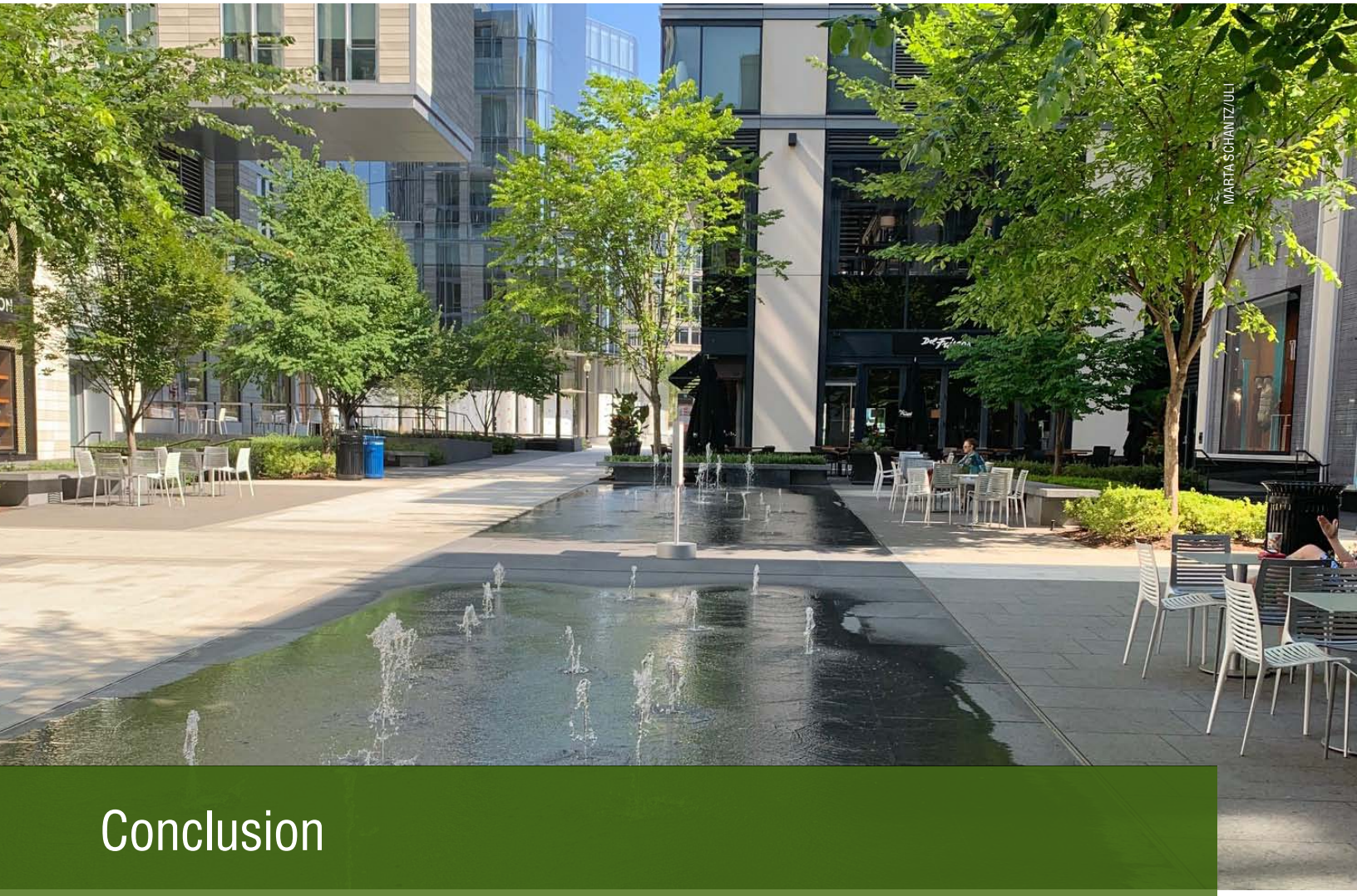
The following considerations should be explored over the next three to five years.

GHG Compliance Metric

D.C. could transition to GHG intensity as the metric for BEPS phase two starting in 2026. D.C. has already said it is going to be looking at potentially transferring from an energy efficiency metric to a carbon metric. That is complicated, but there are good reasons to consider it, given that carbon is what needs to be reduced in the long run. In that case a GHG metric would make sense as an alternative compliance path for BEPS. The panel recognizes the conflict between D.C.'s ultimate goal (GHG reduction) and the current primary compliance path for buildings (energy efficiency). The panel is glad D.C. is exploring the possibility of focusing on GHG intensity, starting in 2026. The panel thinks that sticking with energy efficiency and Energy Star is a good idea for BEPS; it gives some longer-term continuity and consistency to regulation, provides a well-known reporting framework, offers the chance to effectively benchmark and normalize performance data, and aligns with many other cities' strategies for tracking performance. GHG intensity may be an interesting alternative compliance path for some buildings under BEPS phase two—for the leaders (a chance to differentiate and move to net-zero carbon before 2032) and for the laggards (if they cannot achieve energy efficiency goals in the two subsequent phases of BEPS, they should be allowed a GHG intensity path as an alternative).

Embodied Carbon

Not everything related to GHGs and buildings is covered in BEPS and the NZE new construction code. The Clean Energy DC Omnibus Act does not address life cycle and embodied carbon of buildings, or their impact on other major carbon sources (transportation and waste). Leading global cities are working these "scope 3" GHG impacts into their master plans, and the panel assumes D.C. will want to do this as well. Cities are starting to look at reducing embodied carbon in new construction. Construction is incredibly carbon intensive, but there are ways to reduce that which will need to be pursued to achieve D.C.'s total carbon goals in the future. If D.C. does this, introducing the plan well in advance as a carrot rather than as a stick (for example, reduce embodied carbon by X percent, get a credit against your BEPS goals) and clarifying early on (10-plus years) when and how this will become part of building regulations and incentives may make sense.


MARTA SCHANTZ/ULI

Conclusion

THE WASHINGTON, D.C., VISION of being carbon neutral by 2050, of being the world's leading green economy, requires unprecedented market transformation. Having announced this vision, successful implementation is essential. Accomplishing the 2032 goals of the Clean Energy DC Omnibus Act in the built environment is no small task. It will take everyone working together to achieve this green economy vision by 2050. All the stakeholders in D.C. need to understand what is in it for them, and they must pull together on the journey. It is essential that the launch in the very near term gets off to a strong start.

Everyone must feel and act as if they are in this grand initiative together. Everyone must feel that achieving the goals is good for them. Everyone must be prepared to listen to, and truly try to understand, the issues and challenges faced by each stakeholder and be willing to collaborate and work to help and support others to reach the goals in a fair and economically feasible way.

The DowntownDC BID (and all BIDs in D.C.) can play an important role in ensuring members successfully meet D.C.'s goals. Building owners in the DowntownDC BID will benefit from strong outreach, education, and training. Appreciating that D.C., DOEE, DCSEU, and the Hub plan to eventually provide this support, the DowntownDC BID can serve its members well by providing them with early, high-quality programs customized to members' needs. The DowntownDC BID has often been a leader in D.C. Developing these programs to assist members during this enormous new effort and sharing the program formats with other BIDs would provide a tremendous service to D.C.

About the Panel

Lynn Thurber

Panel Chair
Hamilton, Montana

Thurber is chairman of the board of Jones Lang LaSalle Income Property Trust, an SEC-registered, nontraded REIT since 2011. She is a member of the board of directors of Duke Realty Corporation (NYSE:DRE) (since 2008) and a member of the board of trustees of Acadia Realty Trust (NYSE:AKR) (since 2016).

She was chief executive officer of LaSalle Investment Management (2001–2006) and was chairman of LaSalle (2007–2017). LaSalle is a global real estate money management firm with about $60 billion of assets under management, investing in private real estate as well as publicly traded real estate companies on behalf of institutional and individual investors. Thurber founded LaSalle's Global Sustainability Committee in 2007 and was chairman of the committee from 2007 until 2018, setting LaSalle's global policies, becoming an early signatory to the United Nations–supported Principles for Responsible Investment and submitting numerous LaSalle-managed funds to GRESB.

Thurber was global chairman of ULI July 2013 to June 2015. She has been active in ULI's climate and built environment initiatives for over 15 years, was a founding member of the Greenprint Center for Building Performance, and was chairman of the advisory board of ULI's Center for Sustainability and Economic Performance from 2016 until 2018.

She earned an MBA from Harvard Business School and an AB from Wellesley College.

Kevin Bates

Portola Valley, California

Bates is president and owner of Sharp Development Company, a commercial real estate company in the San Francisco area. He specializes in sustainable developments and renovations in the San Francisco peninsula. Sharp Development Company renovates buildings to net-zero energy and carbon neutrality with a very strong emphasis on the health and wellness of the occupants. The company has completed six net-zero energy projects and is currently in the process of driving an 82,408-square-foot manufacturing building in Fremont to net-zero energy while it operates two shifts in the building. These NZE buildings are 100 percent naturally daylit; use natural air ventilation, electrochromic glass, LED lighting, a sophisticated building management system along with other active and passive methods to naturally light and condition the space; and are done at a cost that is quantifiably more profitable for the ownership than a standard renovation to meet code. Bates is working to evolve Sharp's design methodologies, incorporating Kelvin-tuned lighting, power over ethernet, and outdoor solar canopies as well as various ways to bring nature into the workplace.

Before focusing on sustainable developments, Bates oversaw all aspects of the development process, including obtaining entitlements, design, construction, marketing, leasing, and the placement of all debt and equity for over 50 buildings totaling over 2.5 million square feet of space. Product types included office, research and development, retail, data centers, medical, manufacturing, and industrial. He also has extensive experience in the documentation and placement of ground leases.

Before Sharp Development Company, Bates worked as a commercial real estate developer for South Bay Development and as a loan officer for Union Bank. He received a BA in economics from Stanford and completed extension courses in sustainable design at UC Berkeley and UC Davis.

Billy Grayson

Washington, D.C.

Grayson is the executive director for the Center for Sustainability and Economic Performance at the Urban Land Institute, a nonprofit education and research organization that focuses on land use, real estate, and urban development.

As executive director for the Center for Sustainability, Grayson manages a team leading programs on climate risk and resilience, health and wellness, and building energy

and environmental performance. ULI works with members, community leaders, coalition partners, and other key stakeholders to build awareness around sustainability issues in the built environment and to provide ULI members with the tools and resources they need to cost-effectively drive sustainability into their projects and operations.

Grayson has over a decade of experience leading energy and sustainability initiatives in real estate, distribution, and supply chain operations. As sustainability director at Liberty Property Trust, he led a 500-plus building initiative that included green building construction, energy efficiency retrofits, and sustainability-focused property management strategies and tenant engagement. As vice president, social and environmental sustainability, for the Electronics Industry Citizenship Coalition, Grayson led a global compliance program working with the electronics supply chain to identify and mitigate environmental and human rights risks in their shared supply chain, as well as programs addressing climate change mitigation. As sustainability director at WESCO, Grayson developed an operational sustainability program that reduced energy, water, and waste, and launched a global marketing initiative for WESCO's sustainability-focused energy technology products and services.

He holds an MBA and a master's of public policy from the University of Maryland and a bachelor's in environment, economics, and politics from Claremont McKenna. He is a LEED AP and former board member of the Delaware Valley Green Building Council and NAREIT Sustainability Advisory Committee.

Laurie Kerr

New York, New York

President of LK Policy Lab, Kerr is a national leader in green building and urban sustainability policy. She is currently advising states and cities on the creation of second-wave efficiency policies to set them on a path to carbon neutrality.

As deputy director of New York City's Office of Sustainability under Mayor Bloomberg, Kerr led the development of the nation's first comprehensive green building and energy efficiency strategies, including the Greener, Greater Buildings Plan, the Green Codes Task Force, and the Mayor's Carbon Challenge. Subsequently, at NRDC, she founded the City Energy Project to help American cities adopt policies similar to New York's, an effort that now encompasses 35 cities, from Los Angeles to Chicago to Atlanta.

Her awards include the U.S. Green Building Council's Leadership Award, AIANY's Public Architect Award, and fellowship in the American Institute of Architects. She holds degrees in engineering and applied science from Yale, in applied physics from Cornell, in architecture from Harvard and is a licensed architect.

Bill Lashbrook

East Brunswick, New Jersey

Lashbrook began his banking career in 1973 at the Bank of New York. After 12 years as a corporate lender, he moved to commercial real estate lending. In 1993, he joined MidLantic Bank as the real estate credit officer and retained that role after that bank's merger with PNC in 1997. Lashbrook has taken on various roles within PNC in providing customers with debt and equity capital for real estate investment, internal risk management, and regulatory risk capital reporting for commercial real estate.

He has been a ULI member since 1998. He arranged ULI's first sustainability panel at the 2004 Fall meeting. Titled "It's Green and It Works," the panel played to a full house. Lashbrook went on to become a founding member of ULI's Climate, Land Use and Energy committee, a predecessor to the ULI Center for Sustainability. He has served on nine Advisory Services panels, including ULI's first panel focused on sustainability factors in Biloxi, Mississippi, in 2008.

Also at ULI, after many years as an Urban Development Mixed Use product council member, Lashbrook became an early member of the Responsible Property Investing Council and later one of the founders of the Redevelopment Reuse Product Council. He is a Governing Trustee of ULI, a ULI Foundation

Governor, and on the board of ULI's Women's Leadership Initiative. In 2018, he completed a two-year term as an Executive Committee Member of ULI Americas.

Other industry sustainability activities include the U.S. Green Building Council where he was vice chair of the New Jersey Chapter for two years and twice a speaker at Greenbuild. He has been a member of the Real Estate Roundtable for the past 12 years, sitting on the Sustainable Policy Advisory and Tax Committees.

Lashbrook graduated from Duke University in 1973 with a BA in political science and economics. He received an MBA from Seton Hall in 1976.

Alan Razak

Philadelphia, Pennsylvania

Razak is principal of AthenianRazak LLC, a Philadelphia-based real estate services and development company that consults on, creates, and manages real property. He has more than 40 years of commercial real estate experience, encompassing development and project management, finance, architectural design, and consulting. His diverse real estate background includes managing the development process, both as owner and on a consulting basis as owner's representative, and project types including residential, office, and commercial, as well as specialized expertise in data centers and other highly technical facilities.

AthenianRazak was formed in 2011 from the merger of Athenian Properties and Razak Company and has been responsible for the development of projects such as Main Line Jaguar Land Rover, Pembroke North Condominium, 5035 Ritter Road for the AOPC, the Curtis Institute of Music's Lenfest Hall, 833 Chestnut Street, the 76ers training and HQ complex, and the Ruby Match Factory in Camden. Consulting clients include Children's Hospital, Montgomery County, Swarthmore College, Digital Realty, Drexel University, Citadel Investments, Vanguard, and many others.

Before forming Razak Company in 2003, Razak was a principal with Radnor Advisors Inc., which was subsequently purchased by Insignia/ESG. In this role, he coordinated marketing and service delivery to data center and high-technology clients worldwide and managed the Philadelphia office's real estate consulting group. During the early 1990s, he focused on international real estate and technical consulting services for government and domestic financial institutions. For much of the 1980s, Razak was a partner at Rouse and Associates (now Liberty Property Trust), where he managed urban development projects in Washington, D.C., and the Philadelphia region.

Razak began his career as an architect. He has served on the Central Philadelphia Development Corporation's board of directors and is chairman of the board of the Philadelphia Shakespeare Theatre. He is a full member of the Urban Land Institute, former chair of its Responsible Property Investment Council, current chair of the Philadelphia District Council, and for over 20 years has written and taught several ULI professional education workshops for real estate practitioners internationally. He holds a BS in arts and design from MIT, a master of architecture from the University of Washington, and an MBA with a concentration in real estate from Wharton.

Jay Sholl

San Francisco, California

Senior vice president with CBRE Inc., Sholl has built a longstanding reputation as an innovative thinker, trusted adviser, and highly effective leader. He co-leads a multidisciplinary team that provides strategic planning, portfolio optimization solutions, and property development services for communities, nonprofits, corporate, health care, and financial institutions. He provides clients with strategic insights into negotiating and structuring acquisitions (lease or purchase), dispositions (sales and subleasing), build-to-suit or speculative development, and structure finance solutions. Recognizing the fundamental importance of creating healthy sustainable environments, he strongly advocates including sustainability strategies integrating health and well-being and corporate social responsibility policies into every transaction or development solution.

Sholl has extensive international experience working on strategic projects in Europe, Asia, and North and South America. During his career, he has held leadership positions domestically and internationally, including senior managing director with CBRE's Capital Markets Group, senior vice president and principal with the Trammell Crow Company, and development partner with Liberty Property Trust and Rouse Kent Ltd. Sholl serves on the executive board and is the president of the Northern California Chapter of CoreNet Global. He is a full member of the Urban Land Institute, serves on the Advisory Board of the Center for Sustainability and Economic Performance, and is a member of the Responsible Property Investment Council.

Sarah Sieloff

Oakland, California

Sieloff is the executive director of the Center for Creative Land Recycling (CCLR or "see clear"), a national nonprofit that promotes the sustainable, equitable, and responsible reuse of underutilized and environmentally impacted properties by educating, advocating, assisting, and convening stakeholders to revitalize communities through land recycling. CCLR works across the United States, including in Puerto Rico, and under Sieloff's leadership it has grown substantially since 2015. She has increased CCLR's annual fundraising, realigned its strategic direction, and established the organization's programs on the East Coast and in Puerto Rico. She also led the successful absorption of two East Coast nonprofits to expand CCLR's policy and advocacy work at the national level and spearheaded a national effort to protect catalytic U.S. EPA brownfields funding in 2017.

Before joining CCLR, Sieloff served as the Memphis Team Lead for the White House Council on Strong Cities, Strong Communities, where she led an interagency federal team that helped the city of Memphis better manage and leverage $25 million in federal funding. She has a background in international development, speaks fluent Spanish, and is a Truman Scholar. She earned her master's in public affairs from Princeton University and her BA from Eckerd College and previously served as a panelist or chair for ULI Advisory Services panels in Georgetown, South Carolina; Commerce City, Colorado; and Toa Baja, Puerto Rico.

Tom Eitler

Washington, D.C.

Eitler is a senior vice president for the Urban Land Institute, a nonprofit education and research institute that focuses on issues of land use, real estate, and urban development. The mission of the Institute is to provide leadership in the responsible use of land and in creating and sustaining thriving communities worldwide. Since 1947, ULI has been conducting panels that provide strategic advice to communities and organizations on a wide variety of real estate, planning, and urban design and public policy subjects. Eitler manages the professional team that makes these advisory panels possible.

He is an urban planner and land use professional with more than 25 years of experience in comprehensive planning, revitalization, historical preservation, transportation systems, economic development, and sustainable design. He is an expert on U.S. zoning law, municipal codes, and urban design and government operations. He has prepared and conducted hundreds of reports on community engagement plans, charrettes, advisory groups, workshops, and panels. Eitler has authored numerous plans, studies, strategies, and reports on urban planning, design, land economics, public administration, and real estate development. He was the principal author of ULI's *Ten Principles for Building Healthy Places*. He has directed projects in both the public and private sectors in a variety of locations throughout the United States, Europe, Middle East, Africa, and Asia.

Before joining the Urban Land Institute, Eitler was a principal with Community Planning Associates LLC, a land planning consulting firm based in Washington, D.C. Before that he was director of operations for the Onyx Group, a planning and architectural firm with offices in Virginia, California, and Hawaii.

Prior to that, he was a principal planner with a number of local governments, including chief of long-range planning for Prince William County, Virginia, where he established the county's first urban growth boundary initiative, Traditional Neighborhood Design ordinance, and financial guidance for its impact fee system.

He has a master's in urban and environmental planning from the University of Virginia's School of Architecture and three undergraduate degrees in urban studies, political science, and public administration. Eitler is a member of the American Institute of Certified Planners, the land economics society Lambda Alpha International, and the Dean's Advisory Board at the University of Virginia's School of Architecture.

Marta Schantz

Washington, D.C.

Schantz is the senior vice president for the Greenprint Center for Building Performance at the Urban Land Institute, 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, Schantz leads Greenprint and its members as they strive to reduce greenhouse gas emissions 50 percent by 2030.

She brings deep experience in the real estate sustainability market to lead and collaborate across organizations and stakeholders to achieve program goals and successes. Before her time at the Urban Land Institute, Schantz worked at Waypoint Energy providing energy efficiency consulting and program management services to utilities and real estate, and before that she worked at Booz Allen Hamilton on the federal energy consulting team on projects ranging from commercial building efficiency to nuclear energy finance. Her early career started as a cost analyst with the U.S. Department of Energy.

Schantz is a LEED Green Associate and a Fitwel Ambassador. She holds a BS in biological engineering with a minor in science technology and society from the Massachusetts Institute of Technology.

Michaela Kadonoff

Washington, D.C.

Kadonoff is the meetings and event's associate at the Urban Land Institute, a nonprofit education and research organization whose mission is to provide leadership in the responsible use of land and in creating and sustaining thriving communities worldwide.

She has joined numerous Advisory Services panels since coming to ULI in 2019. In her role as associate, Kadonoff manages the Advisory Services panel logistics and coordination as well as assists with the planning of ULI's Annual Fall and Spring meetings.

Before her role with ULI, Kadonoff worked at the Healthcare Distribution Alliance as the administrator/registrar for the Meetings and Conferences department where she processed registrations and provided support in the coordination of various conferences, seminars, and executive foundation functions. She has had experience providing member-facing customer service, hotel and vendor contract negotiations, managing on-site staff scheduling and last-minute changes. She graduated from Roanoke College with her bachelor's of business administration and marketing degree in 2014.

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