Green Building Report

for the District of Columbia, 2013

DC Consolidated Forensics Lab, Photo Credit: HOK

Written by the Department of Energy and Environment
Approved by the Green Building Advisory Council

DEPARTMENT OF ENERGY & ENVIRONMENT

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I. EXECUTIVE SUMMARY

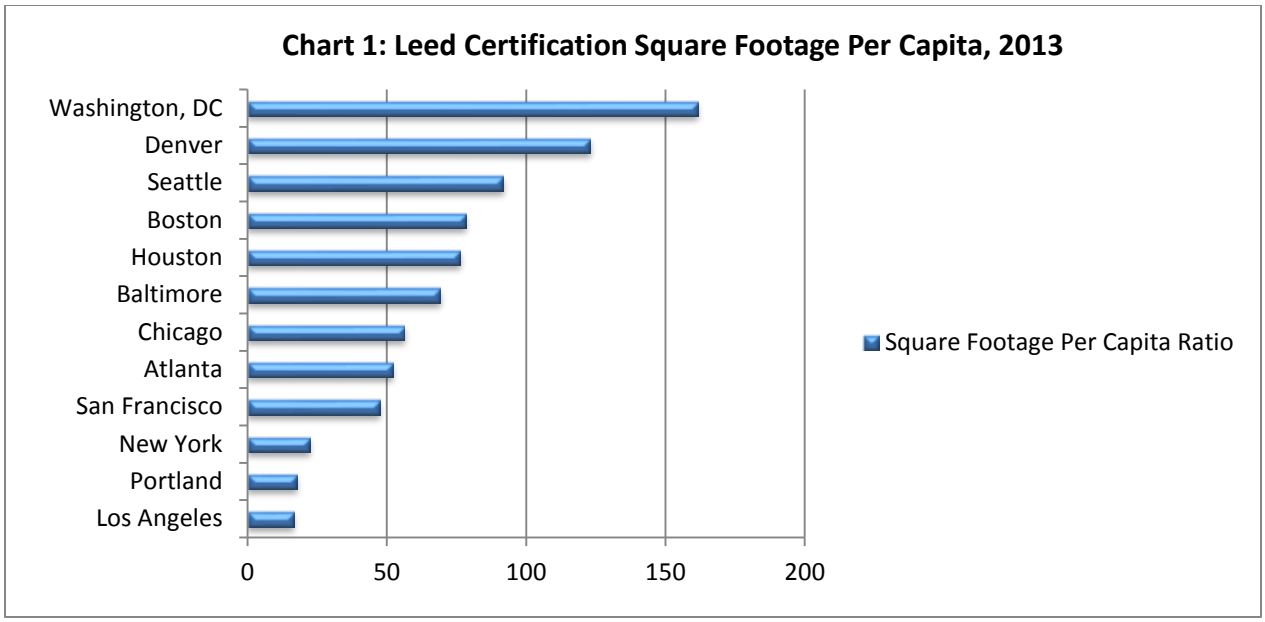
This is the third edition of the Green Building Report ("**GBR**"), a report required by the Green Building Act of 2006 ("**GBA**"). It is intended to track implementation of the GBA and the progress made towards a more sustainable built environment in the District of Columbia. The report is published as a joint effort between the Department of Energy and Environment (**"DOEE"**), the Green Building Advisory Council (**"GBAC"**), and other District agencies involved with the implementation of the GBA.

This report summarizes green building efforts and data from calendar year 2013, although some specific achievements after December 2013 are identified throughout the report. As mentioned in the previous edition of the GBR, this 2013 report further evaluates the implementation of the 2013 Green Construction Code and the Green Building Fund grant program. In addition, an in-depth analysis of the District's progress toward advancing green building development, including LEED, ENERGY STAR, and Green Communities certifications, and a national comparison is discussed.

Green Building Leadership – Setting the Stage

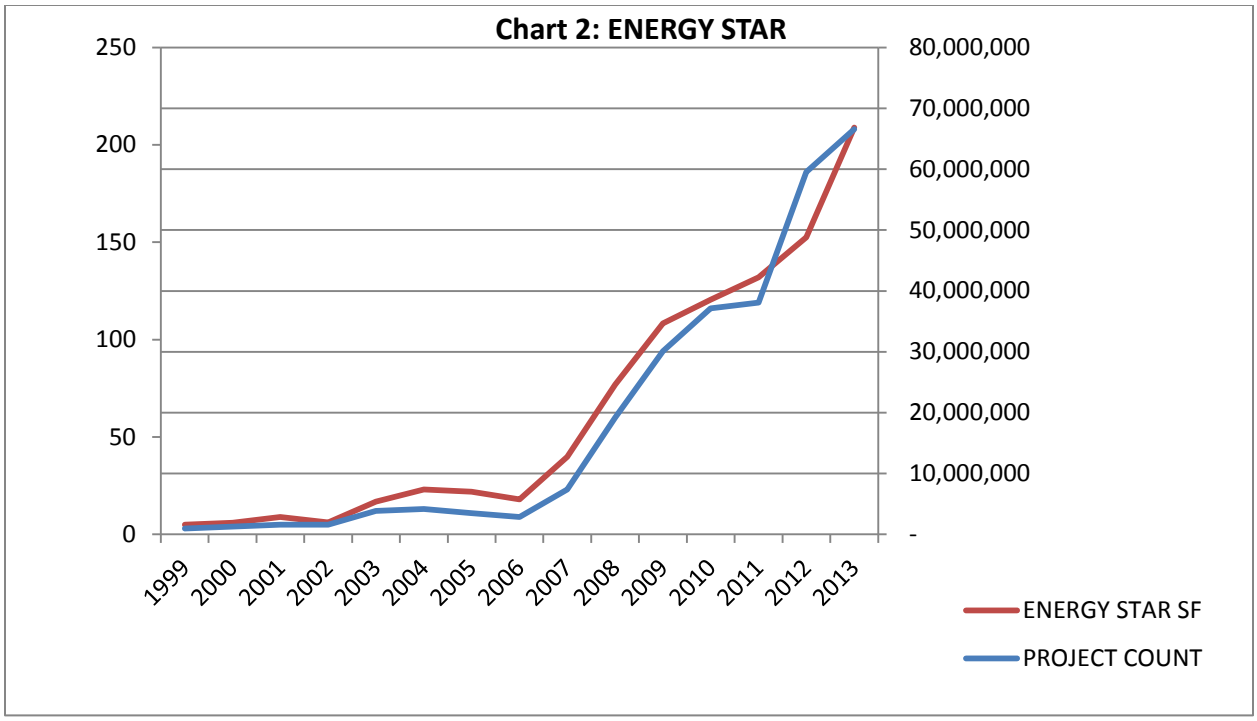
Characterizing our national leadership in terms of green building development presents a difficult task due to variations in green building standards across the country. For the purpose of this report, the U.S. Green Building Council's LEED platform will be cited and a brief overview of District led activities regarding both EPA's ENERGY STAR and Enterprise's Green Communities criteria will be discussed. The District continues to lead the nation in these green building standards on a per capita basis for large metropolitan areas. At the end of 2013, Washington boasted 379 LEED certified projects, including 227 Gold certified projects. This represents a total of 100 million square feet of LEED certified space, with 16.28 million square feet developed in 2013 alone.[1] This translates to more than 160 LEED-certified square feet per capita, according to 2010 national census data. In comparison with other U.S. cities, the District currently leads the pack in both square footage (see chart 1) and project count per capita.

[1] Sustainable DC Green Rankings - http://www.sustainabledc.org/in-dc/green-rankings/



In addition to demonstrating leadership through LEED certification, the District is also a frontrunner in the development of ENERGY STAR certified buildings. For the second consecutive year, DC metro area surpassed every other U.S. city in the number of ENERGY STAR certified buildings per capita. Moreover, DC was ranked second in total number of ENERGY STAR buildings and emissions prevented, and third in total energy cost savings. By the end of 2013, the District saw ENERGY STAR certifications rise from 186 buildings to 208, totaling more than 66.8 million square feet (see chart 2). [2]

[2] For an up-to-date listing of ENERGY STAR projects in the District, visit: http://www.energystar.gov/index.cfm?fuseaction=labeled_buildings.locator



The District's leadership in greening the built environment goes beyond high-performance building rating systems like LEED and ENERGY STAR. For example, the District is consistently in the top three and often first among cities in total green power purchasing, city government green power purchasing, green roof installations, urban parkland space, public transit ridership and bike share ridership.[3] As the nation's capital, and in accordance with the city's Sustainable DC Plan, it is crucial that the District not only maintain but expand its status as a national leader in green building design. Given that the District's building stock represents more than 74% of the District's total greenhouse gas (GHG) emissions, expansion of these investments is critical to our success.

Benchmarking – Knowledge is Power

The Green Building Act and the Clean and Affordable Energy Act (**"CAEA"**) both require all District Government buildings 10,000 gross square feet and larger, and all privately owned buildings 50,000 square feet and larger to benchmark their energy usage. While this encompasses less than 1.6% of all buildings in the city, it accounts for nearly half of the District's total floor area. 2013 was a year of many firsts. It was the first year the benchmarking requirements for all private buildings 50,000 and larger were fully implemented. In August of 2013, the Department of General Services (**"DGS"**) launched Build Smart DC, an interactive website that provides 15-minute interval electricity consumption data for all public facilities.

[3] Sustainable DC Green Rankings - http://www.sustainabledc.org/in-dc/green-rankings/

It was also the first year Pepco allowed building owners to aggregate whole building data. As a result, more buildings were able to report complete data. DOEE received 1,516 benchmarking reports from public and private buildings, which represent a compliance rate of 87%.

The District continues to be a leader in ENERGY STAR scores with a median performance of 75--well above the national median of 66. Using information from benchmarking, District government buildings have reduced their energy use 7% from 2010-2013. On the other hand, almost half of DC's 113 public schools perform in the bottom 30% of schools nationwide. Similarly, energy use intensity (**"EUI"**) for DGS and DC Housing Authority (**"DCHA"**) operated buildings were higher than the national average, across all use types. EUI for schools was also slightly above the national median, although much of the data collected was prior to major modernization efforts.

The District continues to advance our benchmarking program and is committed to improving both enforcement and accuracy. However, incomplete data sets, under reporting and human error have led to significant reductions in the number of records used to calculate the average floor area, number of buildings, and water use intensity across all building sectors. Data cleaning for the 2013 analysis resulted in a 26%-70% reduction in data sets, making year over year analysis difficult. Despite these challenges, weather normalized site EUI for buildings that reported their energy use dropped 5.9% from 2010-2013, with all buildings sourcing more fuel from electricity than natural gas or steam than in prior years.

Green Construction Codes – Standardizing and Mainstreaming Efficiency

The GBA requires that the District's construction codes incorporate "as many green building practices as practicable," and more importantly, mandates regular updates to improve the energy code and encourage more sustainable building standards. This, in addition to strong leadership from the Mayor to modernize the construction codes, led to the formation of the Construction Codes Coordinating Board (CCCB), which reviewed and amended the 2013 DC Construction Codes and recommended formal adoption by the DC Council.

By adopting the 2013 DC Green Construction Code and the 2013 DC Energy Conservation Code, the District has established itself as a national leader in implementing innovative green building codes for public and private-sector buildings.[4] Both codes will fundamentally transform the way buildings perform in the District. For example, it is estimated that the 2013 Energy Conservation Code will improve efficiency from the previous 2006 code by as much as 30 percent.[5] Similarly, the District's inaugural Green Construction Code will extend the building practices legislated by the GBA to the majority of all construction projects, resulting in energy and water savings as well as a greener and healthier city environment.

[4] The 2013 DC Construction Codes were adopted on March 28, 2014.

[5] The 2013 Energy and Energy Cost Saving Analysis of the IECC for Commercial Buildings http://www.energycodes.gov/sites/default/files/documents/PNNL-22760.pdf

The 2013 construction codes are based on the 2012 model codes published by the International Code Council (ICC) and the 2011 National Electrical Code published by the National Fire Protection Association (NFPA). The CCCB, which is housed in the Department of Consumer and Regulatory Affairs (DCRA) and whose membership includes District government and private-industry experts, drafted the changes. Additionally, more than 100 individuals, including architects, engineers, contractors, property managers, real estate developers and government regulators participated in Technical Advisory Group meetings to ensure adoption of the most appropriate codes. As a result, the new codes incorporate more than 500 local D.C. amendments to the ICC and NFPA Codes, with amendments passed to reflect unique District policies and characteristics.

In addition to the 2012 International Green Construction Code and the 2012 International Energy Conservation Code, the District adopted the 2012 edition of the International Building Code, International Residential Code, International Property Maintenance Code, International Fire Code, International Existing Building Code, International Mechanical Code, International Fuel Gas Code, International Plumbing Code, International Swimming Pool and Spa Code, and the 2011 edition of the National Electrical Code.

Through our commitment to standardizing and updating building codes, we aim to make high performing and deep green buildings mainstream. Adoption of the new codes represents a significant step towards meeting this goal, while advancing the ambitious Sustainable DC targets for the built environment, energy as well as climate and the environment.

Green Building Fund

DCRA collects green building fees during the permit intake process to capitalize the District's Green Building Fund (see Table 1 below). As defined in the GBA, the Green Building Fund is to be used for: (a) streamlining administrative green building processes; (b) improving sustainability performance outcomes; (c) building capacity of development and administrative oversight professionals in green building skills and knowledge; (d) institutionalizing innovation; and (e) overcoming barriers to achieving high performance buildings. Though expenditures have not historically matched revenues in the fund, DOEE and DCRA worked diligently in 2012 and early 2013 to increase the fund's efficacy by hiring more green building staff, supporting the energy benchmarking program created in the CAEA, and creating the first ever Green Building Fund grant program. The latter was launched in June 2013.

Through the grant program, the District looks to support innovative solutions to green the built environment. In 2013, DOEE issued a request for applications (RFA) soliciting grant applications from eligible entities. Administered by the Office of Policy and Sustainability (**"OPS"**), the ultimate purpose of these grants was to meet the ambitious goals related to green buildings discussed in the Sustainable DC plan. A total of three projects were selected to receive funding from this program in 2013. These projects are: 1) a Net Zero Energy/Water and Living Building Challenge Financial Study for DC; 2) a Study on Mortality and the Urban Heat Island

Effect; and 3) Development of a Green Building Program Manual. A full overview of these studies is further discussed in chapter VI, subsection C of this report.

Table 1: Green Building Fund Revenue and Expenditures, FY10 – FY14[6]

Fund Activity	FY10	FY11	FY12	FY13	FY14	TOTAL
Revenues	$ 886,726	$ 745,206	$ 809,086	$1,688,587	$1,821,433.26	$ 5,951,038.26
Expenditures	$ 431,801	$ 180,654	$ 205,915	$642,403	$1,143,290.47	$ 2,604,063.47
Surplus	$ 454,925	$ 564,552	$ 603,171	$1,046,184	$678,142.79	$ 3,346,974.79

Incentives

Under the GBA, DCRA is responsible for developing incentives to support green building innovation, with the Green Building Fund as one of the sources of funding. To date, no financial incentives have been created, in part because no extensive studies or analysis have been funded that could identify the appropriate green building level, sectors, or format for incentives. Given limited public resources, incentives should be as targeted and cost-effective as possible. The creation of financial incentives is among the priorities in the GBAC work plan for 2013-2015, and the goal of creating some research to support an incentive is one of the targets of the plan. A study of possible incentive structures and funding mechanisms for green building is planned for FY 2015 as part of the Green Building Fund Grant program. In the meantime, DOEE is working to support and advance other incentive programs such as Property Accessed Clean Energy (PACE) financing and the DC Sustainable Energy Utility to encourage deeper energy efficiency investments in the District's building stock.

FY13-15 Work Plan Progress

Following the appointment term for its new and returning members in 2012, the GBAC drafted a work plan for FY13-15 (see Appendix A). The work plan outlines specific tasks under six key issues that together will continue to drive the District to achieve greater levels of sustainability. These tasks include support of the Green Construction Code, implementation of the Sustainable DC Plan, advising on green building innovation, coordination of green building processes and regulation, administration of the Green Building Fund, and outreach to the greater DC architecture, construction, and development communities. The GBAC will continue to use the work plan to drive improvements in key areas of the green building program for the District. Significant progress has been made on each of these actions over the past year and will be discussed throughout this report.

[6] Revenue for the Green Building Fund in FY13 more than doubled from the previous year because of an increase in building permit applications, following the market recovery at the end of calendar year 2012.

II. INTRODUCTION

A. Context and Report Intent

In line with the vision of Sustainable DC, which aims to make the District the healthiest, greenest, most livable city in the nation, this report, the third in a series published by the government of the District of Columbia, documents the city's progress towards a "greener" and more sustainable building stock. Information not provided in this report can be found in the two previous editions of the GBR or online at www.DOEE.dc.gov/greenbuildings. For additional information or questions about green building programs in DC, please contact Bill Updike at (william.updike@dc.gov).

B. Sustainable Development in the District of Columbia

Since implementation of the Sustainable DC Plan began, a great deal has been achieved. At the end of 2013, more than 83 percent of the Sustainable DC Plan actions were underway, further establishing the District as a leader in sustainable development and investment. The Sustainable DC Plan is intended to address four key sustainability challenges facing the District: jobs and the economy, health and wellness, equity and diversity, and climate and the environment. The plan also includes seven sections dedicated to solutions; the built environment, energy, food, nature, transportation, waste and water. In partnership with specified agencies, stakeholders, businesses and community leaders, the District Government is committed to and consistently working towards making DC the greenest, healthiest most livable city in the nation.
The District of Columbia's building stock accounts for three-quarters of the city's total GHG emissions. Simply put, without an aggressive green building program focused on reducing the environmental footprint of buildings in the District, the Sustainable DC Plan goals to reduce GHG emissions and energy consumption 50% and increase renewable energy use to 50% of total electricity consumption, are unattainable. It is also crucial that the greening of the built environment be pursued equitably. This means that programs and policies must be enacted to ensure that all residents, regardless of race or income level, can benefit from green buildings. As a result, one of the main objectives of the GBAC and the District's green building program is to ensure programs and projects align with the equity goals and actions of the Sustainable DC Plan.

Green Building Policies & Platforms

In 2013, the CCCB finished its work on to develop the District's first Green Construction Code (with eventual passage occurring in March 2014), an adaptation of the International Green Construction Code (IgCC), which provides a regulatory framework for developers throughout the city. With the adoption of the DC Green Construction Code, all projects 10,000 square feet and larger, residential projects 10,000 square feet and larger and four stories and higher are required to comply with the DC Green Construction Code. The Code requires integration of green building strategies in all aspects of building design. It also allows for an alternative compliance path by pursuing certifications under third party platforms. The four green building

certification programs allowed under this alternative compliance path, are the U.S. Green Building Council's ("**USGBC**") LEED program, ICC 700, ASHRAE 189.1, and Enterprise's Green Communities Criteria ("**EGC**").

In addition to the adoption of the 2013 Building Code suite, the Clean and Affordable Energy Act of 2008 established regulations that require all private buildings 50,000 square feet and larger to benchmark their utility data using the Environmental Protection Agency's ("**EPA**") ENERGY STAR Target Finder and Portfolio Manager energy modeling and benchmarking tools.

Leadership in Energy and Environmental Design

LEED is a green building certification program created by the USGBC, but administered by the Green Building Certification Institute ("**GBCI**"), a not-for-profit organization that provides independent oversight of professional LEED credentialing and project certification.[4] To receive certification, a project applies to a specific (or multiple) program(s), such as LEED-New Construction, LEED-Existing Buildings, LEED-Core and Shell, LEED-Homes, LEED-Schools, LEED-Commercial Interiors and others.[7]

There are criticisms of the LEED certification system, and issues for cities that mandate LEED green building certification requirements. These concerns include:

- The dependence on a third-party organization, over which the government has no oversight, to set the District's green building standards

- The perception that application costs associated with LEED are burdensome

Despite these critiques, LEED is the recognized national standard for green building certification and the District has incorporated the LEED framework as an option under the DC Green Construction Code. The adoption of the new Code in 2014 created a localized alternative that will allow the District greater autonomy over green building standards. That process, as well as the details of the code, is discussed later in this section.

Enterprise Green Communities Criteria

Enterprise Green Communities is a green building rating system developed by Enterprise Community Partners, to "fundamentally transform the way we think about, design and build affordable homes."[8] The District has identified EGC as the standard for publicly funded, GBA compliant residential projects. The intent for requiring EGC instead of LEED for Homes projects under the GBA, is to insure a reasonable level of environmental, health and economic performance without the cost burdens associated with LEED certification.

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[7] For more information about GBCI, go to www.gbci.org.

[8] For more information on Enterprise Green Communities Criteria, go to www.greencommunitiesonline.org.

DC Green Construction Code

The 2013 Construction Codes are based on the 2012 model codes published by the International Code Council (ICC), and the 2011 National Electrical Code published by the National Fire Protection Association (NFPA), with amendments to reflect unique District policies and characteristics. The new codes incorporate more than 500 local amendments to the ICC and NFPA Codes. The CCCB, which is housed in the Department of Consumer and Regulatory Affairs (DCRA) and whose membership includes District government and private-industry experts, drafted the changes. More than 100 individuals, including architects, engineers, contractors, property managers, real estate developers and government regulators, contributed their time, through Technical Advisory Group meetings, to ensure the most appropriate codes possible.

In addition to the 2012 International Green Construction Code and the 2012 International Energy Conservation Code, the District has adopted the 2012 edition of the International Building Code, International Residential Code, International Property Maintenance Code, International Fire Code, International Existing Building Code, International Mechanical Code, International Fuel Gas Code, International Plumbing Code, the International Swimming Pool and Spa Code, and the 2011 edition of the National Electrical Code.

The GBAC looks to adoption of the most current version of the building code as the first step towards standardizing green building design, including not only energy efficiency but also climate change resilience, resource efficiency, and stormwater management. The Green Building Act requires that adoption of subsequent ICC codes must continue. Both the CCCB and technical TAG's will beginning consideration of the 2015 code suite in January 2015 to continue advancing green building guidelines in the District.

Green Building Modeling and Reporting

EPA's ENERGY STAR Target Finder is an energy-modeling tool for new construction that enables designers to model future energy performance. Portfolio Manager, the EPA's online energy benchmarking program, is another widely accepted tool that enables building owners to track energy and water use in their buildings and compare a building's performance against similar buildings nationwide. Portfolio Manager is used for more than 300,000 buildings throughout the country and has been accepted as the industry-standard tool to track and evaluate energy and water consumption, develop energy management goals, and identify strategic opportunities for cost savings. Additionally, LEED references Portfolio Manager as the measurement tool to verify energy performance under the LEED-Existing Buildings Operations and Maintenance standard. The GBA and its amendment, the CAEA, have various requirements for the use of EPA's Target Finder and Portfolio Manager.

III. Green Building Report

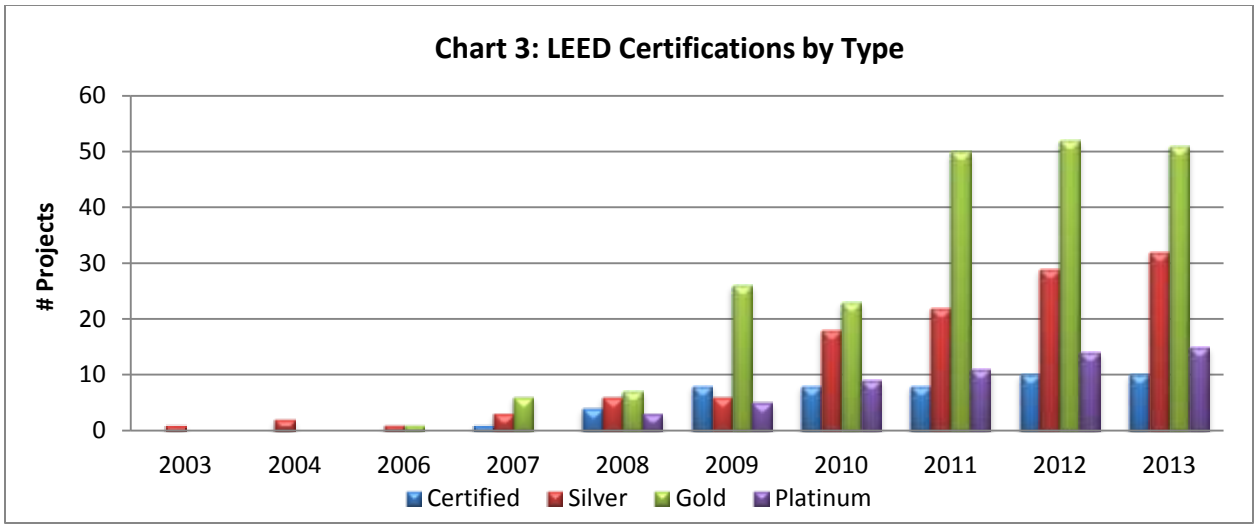
A. Green Building Market Overview

Green building certification programs are highly valuable for ensuring consistency and transparency in the development of high-performance buildings. Certification systems have proven themselves a viable means of standardizing green building practices and pushing towards an overall increase in efficiency by providing operation and design assistance, useful tools throughout construction and building occupancy, and documentation methodologies that progress towards pre-established targets. However, as mentioned previously, one must consider the fact that it remains difficult to draw a direct correlation between the deployment of various building certification programs, and how "green" a city really is. Despite the LEED, ENERGY STAR, or EGC programs being far from exhaustive, the numbers portrayed throughout these certification systems nevertheless remain adequate indicators of the evolution of DC's green built environment over time.

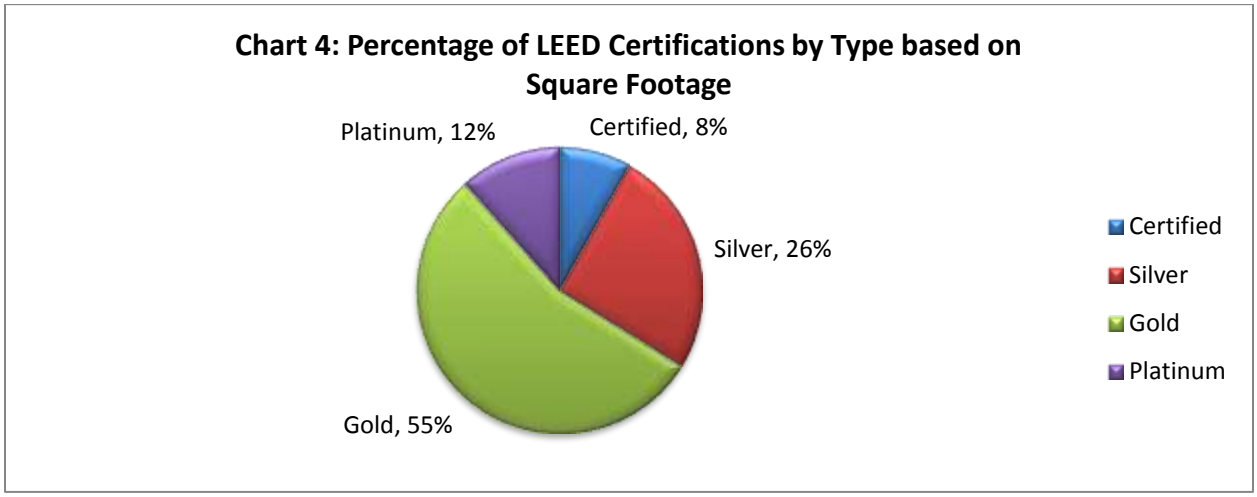
LEED Projects

Over the past several years, the District of Columbia has sustained its efforts in the implementation of green buildings. This has ultimately resulted in our city establishing itself as a national leader in green building deployment. This is notably true for LEED certifications. With 107 projects certified in the single year of 2013, the District accounted for 454 LEED certified projects at the close of the year, not including LEED for Homes or Neighborhood Development projects. This translated into a total of 89,165,512 square feet of LEED certified space, subsequently leading the United States amongst states and cities, in terms of certified space and project count per capita. (See Appendix C: LEED Certifications, 2013) The District also witnessed an additional 157 LEED registrations throughout the course of 2013. Upon completion, these projects will include over 27 million square feet of LEED certified space, further asserting the consistency of the development of LEED certified buildings in the District of Columbia.

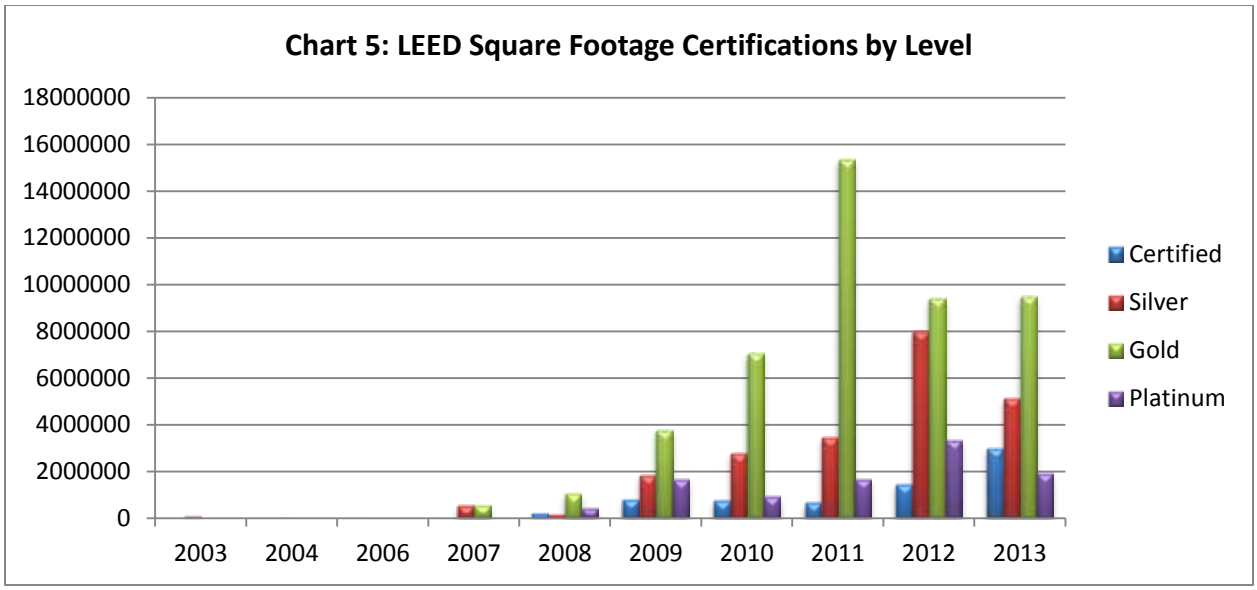
In line with efforts made in previous years, and as seen in Chart 3 below, the distribution of LEED certification types are similar to that of 2012. After a significant increase in certifications from 2003 to 2011, the District of Columbia continues to experience steady progress in LEED certification numbers. This highlights the consistent efforts of the public and private sector in maintaining the focus on greening our built environment.



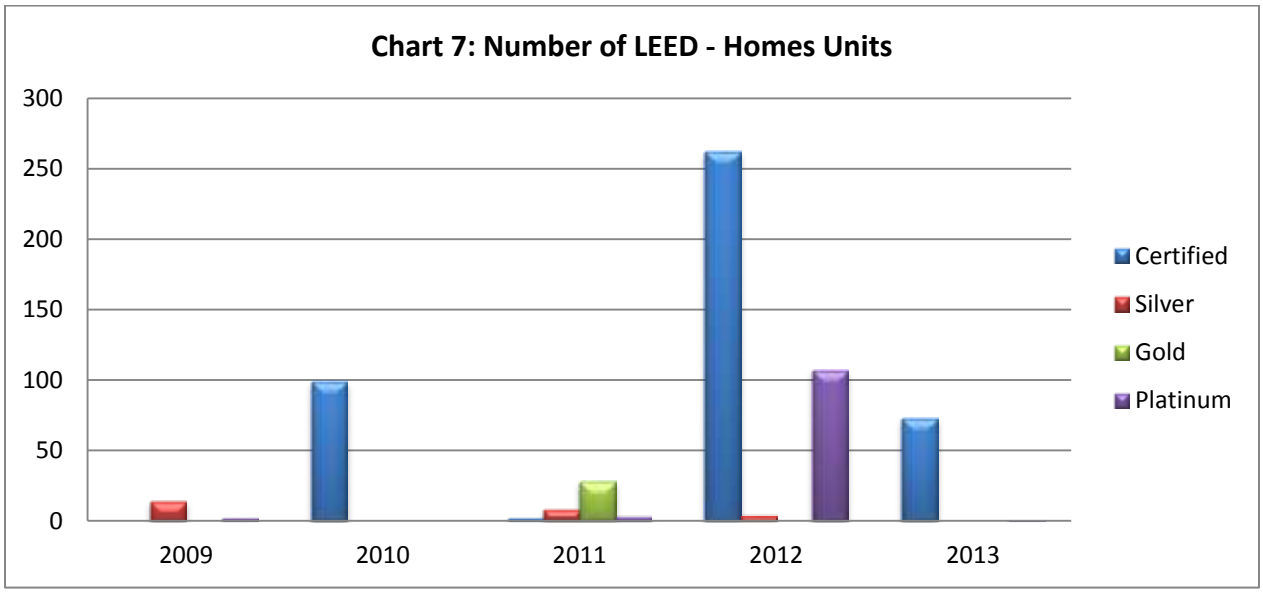
Moreover, the proportion of LEED-Gold and Platinum certifications also remained predominant in comparison to the number of LEED-Certified and LEED-Silver projects, resulting in over two-thirds of the District's LEED square footage being certified at the Gold or Platinum levels (see Chart 4 below). The District is therefore seeing both an increase in the total number of green buildings, but also an increase in the percentage of higher performing green buildings. This shows that both the public and private sector are embracing green practices at a high level.



Athough the overall number of projects receiving Gold and Platinum have remained somewhat constant, the total square footage of Gold and Platinum projects decreased from 17,029,219 in 2011 to 12,709,426 in 2012 and sits at 11,418,519 in 2013 (see Chart 6 below).

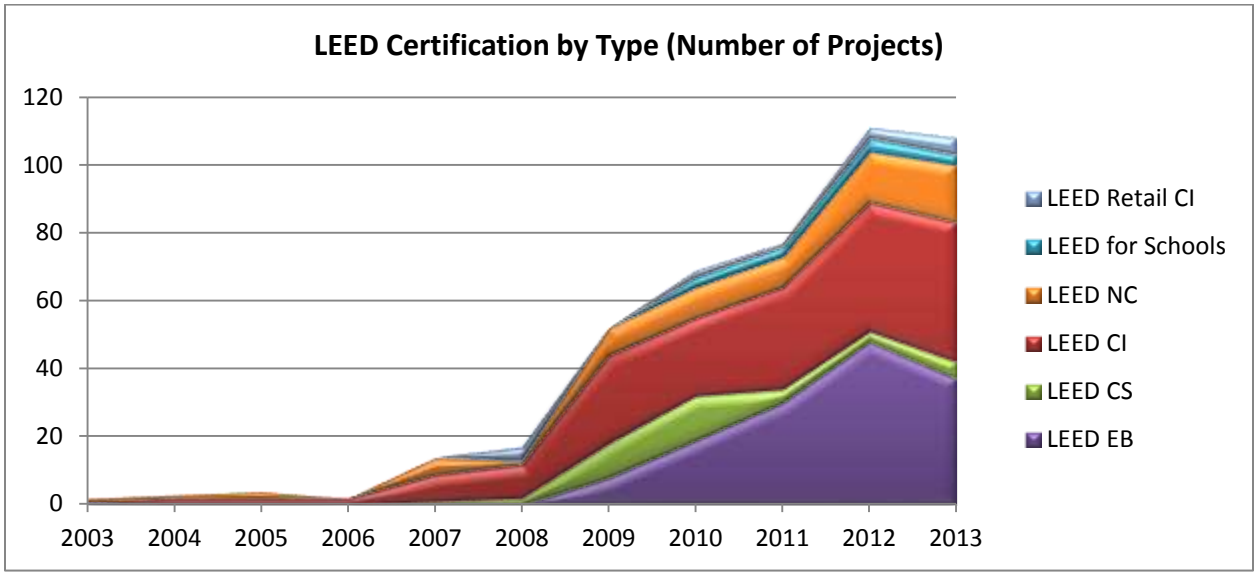


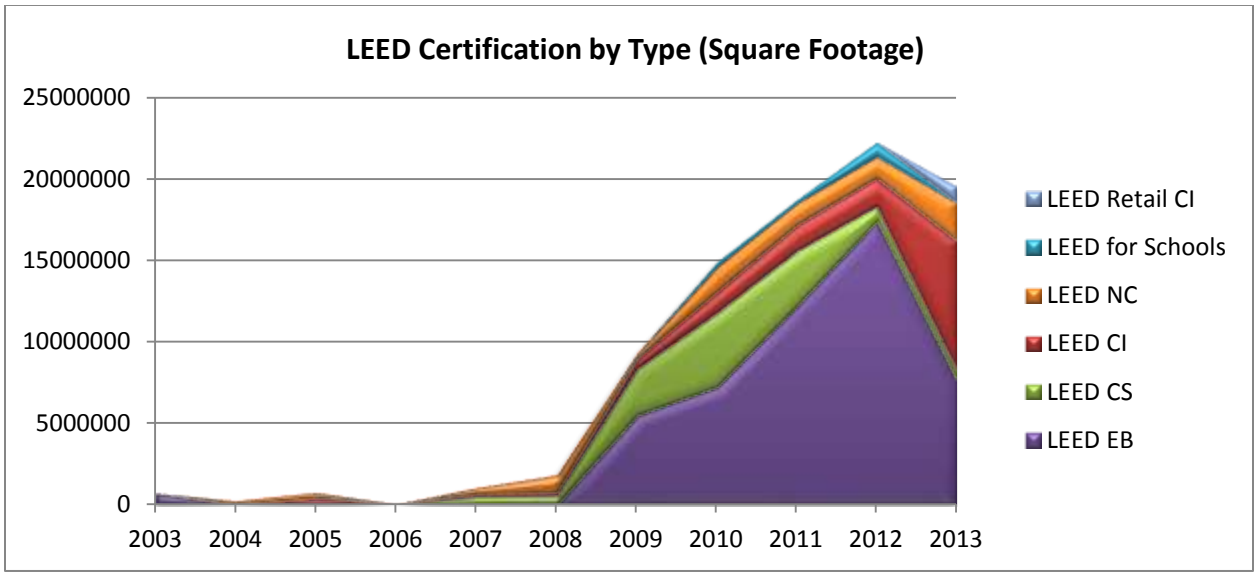
Because USGBC does not include LEED-Homes and LEED-Neighborhood Development in their online data platform, the Green Building Information Gateway (www.gbig.org), the numbers above do not include LEED-H or LEED-ND. The numbers for LEED for Homes certifications can be found in Chart 7 below.



It is also helpful to compare the types of LEED projects that are getting certified, and the trends over time of those projects (see Charts 8 and 9 below). In 2013, the District saw an increase in LEED for New Construction and Commercial Interiors and a slight decrease in LEED for Existing Buildings. These LEED certification types respectively account for 17, 41 and 37 projects. In terms of percentages, the distribution of square footage is similar to that of the actual project numbers. As mentioned in the previous edition of the GBR, the 2008 real estate crash

could account for investment in existing property. Moreover, one could speculate that the slow re-emergence of the economy has led to the current increase in certifications for commercial interiors and new construction. However, one cannot assert that any of the above is fully certain as additional factors may not be accounted for.





Delving further into the analysis of the LEED certification system in the District, the breakdown of projects by focus area in terms of credit achievement enables one to depict trends, issues and potential solutions that can inform policy and regulatory frameworks. Analysis completed on USGBC data covering 447 projects revealed that:

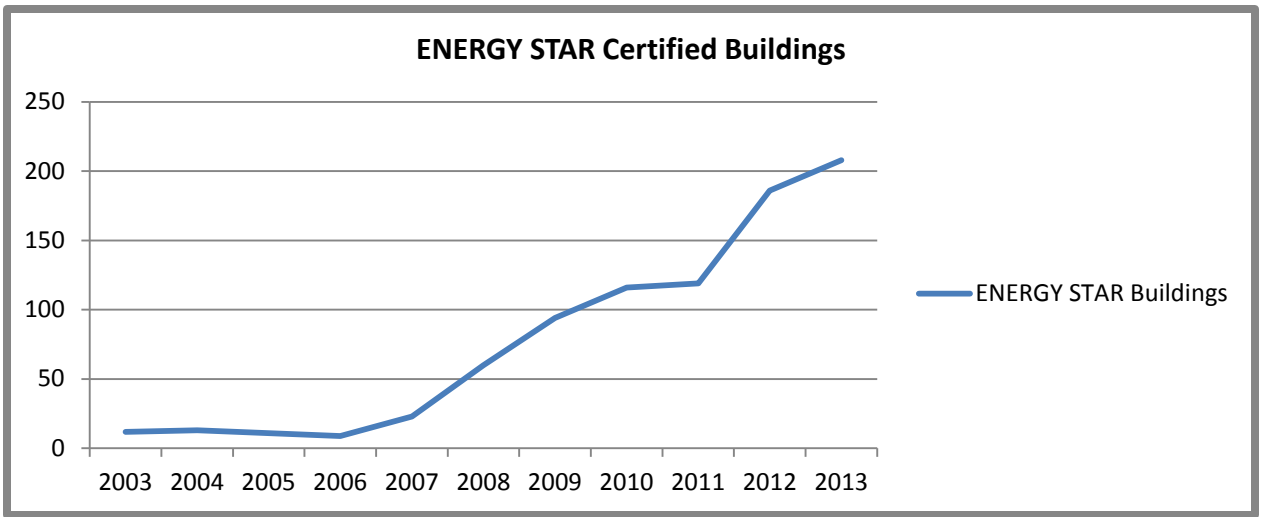
- The structure of several credits prevented projects from engaging in the objectives described, due to feasibility concerns. This was notably true in the case of credits requiring site related modifications, be it in terms of producing on-site renewable energy, or engaging in water-efficient landscaping. The nature of our built environment here in the District, for now, seems to play a discouraging role in the implementation of such projects as much of our building stock is over 50,000 square feet.
- Numerous buildings throughout the city are leased to a variety of different tenants. This can become an issue as one must enable, through an adequately regulated leasing structure, both the tenants and owners right to have a say in the green development of their built environment.
- Relating to the two previous comments, the issue of cost is crucial in implementing and developing LEED certifications across all building sectors. The financial factor is one that must be fully appreciated and considered. The stacked bar-charts provided in appendix F highlight the fact that relatively low-cost credits are likelier to be pursued.

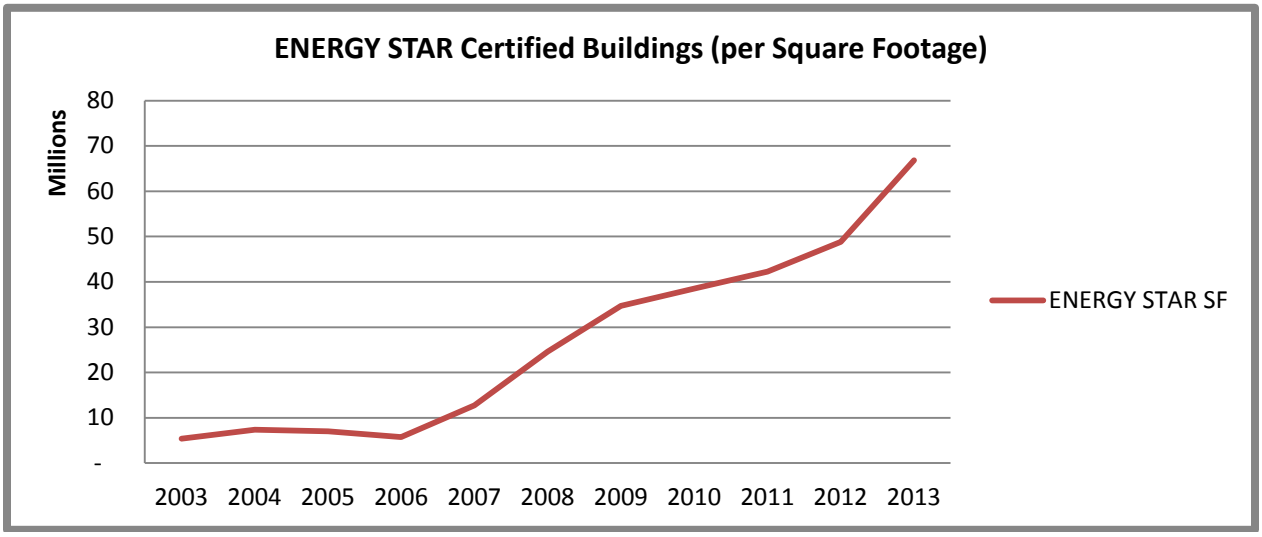
Despite these issues, the LEED certification requirements have proved highly effective in encouraging real estate developers to incorporate a broad diversity of green improvements in the District's building stock. Of the top five market categories of owners of LEED certified projects, corporate entities account for 40%, investor properties represent 16%, non-profit owners account for 17%, the federal government controls 11% and the District government is responsible for 4% (see Chart 10 below).

Chart 10: Project Owner Types for LEED Certified Projects

ENERGY STAR Projects

In 2013, the Washington, DC, metropolitan area had the nation's second largest number of ENERGY STAR-rated buildings (see Table 2 below) for the 5th year in a row. This is despite having a fraction of the population of the Los Angeles metro area, which at the end of 2013 led the nation in total number of ENERGY STAR buildings. Within the city limits, EPA reported 208 ENERGY STAR rated buildings in 2013 (See Appendix D: ENERGY STAR Rated Buildings, 2013), with 66,854,812 square feet of space. Except for a slight decline in 2011, the growth of ENERGY STAR certifications is following an encouraging trend in the District (see Charts 12 and 13 below).





Green Communities Projects

One additional Enterprise Green Communities project was certified in 2013—and since the passage of the Green Building Act in 2006, a total of 11 projects have been certified under the EGC program. According to Enterprise staff, an additional 18 projects have been approved for step one of the certification program and are waiting on the project completion and verification process. Since 2011, four of these projects have gone through EGC's third party verification program. Early in 2013, Mayor Gray announced his intention to significantly increase the amount of money that the District dedicates to affordable housing development, which will likely lead to an increase in the number of EGC certified projects. This commitment was codified in November 2013 with the announcement of a $187 million investment in affordable housing. It is projected that this investment will create or renovate more than 3000 apartments by the year 2020. Per the Green Building Act, the majority of units (if not all) receiving money from this public investment will be built to comply with the EGC criteria.

B. Public Sector Report

The GBA contains green building requirements for public- and publicly-financed construction projects. The Act requires all public, and publicly-financed (with 15% or more of project costs coming from District sources), new construction and substantial improvement commercial projects to meet the LEED Silver standard. Residential new construction and substantial improvement projects 10,000 square feet and larger are required to meet the Enterprise Green Communities standard. An amendment to the Healthy Schools Act in 2011 increased the requirement for schools to be LEED Gold certified.

Summary of Public Sector Implementation

District agencies continue to make tremendous gains in the area of green building—both in terms of LEED certification, and also with cutting edge green building initiatives.

In 2013, the District's Department of General Services continued to 'lead by example' with its new construction efforts and, when possible, exceed the GBA mandated LEED-Silver certification requirement. Continuing to track the running total of LEED certified schools, eight out of ten schools have been LEED certified Gold and two schools have been certified as Silver. DGS also anticipates receiving a Platinum Certification for the McKinley Middle School renovation, in early 2014.

Schools

1.	Phelps HS	FY07	Silver	6-1-10
2.	Schools without Walls HS	FY08	Gold	6-1-10
3.	HD Cooke ES	FY07	Gold	3-1-10
4.	Savoy ES	FY08	Gold	2011
5.	Stoddert ES	FY08	Gold	2011
6.	Walker Jones EC	FY08	Silver	1-31-12
7.	Woodrow Wilson HS	FY09	Gold	9-17-12
8.	Eastern HS	FY09	Gold	6-11-12
9.	Takoma ES	FY11	Gold	10-2-12
10.	Janney Elementary School	FY09	Gold	11-9-13
11.	McKinley Middle School-CI	FY12	Platinum (pending)	3-1-14

DPR

1.	Wilson Aquatic Center		Silver	2009
2.	Riggs LaSalle Community Center	FY08	Gold	11-19-09

DGS pursued other innovative new green building projects, including the below projects:

- Building on the successful deployment of a ~500kW solar array at Dunbar High School, DGS has put 50 additional rooftops into a landmark, large scale municipal solar PPA, which should yield between 10-12MW. These agreements, which leverage third-party

capital and do not impact the District's debt capacity, are allowing the District to significantly increase onsite renewable energy generation during the next several years.

- Through a partnership with the local utility (Pepco), the District receives near real-time electricity consumption data in 15-minute intervals for 85% of its annual load. In addition, DGS worked with Pepco to make this data feed compliant with the national standard Green Button Connect, making DGS the first municipality in the country to meet a White House policy objective intended to make utility data more useful nationwide.

- Data-driven retro-commissioning efforts have been deployed across many of DGS's largest facilities, opening up building automation system data flows to track the delivery of building conditions and energy performance. Improved data collection processes are allowing operating engineers to fine tune building performance, resulting in an estimated 20%-30% in energy savings when fully implemented.

Exemptions

The GBA allows exemptions to be made, provided that a project demonstrates "substantial evidence of practical infeasibility or hardship" as a result of the law. There were no official exemptions awarded by DOEE in calendar year 2013.

C. Private Sector Report

As discussed in previous Green Building Reports, the GBA requirements for private projects were phased in. The mandate, which requires all private projects 50,000 square feet and larger to achieve LEED certification, became effective on January 1, 2012. To inform developers of the benefits of green buildings and ensure the District remains compliant with the GBA, DCRA anticipates launching a tracking system for all projects in 2014 and adding additional personnel to assist with development project review.

Affordable Housing

Greening the District of Columbia's approximately 270,000 residential units represents an exciting opportunity for a more sustainable DC – creating a healthier, greener city, while reducing utility costs for District residents. Housing affordability in the city is a growing and persistent challenge. In 2010, approximately 20% of District residents paid more than 50% of their income for housing costs, with the greatest burden falling on the shoulders of those residents with incomes below 30% of the area's median.[9] A major contributor to the increasing housing cost burdens faced by DC residents is rising utility costs. In order to increase housing affordability, the District has a vested interest in increasing the supply of affordable housing and

[9] http://www.sustainabledc.org/wp-content/uploads/2014/12/6-Green-Affordable-Housing-Task-Force.pdf

ensuring that new and existing homes are built to the highest standards of sustainability and utility efficiency. District government agencies, developers, community-based organizations, and other partners are working together to achieve these goals through a variety of initiatives:

Providing affordable, transit-oriented, housing opportunities with an emphasis on deep sustainability. The District of Columbia Housing Authority (DCHA) partnered with developer William C. Smith to redevelop a former public housing site located along Suitland Parkway in Southeast DC, by leveraging a $20 million federal HOPE VI grant. The award-winning Sheridan Station project provides 327 units of mixed-income rental and for-sale condominiums and apartments near the Anacostia metro station. The multifamily apartment building, delivered during Phase I of development, is LEED Platinum and its rooftop includes the largest privately-owned photovoltaic power system in the city as of the close of 2013.

Identifying opportunities for greater efficiency and renewable energy. In addition to Sheridan Station, DCHA has invested in energy-efficiency measures at many of its properties – including new chillers, boilers, condensing water heat recovery systems, low-flow plumbing fixtures and energy-efficient lighting upgrades. These efficiency measures have resulted in an annual savings of $3.9 million since renovations were completed in 2010. DCHA is now examining the feasibility of making its entire portfolio achieve net-zero energy standards per the Sustainable DC goal. DCHA will soon be moving to redevelop an idle power plant once fueled by coal at the Langston Dwellings in Northeast Washington into a model for renewable energy generation. A recent District-funded feasibility study suggests the site has the potential to reach net-positive energy through on-site renewables and fuel cells and has the potential capacity to power up to 15% of DCHA's entire portfolio.

Creating and preserving more green, affordable housing. In 2011, the city set a goal to preserve or create more than 10,000 units of affordable housing by 2020. In October 2014, Mayor Gray announced that the District would exceed this goal. Nearly 12,000 units of affordable housing are expected to be constructed by 2020. The majority of these projects will receive a public subsidy from the DC Department of Housing and Community Development or other agencies. In compliance with the Green Building Act of 2006, publicly-financed (with 15% or more of project costs coming from District sources) residential new construction and substantial improvement projects 10,000 square feet and larger are required to meet the Enterprise Green Communities standard.

IV. BENCHMARKING

A. Overview

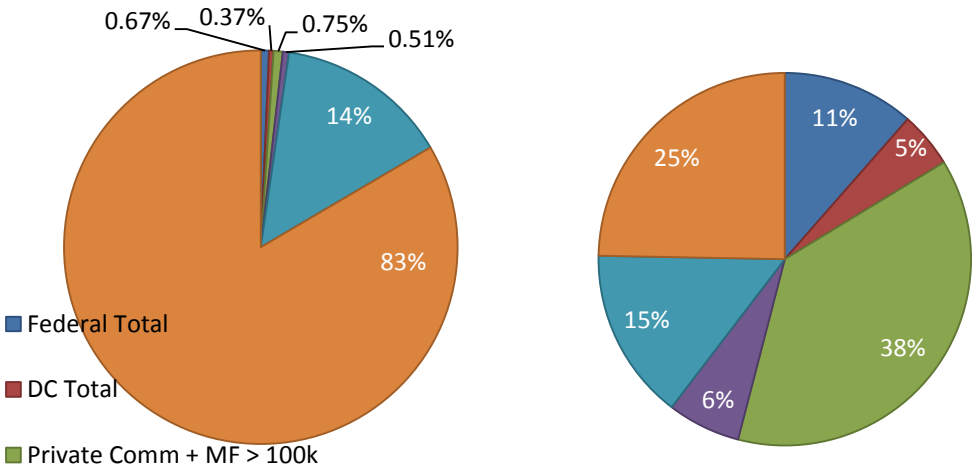
DOEE's 2012 climate emissions reporting confirms that buildings are responsible for 74% of our greenhouse gas emissions. Most of these buildings will still be here in 20 years. Therefore, any effort to reduce energy use in the District and mitigate climate change must include not just new

buildings, but also existing buildings and renovations. Energy benchmarking is the starting point for efforts to reduce the energy use of existing buildings, as one can't manage what has not been measured. Since the passage of the GBA and the CAEA, the District Government has made major strides in implementing the energy benchmarking law and putting data to work to improve energy efficiency in both public and private buildings. This section summarizes the major points of progress made during calendar year 2013, and findings from the benchmarking data for both District Government and privately-owned buildings. [10]

Characteristics of Covered Building Stock

The benchmarking law leverages the power of scale. There are 128,000 buildings in the District, representing more than 730 million gross square feet. The benchmarking law, which applies to District Government buildings over 10,000 gross square feet and privately-owned buildings over 50,000 square feet, covers only 1.6% of the total number of buildings, but 49% of the total floor area.

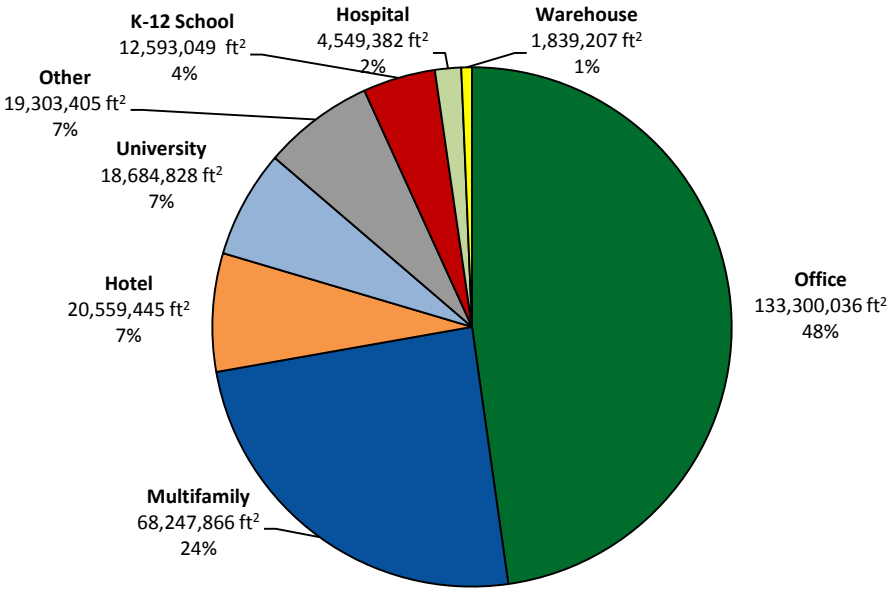
Chart IV.1 Number of buildings (left); gross floor area (right) covered by the benchmarking law.



As discussed below, not all buildings are in compliance and have reported 2013 data to DOEE, but most have. Chart IV.2 below shows the breakdown of square footage by property type. Any property type making up less than 1% of the total was merged into the "Other" category.

[10] Many of the graphs in this section are sourced from Kontokosta, Constantine, et al. 2015. "Benchmarking and Data Quality Analysis of Energy Disclosure Data for Washington, DC," Report of the Center for Urban Science and Progress to the Government of the District of Columbia, Department of Energy and Environment.

Chart IV.2: Floor area of buildings reporting benchmarking data, as reported (inclusive of parking).



B. Major Milestones in 2013

Public Building Benchmarking Activities and Compliance

The Clean and Affordable Energy Act mandates the benchmarking and disclosure of energy use for all properties over 10,000 gross square feet that are owned or operated by the District Government and District instrumentalities. These properties make up approximately 5% of the total square footage in the city. The 10,000 square foot threshold for public buildings—much smaller than the 50,000 square foot threshold for privately owned buildings—means that almost all District Government buildings are subject to the law.

Most District property, including DC's public schools, are operated by the District's Department of General Services (DGS). 2013 marked a paradigm shift in DGS' energy management and established the District as a national leader. In August 2013, DGS launched a new website, Build Smart DC (www.buildsmartdc.com). BuildSmartDC is an interactive website that allows anyone to view the energy performance of any DGS building, displaying electricity consumption in 15-minute intervals in near-real time (next day) and with monthly and annual electricity and gas consumption information. It also shows annual greenhouse gas emissions, annual energy costs, and other metrics. For schools and offices, the ENERGY STAR score is also shown. BuildSmartDC can shine a light on anomalies and inefficiencies in a very powerful way, which can lead to real energy reductions and cost savings if action is taken. The District remains one of the few jurisdictions to publicly disclose such detailed information on public building energy.

With the launch of Build Smart DC, DGS assumed direct responsibility for maintaining and reporting the benchmarking data for their facilities, whereas in prior years, DOEE managed the data directly.

While the vast majority of District Government property is operated by DGS, not all of it is—the DC Housing Authority (DCHA), the DC Water and Sewer Authority (DC Water), Events DC, and the DC Courts all manage their own buildings. 2013 was the first year of compliance for DCHA and in 2014 DCHA submitted benchmarking data on its 44 properties to DOEE. This data was disclosed alongside private building data. However, DOEE did not receive any benchmarking data, as required, from DC Water, Events DC, the University of the District of Columbia, or the DC Court system.

Private Building Benchmarking Activities and Compliance

2013 was the first data year that the benchmarking requirements for private buildings were fully implemented, with all buildings 50,000 square feet and larger having to report 2013 data by April 1, 2014. 2013 was also the first year that building owners were *required* to report whole building electricity data. For 2012 data and earlier, multifamily building owners could report only common area energy use if they had separately metered tenants. But in 2013, Pepco rolled out a service that allows building owners to get aggregated whole building energy data, so long as there are five or more separate meters/accounts at the building. Building owners provide a list of meter numbers to Pepco, and Pepco provides the owner with total energy use for the premises, negating the need for waivers from individual residents. The aggregation of 5 accounts on a monthly interval ensures that no individual account data can be isolated. However, the multifamily energy use intensity histograms (Chart 6) suggest that many building owners did not report whole building data. DOEE did not enforce on this issue for 2013 data, but plans to do so in the coming years. At the end of FY14 (compliance is checked in fiscal and not calendar years), the compliance rate for 2013 private building data was 71**%**.

C. Analysis of 2013 Data

Data Cleaning (Single Year)

Unfortunately, not all the benchmarking data submitted to DDOE is of high quality. Improving the quality of benchmarking data is a major initiative of DDOE.

In order to analyze the benchmarking data, outlier and missing values have to be removed, so the sample is not skewed. DOEE worked with New York University's Center for Urban Science and Progress (NYU) to develop this methodology. The following outlines the data cleaning steps taken for energy and water analysis on the 2013 data. All 2013 analyses in this report, whether conducted by NYU or DOEE, was completed with the same cleaned dataset, and has been put in the same color scheme for ease of reading.

The steps of data cleaning are:

A. Public and private building datasets merged for a more complete picture
B. Duplicates of data for the same building were removed
C. Records with no floor area were removed
D. Records with zero or null values for the four key energy use intensity (EUI) values for analysis were removed (removing only the records without the value for that piece of analysis):
    - Weather Normalized Source EUI (kBtu/ft^2)
    - Weather Normalized Site EUI (kBtu/ft^2)
    - Indoor Water Intensity (all water sources) (gal/ft^2)
    - Total GHG Emissions Intensity (kgCO2e/ft^2)

Chart IV.4A: Number of Buildings Before and After Cleaning for Source EUI

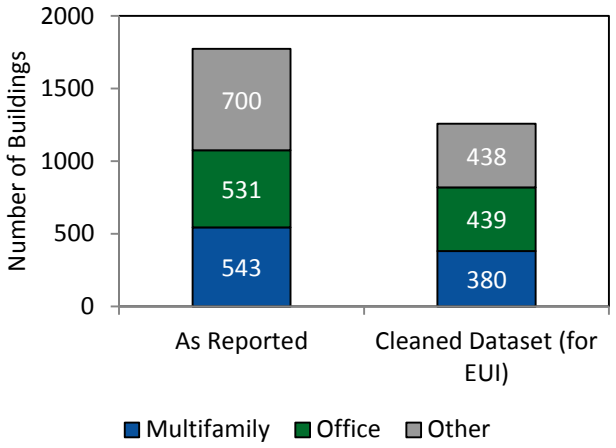


Chart IV.4B: Number of Buildings Before and After Cleaning for Water Use Intensity

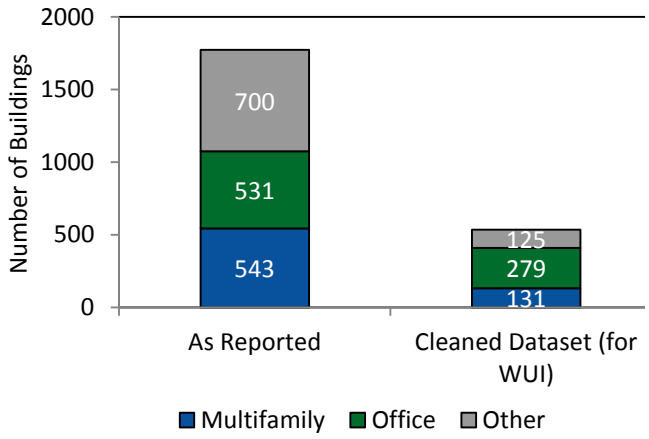
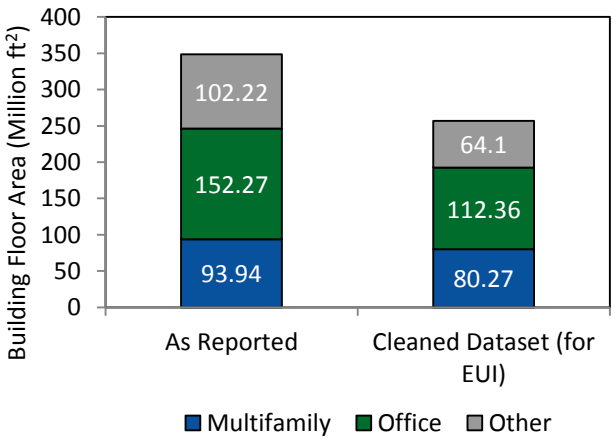


Chart IV.4C: Floor Area Before and After Cleaning for Source EUI



E. Finally, outliers needed to be removed. Due to the self-reported nature of the data, data entry errors can create outliers that affect the analysis. Outliers were removed for office and multifamily properties by performing a log-transformation of the relevant metric. Records with values more than 2 standard deviations of the mean on the log-scale were removed. This is a more sophisticated cleaning method than just removing EUIs that are above or below an arbitrarily set-point.

The cleaning methodology described above resulted in a substantial reduction in the number of records. As shown in Chart 4, the source EUI filter resulted in a 29% reduction in the total number of buildings in the dataset [1774 to 1257 (Chart IV.4A)] and a 26% reduction in the total floor area in the dataset [348 million to 257 million (Chart IV.4C)]. The reductions for site EUI and greenhouse gas analysis were very similar, and are not pictured here. The reduction in dataset for water use was much more dramatic, 70%, due to many buildings not reporting any water data (Chart IV.4B). This is likely due to an ongoing lack of awareness of water use reporting requirements.

Unless otherwise noted, all graphs in the benchmarking section of this report refer to a combined dataset of DGS, DCHA, and privately-owned buildings.

Energy Use Intensity

The bubble chart in Chart IV.5 summarizes the number of properties for office, multifamily and eight other property sectors and their respective median EUI. The area of the circles indicates the total amount of energy consumed by sector, plotted against the number of properties on the horizontal axis and the median weather-normalized source EUI in each facility sector on the vertical axis. Offices make up the bulk, both in the number of buildings and the total energy use. Supermarkets and hospitals have the highest median EUIs, while multifamily buildings, houses of worship, and non-refrigerated warehouses have the lowest EUIs. With the exception of the energy-intensive hospital sector, sectors with less than 15 reported buildings of that type were not included on the chart.

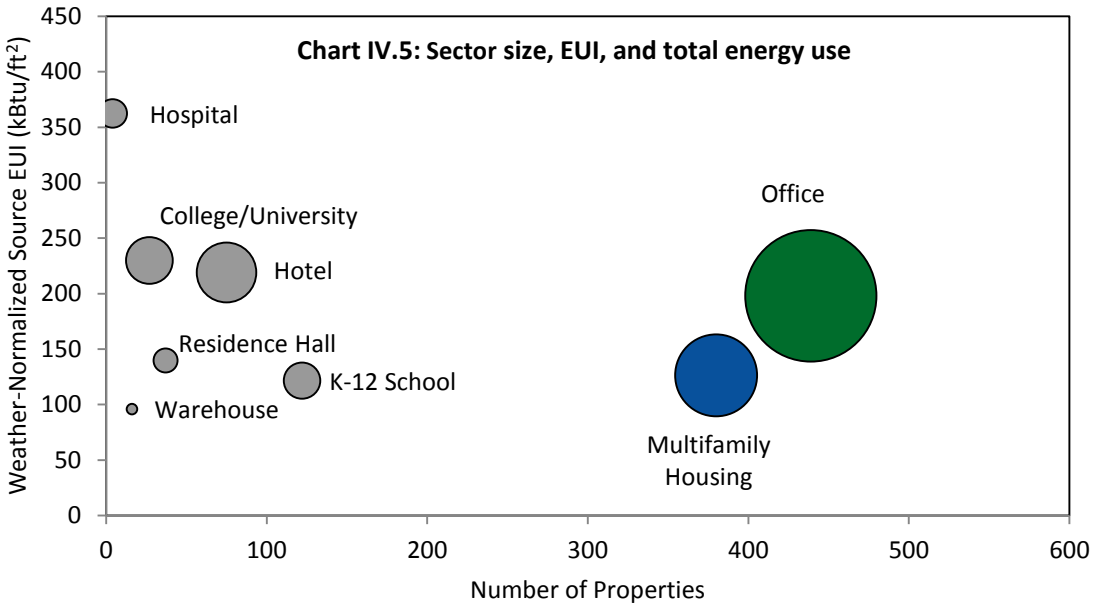


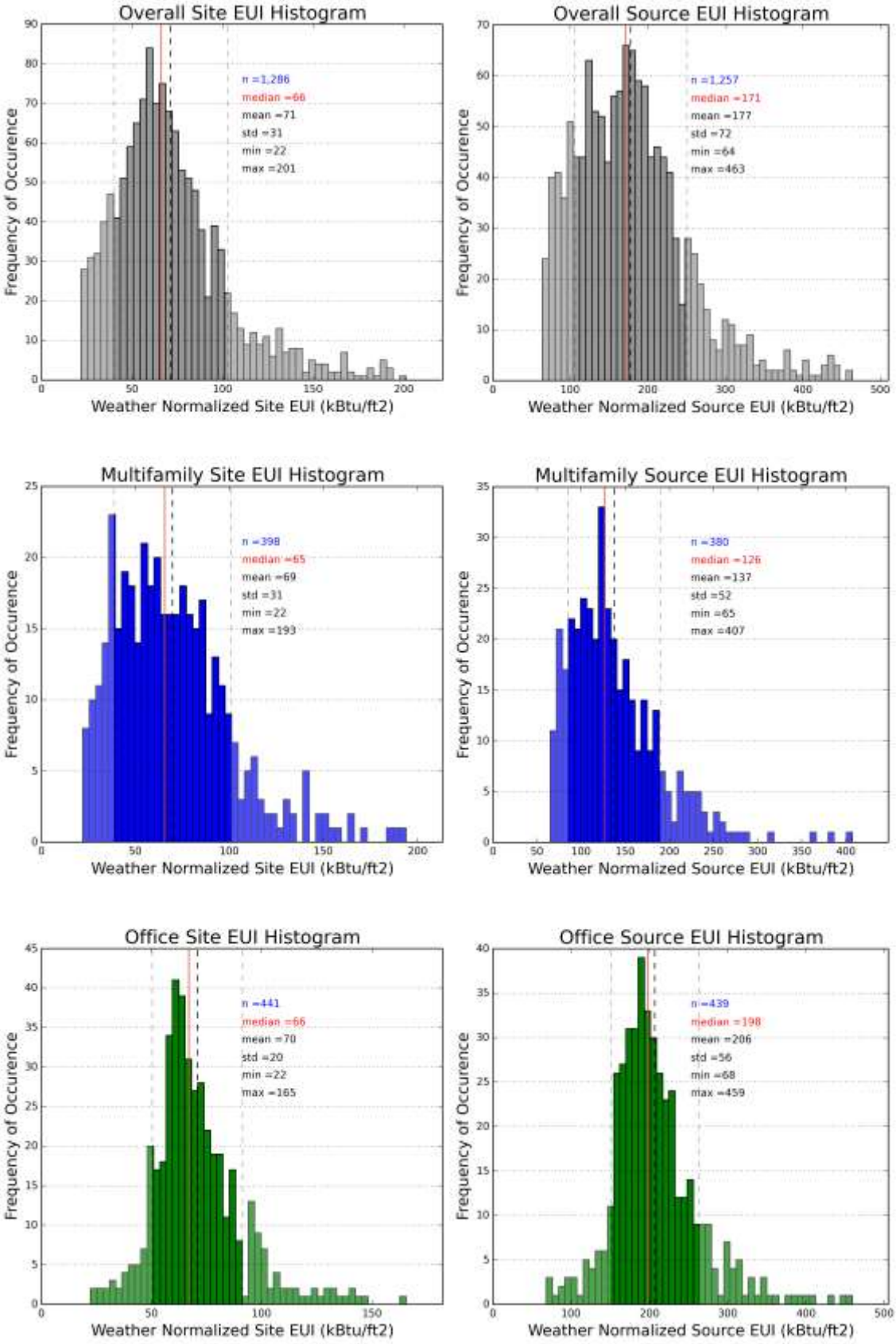
Chart IV.6 contains six histograms of the weather-normalized site and source energy use intensity of all multifamily office buildings and others. Weather normalization of energy use facilitates a more accurate comparison between different parts of the country and corrects for year-to-year differences in weather. Weather normalized energy is the energy your building would have used under 30-year average conditions (also referred to as climate normals). The weather in a given year may be much hotter or colder than the normal climate; weather normalized energy accounts for this difference. For consistency, all EUIs in this report are weather-normalized.

Site energy and source energy are both important metrics for tracking and evaluating energy efficiency. Site energy is the amount of electricity, gas, and other energy sources consumed on site at the building. It is what owners are most familiar with, and also the best metric for tracking the performance of a single building over time.

Source energy, otherwise known as p energy, is the total energy required to provide the site energy, including all losses in production, generation, and transmission. The majority of the primary energy in fossil fuels is lost through heat during the generation of electricity, and a smaller amount of energy is also lost during interstate transmission. Because a unit of electricity is not comparable with a unit of raw fuel, source energy is the best metric for comparing buildings to one another, especially when those buildings have different fuel mixes. Because of these variations, both metrics are presented in Chart IV.6.

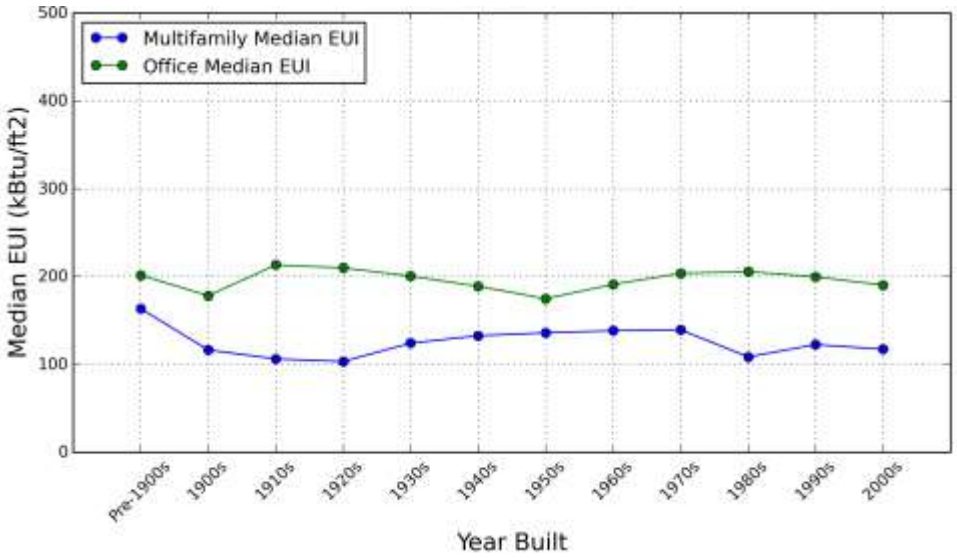
While the office histograms are more-or-less normally distributed, the multifamily histograms demonstrate a profound right skew. There are many more instances of lower EUI values than one might expect. We believe this may be the result of a large under-reporting of the energy use in multifamily buildings. Many multifamily building owners with separately-metered residential units did not get the aggregated whole building data, causing an over-reporting of low EUIs for multifamily buildings. Because of the quantity of these reports, they were not rejected as outliers by the standard-deviation approach discussed above.

Chart IV.6: Weather Normalized Site and Source EUI Histograms



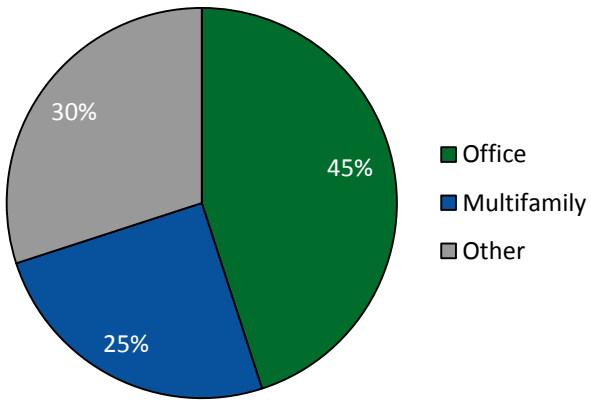
Contrary to popular belief, there is no correlation between the age of buildings and their EUI. This is clear when looking at the median source EUIs for each decade for offices and multifamily buildings:

Chart IV.7: Office and Multifamily Property Median EUI by Decade Built



Office buildings produce 45% of all GHG emissions from the buildings reporting benchmarking data. The histograms of GHG emission intensity are very similar to those shown in Chart IV.6 for EUI, so GHG histograms are not included.

Chart IV.8: GHG Emissions by Sector

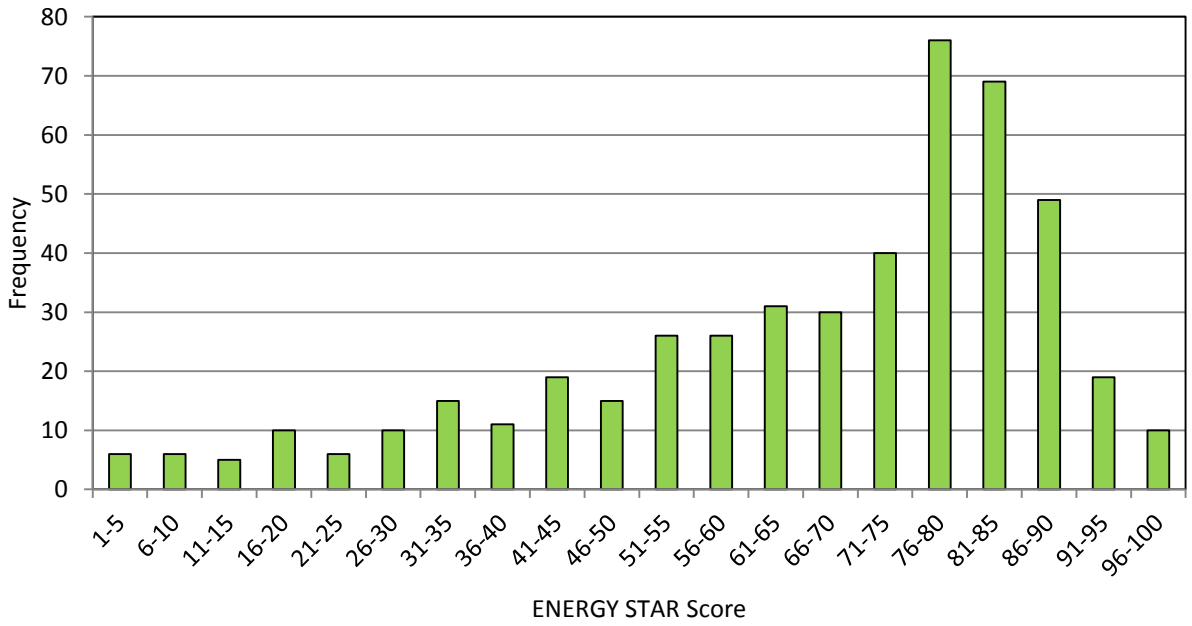


ENERGY STAR® Scores

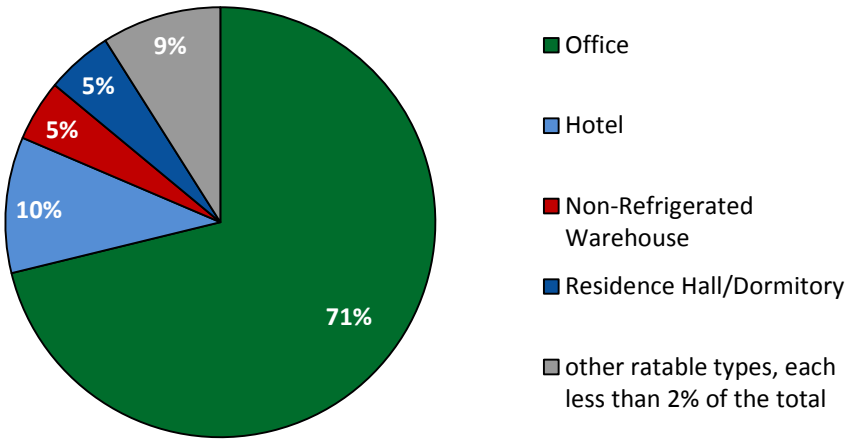
The ENERGY STAR score represents how a building compares to other similar buildings nationwide, adjusting for weather and use, on a 1-100 percentile scale. A building with a score of 75 performs better than 75% of similar buildings, whereas a building with a score of 10 performs better than only 10% of similar buildings. By definition, an average building would have a score of 50.

As notably displayed in their ENERGY STAR scores, District buildings continue to have very strong energy performance. Private buildings in the District substantially outperform the national median of 50—the average ENERGY STAR score for 2013 is 66, and the median is 74 (Chart IV.9) These numbers are slightly lower than for 2012, which is to be expected, because the 2013 set encompasses many more buildings, many of which have never benchmarked before and can be expected to perform worse than their peers. Of the buildings achieving a score sufficient to apply for ENERGY STAR certification from U.S. EPA (an ENERGY STAR score of 75 or higher), 55% have been certified for 2012 or 2013, while 34% have never been certified.

Chart IV.9: Histogram of 2013 ENERGY STAR Scores for Private Buildings (20 bins)



Not all building types can get an ENERGY STAR score. The bulk of the buildings included in the above graphs for 2013 are offices, as indicated in Chart IV.10. In 2013, EPA had not yet launched a score for multifamily housing, the District's second-largest sector.



Fuels

One of the most important findings from the benchmarking data was that the fuel use in large buildings, particularly large office buildings, differed dramatically from typical assumptions. Overall, 72% of energy used in the benchmarked building stock is electricity, 25% is gas, and the remainder is a mix of fuel oil and district steam—about what was expected based on DOEE's knowledge of overall citywide energy consumption. Most office buildings are all-electric, with electricity making up 92.4% of all office energy use.

When looking at aggregate patterns across the sample, more than half of the electricity used is consumed by office buildings, and almost half of all the natural gas is used in multifamily housing. (See Chart IV.18 and Table IV.1 for more.)

Chart IV.11: Proprotion of Fuel Consumption by major type for all multifamily, and office buildings

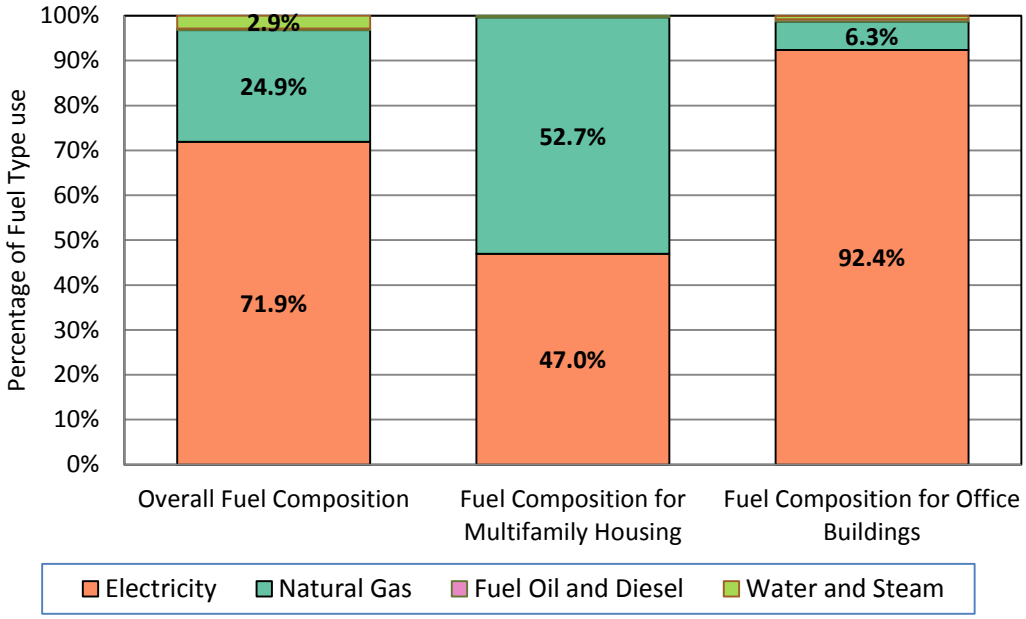


Table IV.1: Cross Tabulation of Fuel Use by Property Type

Property Type	Units	Electricity	Natural Gas	Distillate Fuel (Fuel Oils (# 1,2,4,5, & 6), Diesel #2, & Propane)	District Water-Based Energy (District Steam, District Hot Water, & District Chilled Water)	Total
ALL BUILDINGS	MMBtu	12,424,735	4,304,620	62,210	498,362	17,289,928
	Customary	3,641,481,652 kWh	43,046,197 therms	62,210,154 kBtu	498,362,458 kBtu	N/A
	Percentage of sector energy use	71.9%	24.9%	0.36%	2.88%	100%
MULTI-FAMILY HOUSING	MMBtu	1,695,500	1,901,658	12,324	0	3,609,482
	Customary	496,922,492 kWh	19,016,577 therms	12,324,463 kBtu	0 kBtu	N/A
	Percentage of sector	47.0%	52.7%	0.34%	0.00%	100%

	energy use					
	Proportion of this fuel used in Multifamily	14%	44%	0.34%	0%	N/A
OFFICE BUILDINGS	MMBtu	6,690,439	454,412	32,164	49,062	7,226,075
	Customary	1,960,855,417 kWh	4,544,119 therms	32,164,011 kBtu	49,062,175 kBtu	N/A
	Percentage of sector energy use	92.6%	6.3%	0.45%	0.68%	100%
	Proportion of this fuel used in offices	54%	11%	0.45%	0.68%	N/A

The tendency towards full electrification has long been present in the office sector, but has greatly accelerated in the multifamily housing sector since the early 1970s (Chart IV.12, IV.13). In buildings built between 1900 and 1970, natural gas use makes up over 60% of all energy use. However, multifamily buildings built in the 1980s source less than 40% of their energy from natural gas, while many of the newest buildings use little or no natural gas (Chart IV.13).

Chart IV.12: Fuel Type Usage Composition by Building Age – Multifamily Buildings

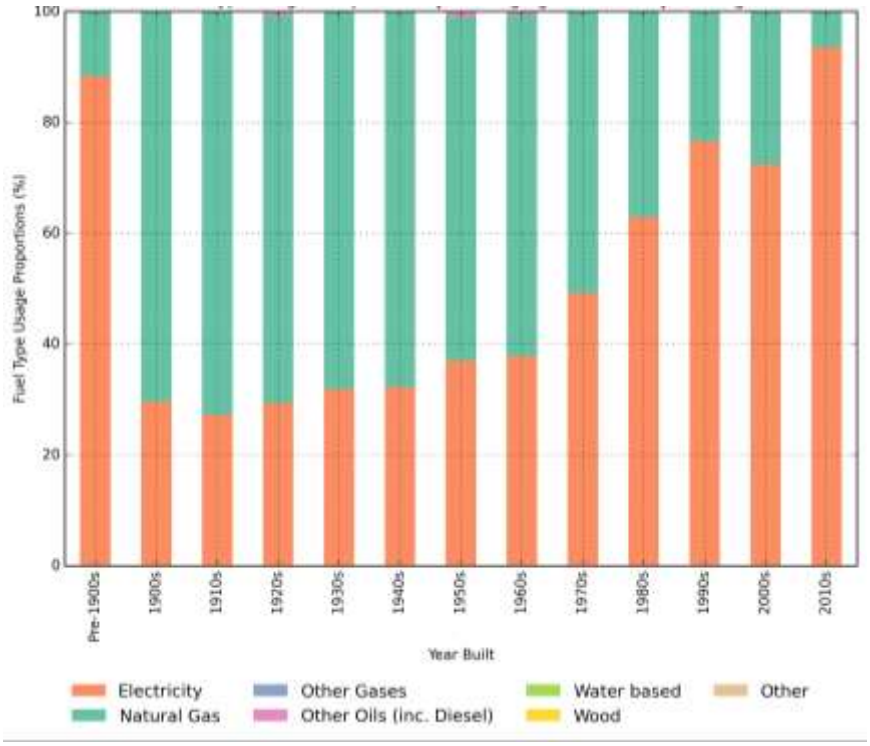
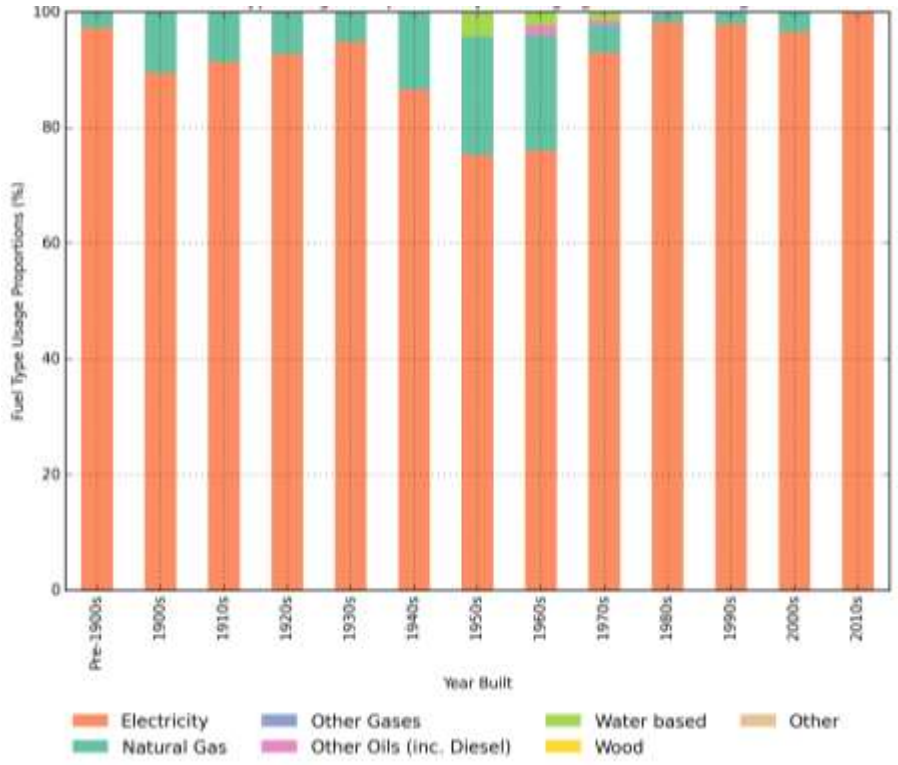


Chart IV.13: Fuel Type Usage Composition by Building Age – Office Buildings

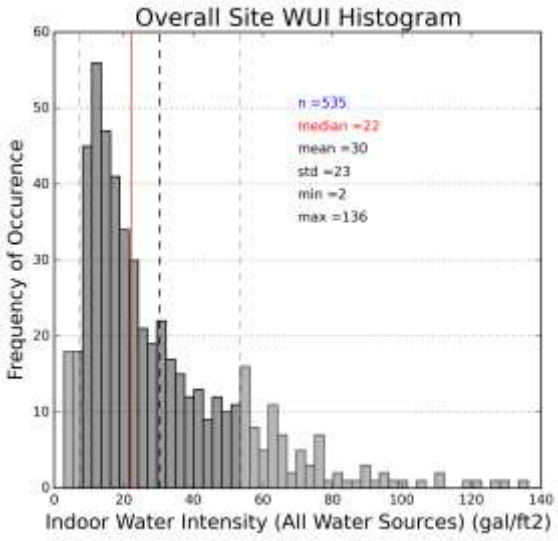


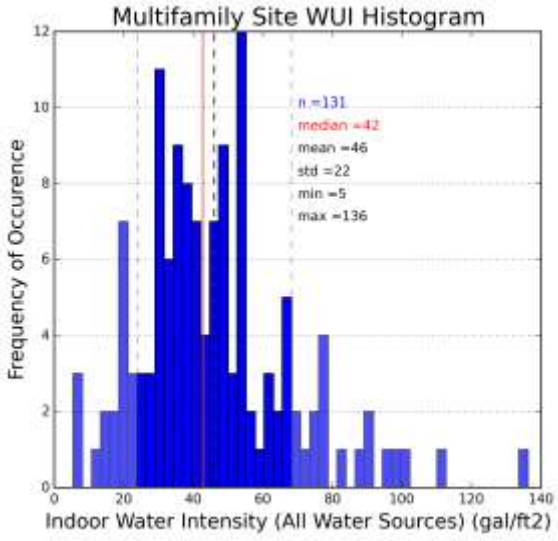
Water Use

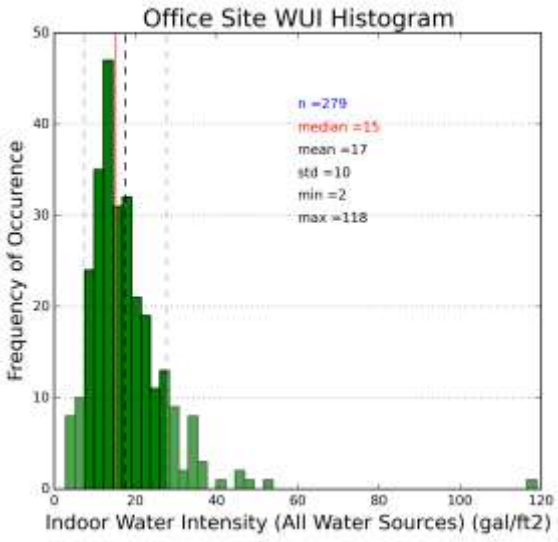
While water use is a required metric to be reported under the District's energy and water benchmarking requirements, many building owners are not aware of this requirement. Some confusion is due to the fact that water use is labeled as optional within Portfolio Manager. Many members of the regulated community have been benchmarking their energy use for years, but have not been benchmarking their water use.

In 2012, so few building owners reported water data that nothing could be said of the resulting data. While 70% of building owners who reported benchmarking data did not report valid water data in 2013 (Chart IV.4B), enough did report to generate the histograms in Chart IV.14. The data shows that there is a wide variation in the amount of water used on a per-square-foot basis, and that multifamily buildings use dramatically more water than office buildings. This is actually not surprising, considering the amount of water-intensive activities that take place at home, relative to work. Notably, even *after* discarding outliers, there was still more than a ten-fold difference between the most and least water intensive properties.

Chart IV.14: Indoor Water Use Intensity, 2013







Analysis of Public Building Performance

As the performance of the public sector buildings is more directly the responsibility of the District Government, a deeper dive into their performance is warranted.

As shown in Chart IV.15, DGS buildings are more energy-intensive than national peers, with median source energy use for District facilities exceeding the national medians across all major use types. The most dramatic difference, in the recreation category, is a result of the inclusion of sports and public assembly facilities in the DC Parks and Recreation portfolio.

Chart IV.15: DGS Median Source Energy Use Intensity, Compared to National Median Source Energy Use Intensity, by facility type.

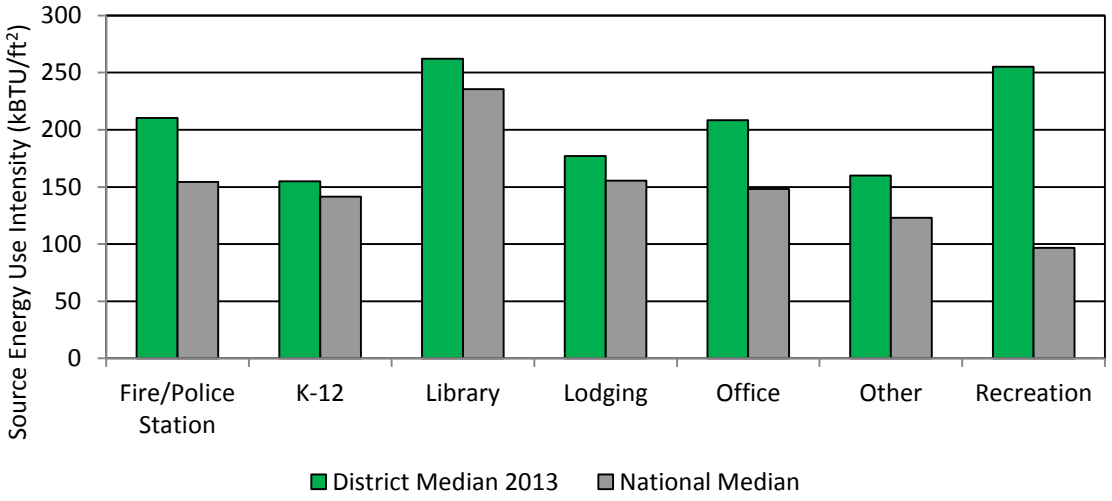
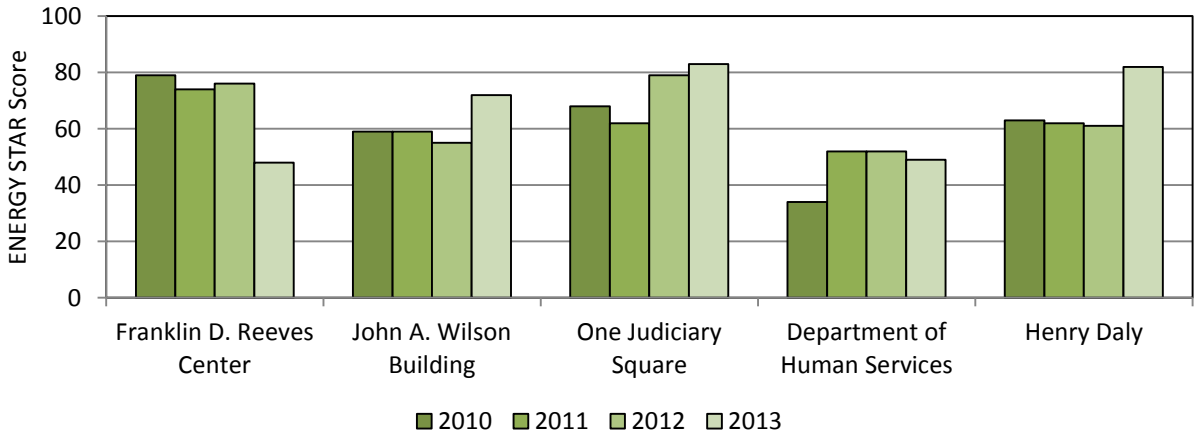


Chart IV.16 shows the change in ENERGY STAR scores for major DC Government office buildings from 2010 through 2013. This chart shows that at many major DC office buildings—including the John A. Wilson Building and One Judiciary Square, the ENERGY STAR score increased from 2010 to 2013.

Chart IV.16: Change in DGS Office Building ENERGY STAR scores over time.



The over 100 DC Public Schools (DCPS) do not lend themselves to a similar chart as offices. Chart IV.17 shows the distribution of ENERGY STAR scores across 113 DC Public Schools.

Almost half the buildings perform in the bottom 30% of energy efficiency for K-12 schools nationwide. However, the other 58 schools are distributed evenly across the remaining percentiles. It is important to note that this data predates many of the recent school modernizations. As Chart IV.17 indicates, the energy use of schools is more-or-less normally distributed, with the median schools being just slightly above the national median, as shown in Chart IV.I5

Chart IV.17: Histogram of DCPS ENERGY STAR scores

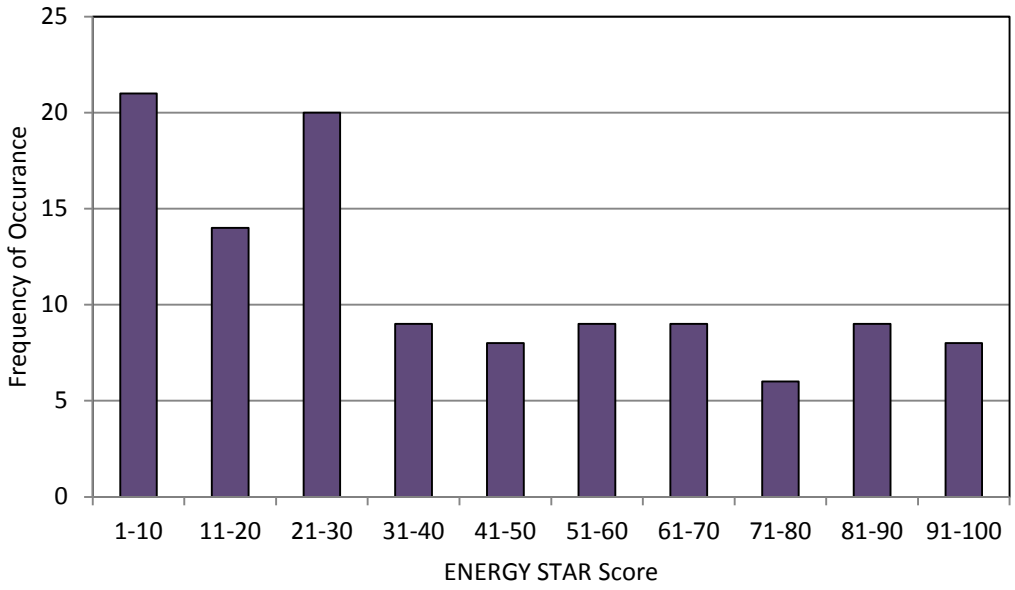
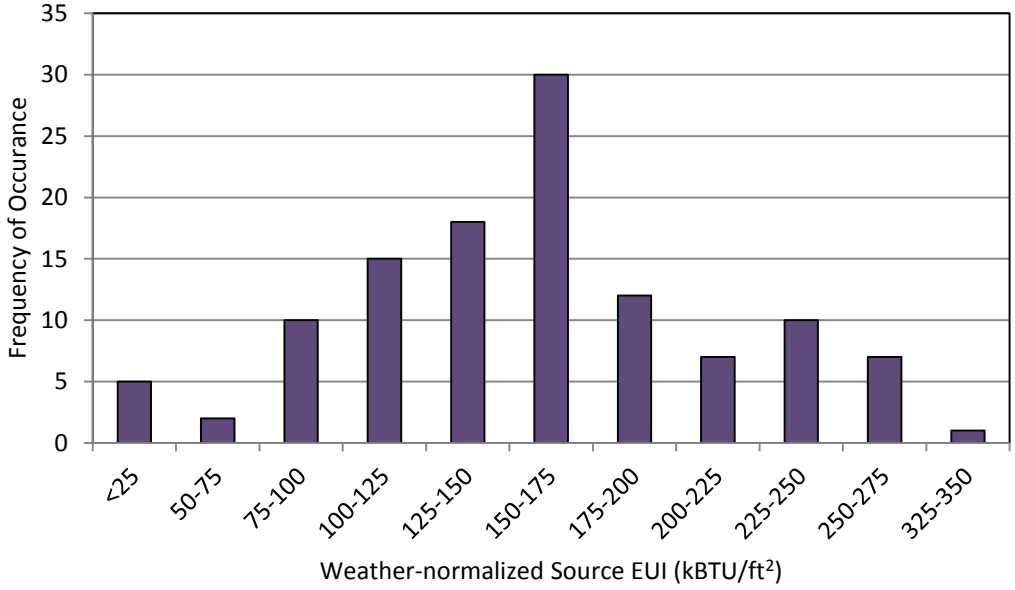
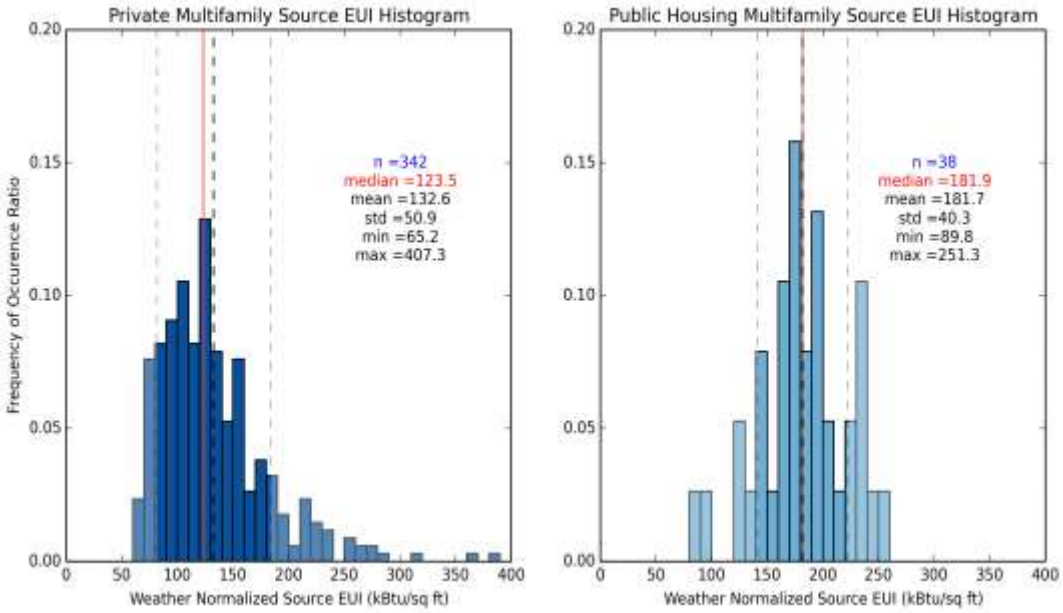


Chart IV.18: Histogram of DCPS Source Energy Use Intensities



The DCHA portfolio overall performs substantially worse than the national average. The national median for multifamily source EUI is 127.9. The median source EUI for private sector buildings is similar, at 123.5, as indicated in the graph on the left in Chart IV.19. However, the median energy performance of the DCHA buildings is substantially worse. The DCHA median source EUI is 182 kBtu/ft^2--42% higher than the national median. However, the most-energy intensive multifamily properties, even after removing outliers, use almost 50% more energy than the most-energy-intensive DCHA buildings.

Chart IV.19: Comparison of private (left) and public (right) multifamily Source Energy Use Intensity



It should be noted, however, that this higher energy use from public housing cannot be assumed to indicate just energy inefficiency, but also occupant density. While the benchmarking data for multifamily buildings does not track number of occupants, it does track number of bedrooms. In 2013, DCHA properties contained, on average, 2.15 bedrooms per thousand square feet, while the privately-owned multifamily buildings that reported 2013 data to DOEE contained, on average, 1.07 bedrooms per thousand square feet. When looking at the ratio of energy use to bedrooms, the private sector buildings (the majority of which are market-rate apartments or condominiums) appear to be more energy-intensive than the DCHA's portfolio.

Table IV.2: Weather Normalized EUI and Bedroom Density for Public and Private housing

Row Labels	Average of Weather Normalized Source EUI (kBtu/ft^2)	Average of Bedroom density (Bedrooms per 1000 ft^2)	Average of Source Energy per bedroom (kBtu/Bedroom)
DCHA	181.6921	2.15	97,478
Private Multifamily	132.6497	1.07	240,765

D. Data Analysis: Change over Time

Data Cleaning (Multi-Year)

DOEE conducted analysis of year-over-year changes in-house, using methodology developed by the U.S. Department of Energy for their Better Building Challenge. In this methodology, we took a sample of all buildings that submitted data for all the years being analyzed. Because of the phased-in nature of the benchmarking requirements, more buildings have reported year over year, so assessing data sets from prior years dramatically reduces the sample size. For analysis of changes in energy use from 2010 to 2013, only 205 buildings (mostly offices) reported valid data for all four years; for the analysis in change in energy use from 2012 to 2013, 443 buildings reported valid data for both years. For ease of calculating, DGS and privately-owned buildings were analyzed separately. DCHA buildings were excluded entirely because they did not report until 2013.

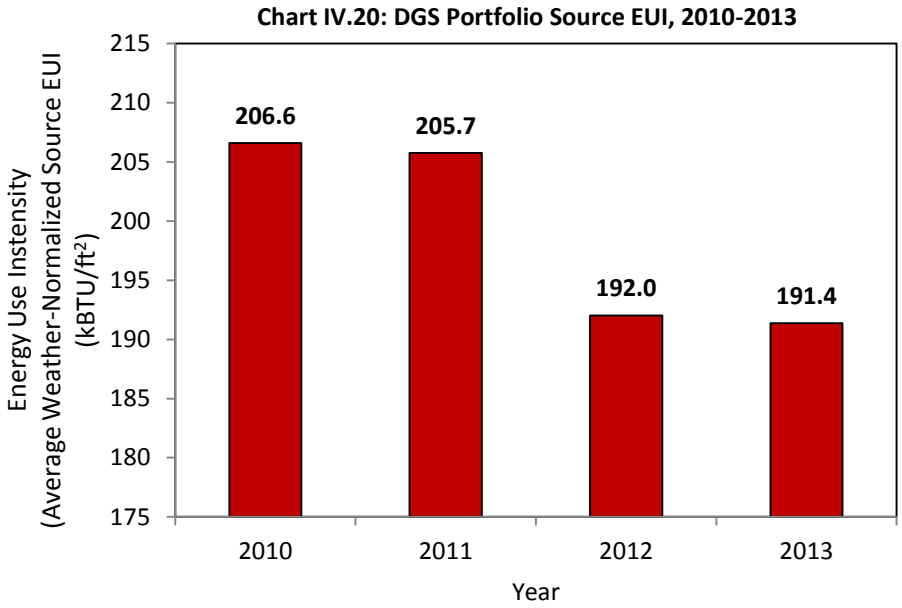
We then incorporated the cleaning steps discussed earlier by only including buildings that were in cleaned 2013 dataset for weather-normalized source EUI. Next, we removed any buildings where the source EUI changed by more than 50% from one year to the next. It should be noted that this is not because no building could possibly reduce its energy use by 50%. Energy use reductions of 50% and greater are in fact possible through an aggressive and comprehensive retrofit. However, such projects take a year or often more to complete. Therefore, it isn't plausible that an EUI could drop by 50% from one year to the next. Such changes are most likely due to data errors, and are thus removed. Once a cleaned multi-year dataset is assembled, total energy use and the total square footage of the dataset is calculated, and then the former divided by the latter to calculate the EUI of the group of buildings. This accounts for different building sizes; simply calculating the average of the EUI values for each building would not produce accurate results.

When comparing buildings to one another within a given year, DOEE focused on using source energy use intensity, in order to compare buildings that use electricity and buildings that use gas fairly. And for the DGS analysis, we continued to use weather-normalized source EUI. However, in July 2013 EPA adjusted its site-to-source conversion factors for electricity to reflect changes in the electrical grid of the United States—primarily, the increasing importance of renewables, which are not subject to the generation heat losses that exist for fossil fuels. Because the data collected by the DOEE benchmarking program from private buildings is a snapshot at the time of reporting, the site-to-source ratio of records reported prior to July 2013 and records reported after July 2013 are different. Therefore, in this report and going forward, we will use weather-normalized site EUI when making year-over-year comparisons for the analysis of private buildings. Because of the different reporting mechanism used by DGS buildings, DOEE has up-to-date and accurate site-to-source ratios for all DGS properties. As a result, the time series analysis of DGS buildings continues to use weather-normalized source EUI throughout this report.

Finally, though water data was collected beginning in 2012, it was not reported by most buildings until 2013 – and even then, it was underreported. Therefore, no analysis of the change in water use from 2012 to 2013 was possible.

Year – Over Year Change, DGS Buildings

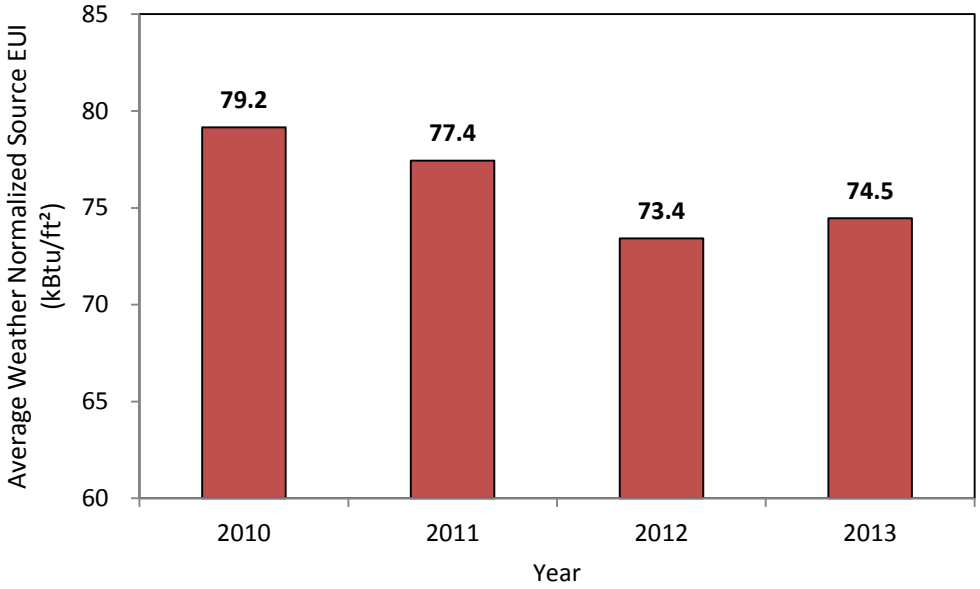
An analysis of DGS operated buildings reveals that District government buildings have much room to improve, but reduced their energy use 7% from 2010 to 2013 (Chart IV.20). However, there was virtually no change in energy performance overall between 2012 and 2013.



Year-Over-Year Change, Privately Owned Buildings

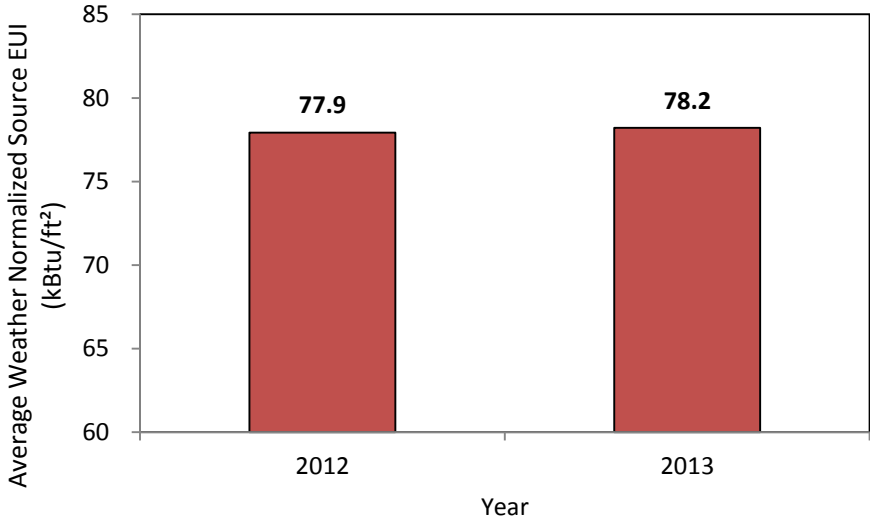
The 2012 Green Building Report touted a decrease in energy use intensity for private buildings between 2010 and 2012. Unfortunately, this trend was reversed in 2013. This backsliding was initially hidden by the drop in source energy ratio, which made the EUI of the private sector buildings appear to continue to drop in 2013. However, when looking properly at site EUI, while still accounting for weather, a different picture emerges. Buildings that reported their energy use for all four years from 2010 to 2013 reduced their overall average weather-normalized site EUI by 5.9% from 2010 to 2013. But between 2010 and 2012, the site EUI decreased by 7.2%, and then in 2013, increased by 1.4% (Chart IV.21).

Chart IV.21: Privately-owned Site EUI, 2010-2013



If the dataset is expanded to only look at whether the buildings reported 2012 and 2013 data, the change is more modest but still in the wrong direction—a 0.37% increase in weather-normalized site EUI from 2012 to 2013 (Chart IV.22).

Chart IV.22: Privately-owned Site EUI, 2012 & 2013



E. Lessons Learned

2013 was the first year DOEE actively enforced benchmarking compliance on privately-owned buildings, resulting in a dramatic increase in compliance. DOEE also became aware of large data quality problems within the dataset. This led to several key lessons learned:

- Beginning with 2014 data, buildings can no longer—as they could in 2013—submit a blank report and be in compliance. Now both valid energy and water intensity values are required. However, buildings are increasingly being held to higher standards too, including the proper submission of whole building data for multifamily properties.
- In 2014, and largely in response to issues with the quality of the 2013 dataset, DOEE issued a grant for a team to develop a data quality algorithm that could be used to identify good targets for compliance assistance and enforcement. The grant team from NYU CUSP also developed better methods for cleaning data and identifying statistically relevant findings which will be incorporated into future green building reports.
- DOEE produced new educational materials to help address knowledge gaps in the regulated community, especially among multifamily building owners. We believe education is a crucial complement to enforcement and that training and resources will be critical to increasing compliance.
- As the benchmarking program expanded with 2013 data to smaller buildings and facilities that did not report prior to being fined, we found more poor performers. On some level, this is not surprising—if measuring your energy use helps you manage it, then it stands to reason that buildings that have not been measuring their consumption have typically been managing it poorly or not at all.

Exempt Entities

Federal government buildings are not covered under the CAEA. However, the Energy Independence and Security Act of 2007 mandates that the federal government benchmark the energy performance of its facilities and make the results public online, and DOEE is working closely with the U.S. General Services Administration ("GSA") and the U.S. Department of Energy ("DOE") to accelerate this disclosure. DOEE also does not have the ability to enforce on foreign embassies and international institutions. Fortunately, more than 70 embassies—including most of the embassies 50,000 square feet and larger—have signed a sustainability pledge with the city, which includes a commitment to share their energy benchmarking data.

The regulation also specifically exempts several classes of buildings from benchmarking: buildings on a single tax lot that are under the size threshold and are separately metered for all utilities, and buildings that were built or sold during the reporting year. Additionally, exemptions may be requested from the GBAC if an owner believes disclosure of a building's energy use would harm the public interest, but no such exemptions have yet to be requested.

Utility Data Access

In order to successfully and accurately benchmark their buildings, owners and managers need access to whole-building energy and water consumption data. Utility provision of whole building energy data has been critical to the success of mandatory benchmarking in New York City and Seattle. District law and DOEE regulations require non-residential tenants to provide their landlord with data the owner needs to benchmark the buildings, and the tenants are liable for $100/day fines for non-compliance. Residential tenants have no requirements. This requirement on non-residential tenants renders moot many of the privacy concerns surrounding utility data of non-residential tenants in buildings covered by CAEA.

In collaboration with DOEE, the District's electric utility, Pepco, is supporting the benchmarking regulations by providing aggregate energy use data to authorized requestors where five or more accounts are present in the building. The aggregation of 5 accounts on a monthly interval ensures that no individual account's data can be isolated. The use of this service was optional in 2013, but will be required in 2014. In 2013, more than 100 buildings acquired whole building utility data from Pepco for reporting to DOEE. For cases where there are fewer than 5 accounts, and for water and natural gas data, DOEE has designed a common waiver form that a tenant can use to authorize their landlord to access their energy and water consumption data.

V. Codes, Regulations & Legislation

A. Green Construction and Energy Conservation Codes

The GBA mandates that "the Mayor shall, in consultation with the GBAC, submit construction code revisions to the DC Council that incorporate as many green building practices as practicable," and identifies the need to continually improve the energy code. As a result, the District is establishing itself as a leader in the arena of green codes development:

- In 2008, the District completed a comprehensive building code update, involving stakeholders including the GBAC, DOEE, DCRA, the District of Columbia Building Industry Association ("**DCBIA**"), the Apartment and Office Building Association ("**AOBA**"), and others. The following code improvements were adopted:
    - More stringent efficiency requirements for building envelope, water fixtures, and removal of impediments for the use of waterless urinals and green piping
    - Adoption of ASHRAE Standard 90.1-2007 for commercial buildings
    - "30 Percent Solution"[11] energy efficiency strategies for low-rise residential buildings
    - Stormwater management measures, including on site rainwater retention and easier methods for disconnecting downspouts
    - Urban heat island requirements for flat roofs

- In 2012, the Mayor issued a directive for the District's Construction Codes Coordinating Board (**"CCCB")** to leapfrog the International Code Council 2009 model codes and instead move directly to the 2012 versions. The 2012 I-codes include the International Green Construction Code (**"IgCC"**) for the first time, as well as a new International Energy Conservation Code (**"IECC"**). In March of 2012, the CCCB and its Green and Energy Technical Advisory Groups began the process of adapting the IgCC and IECC for use in the District. The initial versions of the Green and Energy Conservation Codes were issued for a first public comment period in late 2012. After two additional rounds of public comments, the CCCB submitted the final code proposals to the Mayor. The 2013 DC Construction Codes were approved by the DC Council on March 28th, 2014[12]. The Green Building Division at DCRA was very involved with the Green and Energy TAG's.

With the adoption of the 2013 DC Construction Codes, including the new IgCC and IECC, the District now has one of the greenest construction codes in the country. However, compliance and enforcement are essential to ensuring building performance is improved. Recognizing the importance of a strong code enforcement program, the District established the Green Building

[11] Advanced by the Energy Efficient Codes Coalition, http://www.energyefficientcodes.org/.

[12] The 2013 DC Construction Codes are available at http://dcra.dc.gov/page/regulations-dcra

Division at DCRA. The Green Building Division is responsible for the enforcement of the Green Building Act, Green Construction Code and Energy Conservation Code. Three staff were hired for the Division in 2013 to build out the green building program including the development of the green building intake, permitting, inspections and certificate of occupancy issuance process. Additionally, they provided green building training for DCRA staff, third-party plan reviewers and inspectors, and the building community and developed green building educational tools and resources to prepare them for the adoption of the new green and energy codes.

The agency intends to continue this commitment with the hiring of additional technical green building staff (e.g. green building plan reviewer and inspector), increase investment in training and education, further develop green building resources and tools, and increase inter-agency coordination with other agencies critical to green building (DGS, DOEE, DDOT, DHCD, DCHA, DMPED and OCA).

B. Rulemaking

As discussed in the previous Green Building Report, a number of new rules related to implementation of the GBA were published in 2013:

- 60 DC Register 367, Volume 60, Number 3, published January 18, 2013:

  In this rule a new section, 3513, was added to DCMR Title 20, Chapter 35, and the definitions in Section 3599 were amended. The final rulemaking followed an extensive stakeholder engagement process with two rounds of proposed regulations in 2011 and 2012, and was supported by multiple guidance documents published online. These final regulations and guidance documents implement the energy and water performance benchmarking provisions of the Green Building Act and its amendments, which mandate that owners of privately-owned buildings annually benchmark their buildings using the Portfolio Manager tool and report the results to the District for public disclosure.

- D.C. Register 11318, Volume 60, Number 33, issued August 2, 2013:

  In this rule, DCMR Title 12 Chapter 2A was amended to include new definitions. These emergency regulations apply to all construction projects that are required to comply with the GBA (D.C. Official Code § 6-1451.01), including publicly-owned or publicly financed projects, and private-owned projects of 50,000 square feet or more of gross floor area. The emergency regulations further clarify the GBA's intended definition of "residential occupancy" to include "residential group R-2, R-3 or R-4 occupancies, and buildings regulated by the Residential Code."

  The rule also further clarifies the definitions of new construction and substantial improvement that are found in the Act. New construction is now defined as "the construction of any building or structure whether as a stand-alone, or an addition to, a building or structure. The term 'new construction' includes new buildings and additions or enlargements of existing buildings, exclusive of any alterations or repairs to any existing portion of a building." Substantial improvement is defined as "any repair or

alteration of, or addition to, a building or structure, the cost of which equals or exceeds 50 percent of the market value of the building or structure before the repair, alteration, or addition is started."

C. Legislative Amendments

No legislative amendments to the Green Building Act were made in 2013.

VI. Implementation

A. Capacity Building, Training & Education

The District continues to improve its capacity to support green building development, and has committed to providing staff and stakeholders training, education, resources and tools for the advancement of green building in the city.

Capacity Building

In calendar year 2013, DCRA established its Green Building Division with the hiring of a Green Building and Sustainability Coordinator, Green Building Program Analyst, and a Green Building Program Support Specialist. The primary goal of the Green Building Division is to effectively enforce the Green Building Act and the new Green Construction and Energy Conservation Codes in the District through plan review, inspections, educational resources, and training. In addition, DCRA designated a public facing office at the agency's headquarters for the Green Building Division. In the FY14 budget spending plan for the Green Building Fund, additional positions for a green building inspector and green building plan reviewer were listed. The hires are crucial to the development and implementation of the 2013 DC Construction Codes and GBA.

An additional position was dedicated in the Green Building Fund to support a staff person to work on the ENERGY STAR benchmarking program at DOEE. Finally, monies were set aside from the fund and earmarked for DGS to support the work of energy and water benchmarking for our public buildings.

Training & Education

DCRA spent a significant amount of money and dedicated much staff time to code and other trainings. The agency held 29 trainings with roughly 800 participants in 2012 and 2013, including several focused on green building and energy code compliance, including the list below:

2013 (20 Trainings, 440 month attendees)

- **ICC** – 2012 IECC Performing Plan Review
- **ICC** – 2012 IECC Performing Inspections
- **Everyday Green** - Building Science Fundamentals 101

2012 (9 Trainings, 295 attendees)

- **USGBC** - Green Building Basics and LEED Online
- **ICC** - 2012 IECC Fundamentals
- **ICC** - Developing Green Building Ordinances and Programs
- **Prospect Solar** - Solar Panel Installation
- **ASHRAE** - Complying with Standard 90.1 – 2010 (2 days)

- **ASHRAE** – Fundamental Requirements of Standard 62.1
- **ASHRAE** - Basics of High Performance Building Design
- **ASHRAE** - Understanding Standard 189.1 – 2011
- **CertainTeed** - The Practice of Sustainable Design for Homes

Green Building Symposium and Expo

In 2012 and 2013, DCRA hosted an annual Green Building Symposium and Expo–a day long educational green building conference that includes educational sessions, a keynote speaker and a local green building vendor expo. In both years, it is estimated that roughly 250-400 people were in attendance including the Mayor and many agency directors. In 2013, Jonathan F.P. Rose, a noted green affordable housing developer, gave the keynote address. [13]

B. Enforcement & Compliance

Enforcement of the GBA, Green Construction Code, Energy Conservation Code, and the Green Area Ratio occurs at multiple levels: agency Director accountability to the Mayor, public disclosure of benchmarking results, publication of the Green Building Report, building permitting and inspection of individual projects, and more. The weight of compliance rests on the permitting and inspection process which is outlined in the next section.

Project Permitting and Inspections

A basic green building permitting intake processes (called the "Green Building Intake Form"), standard operating procedures (**"SOPs"**), and tracking systems (Accela) have been in place at DCRA for many years with the mechanical plan reviewers taking on the cursory Green Building Act compliance review. With the establishment of the DCRA Green Building Division, DCRA has begun modernizing and streamlining GBA compliance, and green and energy code review and inspections processes to improve and track compliance. This represents a significant change in DCRA policy

The entire program is fully captured in the new Green Building Program Manual.[14] Anticipated benefits of effective and streamlined code enforcement and education through a robust, transparent green building program will (1) guarantee a higher level of code compliance and environmental benefits, (2) lower the soft costs for the implementation of new green technologies because of streamlined processes and lower permitting fees, and (3) educate stakeholders on more cost-effective and efficient ways to permit and build their projects.

Some of the highlights and innovations of DCRA's new green plan review and inspections process are below:

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[13] Presentations and video for the Green Building Symposiums are archived at - http://dcra.dc.gov/page/green-building-events-training-opportunties

[14] Available for download as an DCRA administrative bulletin at http://dcra.dc.gov/page/administrative-bulletins

- Created the first draft version of the Green Building Program Manual for review by stakeholders. The manual includes the new green building permitting, inspections and post certificate of occupancy guidelines and requirements at DCRA.
- Began updating the online building permit application to reflect the new codes and updated green review process.
- Developed a green building resource guide that serves to teach the public stakeholders a deeper knowledge of the District's green building regulations. The guide has information on case studies, best practices, educational resources, and more.
- Created a general email inbox for the Green Building Division to help deliver more effective customer service - green.building@dc.gov
- Began working with the third party inspections and plan review companies to update their role in the enforcement of green building regulations – specifically the energy code.
- Began working with DOEE's solar division and the DOEE solar stakeholder's group to update the solar permitting and inspections process, including modernizing solar permitting fees, creating a transparent and consistent review process and addressing problematic solar system design issues specific to the District (i.e. rack mounting on brick parapets).
- Began working with DOEE's green roof division to develop streamlined green roof permitting guidelines.
- Began updating DCRA's IT systems to reflect new green building regulations and allow for improved data tracking. This includes the online building permit application, a new solar building permit application and back-end data tracking.
- Began talking to the International Code Council to consolidate and publish free versions of the new Green Construction and Energy Conservation Codes in a combined, easy to read format, saving project teams extensive amounts of time.
- Began updating the DCRA website to include current and accurate information about the green building program at DCRA.

Green Building Enforcement Mechanisms

The GBA requires financial surety for mandated green building projects. With passage of the Green Building Compliance, Technical Corrections, and Clarification Amendment Act of 2012 ("**TCCAA**") four types of financial securities are now permitted including: (i) cash deposited into an escrow account; (ii) letters of credit; (iii) bonds; and (iv) binding pledges to fulfill green building certification. If the building owner fails to receive the required green building certification, the District now has the ability to draw down on funds or levy fines against the applicant. DCRA developed supporting process documentation for customers using either the "green building bond" or "binding pledge" pathway. Additionally, DCRA placed a "green financial security review" in the certificate of occupancy issuance workflow and is notifying customers who must complete the binding pledge at the building permit issuance, in order to avoid any delays.

The Green Construction and Energy Conservation Codes are enforced through the traditional code enforcement process (e.g. inspection sign-off, notice of violation, fines and infractions).

DCRA is in the process of updating the current building code violation/fine structure to adequately deter project teams from choosing to not comply as part of business.

C. Green Building Fund

As established by the Green Building Act, DCRA collects green building fees during the permit intake process, which in turn generate the Green Building Fund budget. The Green Building Fund (See Table 6 for revenues and expenditures) is to be used for: (a) streamlining administrative green building processes; (b) improving sustainability performance outcomes; (c) building capacity of development and administrative oversight professionals in green building skills and knowledge; (d) institutionalizing innovation; and (e) overcoming barriers to achieving high performance buildings. DOEE and DCRA worked diligently in 2013 to maximize the benefits of the fund, including hiring two more staff to implement the goals of the GBA, supporting the energy benchmarking program created in the CAEA, and awarding three grants under the Green Building Fund Grant program.

Table 6: Green Building Fund Revenue and Expenditures, (FY10 – FY13)[7]

Fund Activity	FY10	FY11	FY12	FY13	FY14	TOTAL
Revenues	$ 886,726	$ 745,206	$ 809,086	$ 1,688,587	$1,821,433.26	$ 5,951,038.26
Expenditures	$ 431,801	$ 180,654	$ 205,915	$ 642,403	$1,143,290.47	$ 2,604,063.47
Surplus	$ 454,925	$ 564,552	$ 603,171	$ 1,046,184	$678,142.79	$ 3,346,974.79

The Green Building Fund grant program funded three research projects in FY 2013, supporting innovative solutions to green the built environment in the District. In this inaugural round of the grant program, the GBAC wanted to diversify the grants to maximize their impact. The first, a *Net Zero Energy/ Water and Living Building Challenge Cost/ Benefit Analysis* sought to support deep innovation in green buildings. The second, *Assessing the Health Impacts of Urban Heat Island Reduction Strategies*, concentrated on the health issues related to the increased heat events in urban centers and how sustainable building measures could mitigate them. Finally, the third grant, *Green Building Manual: Green Building Resources, Document Submittal Templates, and Green Building Road Map* focused on the practical side of implementing increased green building policy and code modifications for the city. Each of the research projects and their outcomes are further explained below.

For more information and to read the full studies and reports discussed below, please visit DOEE's website at http://DOEE.dc.gov/publication/green-building-fund-grants.

Net Zero Energy/ Water and Living Building Challenge Financial Study for DC
The purpose of the *Net Zero and Living Building Challenge Financial Study: A Cost Comparison Report for Buildings in the District of Columbia* was twofold. First, to investigate costs, benefits and approaches necessary to improve building performance in the District of Columbia from LEED Platinum to net zero energy, net zero water and Living Building Challenge leves of performance. Second, to advise District government on policy drivers related to deep green

buildings and to analyze the opportunities for the District to offer incentives to advance most rapidly toward net zero energy, net zero water and Living Buildings.

The study conceptually transformed three LEED Platinum buildings (office new construction, multifamily new construction, and office renovation) in the District to net zero energy, net zero water and Living Buildings. Using real financial data from actual projects, the team considered the cost of enhanced energy conservation strategies, renewable energy, rainwater harvesting techniques and water reuse strategies, and those that would create Living Buildings.

Study on Mortality and Urban Heat Island Effect

The District of Columbia is susceptible to extreme heat events with health impacts that are exacerbated by the fact that the city is often significantly warmer than surrounding rural areas during the summer. Research from studies conducted by other cities has indicated that measures to reduce excess urban heat (known as "urban heat islands") can have a positive impact on weather conditions and health during extreme heat events. Many such measures are already a part of District policy, including promoting cool roofs and pavements that reflect sunlight rather than absorb it as heat and installing green roofs, shade trees, and vegetation to provide shade and other cooling benefits.

Assessing the Health Impacts of Urban Heat Island Reduction Strategies estimates possible reductions in heat-related mortality in the District assuming the installation of urban heat island reduction measures and determines if the number of days with weather conditions that are historically associated with high mortality will decrease significantly using cooling strategies. The study team identified four actual multi-day heat events, calculated excess mortality during those events, and modeled the impact of increased surface reflectance and increased vegetative cover on meteorological conditions and expected mortality.

The study found that a 10-percentage point increase in urban surface reflectivity could reduce the number of deaths during heat events by an average of 6%. Adding a 10% increase vegetative cover to the increases in reflectivity yielded an average 7% reduction in mortality during heat events. During the decades between 1948 and 2011, an average of 285 people died of heat-related causes (Kalkstein et al., 2011). A 6–7% decrease in mortality would save approximately 20 lives per decade. In addition, an even larger reduction would be expected in hospital admissions from heat-related illness, although this analysis was not in the scope of this study.

The District, given its current policy landscape and development, could achieve the increases in reflectivity and vegetation used in this study. Increasing District-wide roof reflectivity by 10 percentage points is achievable by converting dark grey roofs to white roofs on approximately 25 percent of the District's buildings. Assuming the average roof lasts 20 years, the District could achieve this with end-of-life roof replacements in slightly more than 5 years. Achieving the same increase in reflectivity for pavements would require the conversion of 50 percent of District pavements from dark asphalt to a slightly lighter option like grey concrete. A significantly smaller percentage of pavements would need to be converted if cool coatings were applied where feasible.

Development of Green Building Program Manual

With the adoption of the DC Green Construction Code, the GBAC considered it necessary to develop a series of guidelines for the private sector to provide guidance and information relating to DCRA steps and regulatory procedures, in order to assist the public in interpreting and complying with the relevant green building and energy conservation laws and regulations. With that direction, DCRA created the first draft of the Green Building Program Manual laid out in a typical project timeline including; 1) Design Phase; 2) Permitting Process; 3) Building Inspections; 4) Certificate of Occupancy; 5) Post-Occupancy; and 6) Enforcement.

Using Green Building Fund monies, DCRA awarded a local consultant a contract to develop an educational resource guide component to the Green Building Manual as well as submittal templates to be used by project teams to show compliance during permitting and inspections. The submittal templates allow for standardized documentation, expedited review times, and less time commitment by the project teams to build out customized documentation. The resource guide is a non-administrative companion to the green and energy codes that is intended to educate and help project teams throughout the construction process.

The manual is a living document and guide to assist in complying with the GBA and the codes. It identifies processes, links between green programs, submittal forms needed, and other information to ensure compliance. The fields of green building and energy efficiency are evolving daily, and new and better products, processes and technologies are being applied toward the goal of lowering the environmental impacts of construction. To this end, as new information is shared with and evaluated by DCRA, the manual will be updated quarterly and released as an administrative bulletin on the Green Building Division website to help guide project teams toward the current best practices in greening their projects consistent with legal and regulatory requirements.

Version 2 of the Green Program Manual is available on DCRA's website as an administrative bulletin under http://dcra.dc.gov/page/administrative-bulletins .

D. Incentives

Although formal incentive programs have yet to be developed to support green building investments, the District launched the Property Accessed Clean Energy (PACE) financing program in 2013. PACE is a powerful tool to drive private investment into buildings and provide property owners with lower utility bills, enhanced property values, and improved building maintenance, comfort, health, and resiliency. The upfront cost of building retrofits is a substantial barrier to deploying energy efficiency and clean energy in existing buildings, even when green technologies can save building owners substantial money over a project lifecycle. PACE financing pays for 100% of the capital costs of energy projects upfront, eliminating any out-of-pocket payments for building owners, thus reducing gaps in capital budgets. By providing financing over longer terms than are traditionally available to commercial loans (up to 20 years or more), PACE financing also reduces monthly payments, which in turn allows for

larger capital investments in green measures and the ability to achieve much deeper energy savings.

PACE financing therefore – particularly when paired with DC Sustainable Energy Utility rebates and other District incentives – provides an indispensable way to overcome first-cost barriers for green projects. By aligning ongoing savings with the semi-annual PACE payments, PACE increases net operating income (NOI), reduces capital costs, and cuts long term operating expenses. Further, because PACE only uses the District's tax collection authority to credit enhance private capital investment, it requires no direct funding from the District.

In 2013, DOEE's PACE contractors completed their first PACE project on an affordable multifamily development, located at 400 M Street in southeast DC, as part of the Capper Carrollsburg Hope VI redevelopment. The total amount of financing for the project was $340,000 dollars, resulting in a 15% annual reduction in energy usage and more than 40,000 dollars in avoided costs.

VII. Conclusion

The Sustainable DC Plan outlines six focus areas for advancing sustainability in our built environment: reduce energy consumption in our building stock and generate the remaining energy needs onsite or nearby; reduce water consumption and increase onsite rainwater capture; pursue minimal or zero waste (both waste water and solid waste, including downstream impacts) and eliminate toxic products in our buildings.

And while Sustainable DC established goals and metrics for each focus area, even greater coordination with District agencies, subject matter experts, and jurisdictions on the cutting edge of green building policy will be essential to advance our green building policy agenda in the coming years. Additional research on energy modeling and incentives will also be critical to supporting implementation of the Green Construction Code and improving energy benchmarking and building performance. We must also continue utilizing the Green Building Fund to conduct studies and finance innovative ideas such as net zero energy, Living Building Challenge, and other high performance projects. Lastly, the District must explore incentive programs that can off-set the differential cost of deep green and net zero building solutions.

But the GBA, benchmarking efforts, and new green codes are not enough alone to keep pace with a growing population and expanding building stock. In order to meet our aggressive Sustainable DC goals and continue leading the nation in sustainable development, we must leverage DCRA's newly created Green Building Division to advance compliance with the Green Construction and Energy Conservation Codes, and ensure there is sufficient training, education and enforcement in place to create a culture of green building in the development community. Similarly, the District's green building program, with support from the GBAC, must align with the Sustainable DC Plan in order to ensure a holistic approach to implementation and monitoring across District agencies.

This approach to modernizing and advancing green building initiatives in the District by pursuing a leading edge construction code, developing resources to support benchmarking efforts, and coordinating a holistic approach to GBA implementation, has established the District as a national leader in green building policy and development. It has also set precedence for ensuring green building technology is institutionalized into the mainstream building community. This momentum, alongside future plans to expand incentives and conduct additional studies has put the District well on track to achieve the aggressive Sustainable DC targets, and on the path to achieving the goal of being the healthiest, greenest and most livable city in the nation by 2032.

Glossary

AOBA	Apartment and Office Building Association
ASHRAE	American Society of Heating, Refrigerating and Air-Conditioning Engineers
AWDZ	Anacostia Waterfront Development Zone
AWDZ Act	National Capitol Revitalization Corporation and Anacostia Waterfront Corporation Reorganization Act of 2008
CAEA	Clean and Affordable Energy Act of 2008
CBD	Central Business District
CCCB	Construction Codes Coordinating Board
DCBIA	District of Columbia Building Industry Association
DCPL	District of Columbia Public Libraries
DCRA	Department of Consumer and Regulatory Affairs
DOEE	District Department of the Environment
DHCD	Department of Housing and Community Development
DMPED	Office of the Deputy Mayor for Planning and Economic Development
DGS	Department of General Services
DOC	Department of Corrections
DOH	Department of Health
DPR	Department of Parks and Recreation
DPW	Department of Public Works
DYRS	Department of Youth Rehabilitation Services
FEMS	Fire and Emergency Medical Services
GBA	Green Building Act of 2006
GBAC	Green Building Advisory Council
GBCI	Green Building Certification Institute

EGC	Enterprise Green Communities
EUI	Energy Use Intensity
GSA	U.S. General Services Administration
HFA	Housing Finance Agency
ICC	International Code Council
IECC	International Energy Conservation Code
IgCC	International Green Construction Code
LEED	Leadership in Energy and Environmental Design
LEED-AP	LEED-Accredited Professional
LID	Low-Impact Development
MPD	Metropolitan Police Department
MS4	Municipal Separate Storm Sewer System
OP	Office of Planning
OTR	Office of Tax and Revenue
PDRM	Preliminary Design Review Meetings
RFP	Request for Proposals
SOP	Standard Operating Procedures
TAG	Technical Advisory Group
TCCAA	Green Building Technical Corrections, Clarification and Revision Amendment Act
UDC	University of the District of Columbia
USGBC	U.S. Green Building Council

List of Appendices

Appendix A: 2013-2015 Work Plan

Green Building Advisory Council Actions & Updates	Target Date	Status
Green Construction Codes:		
Action 1: GBAC will work to support the development of the new Green Construction and Energy Conservation Codes in the District, as well as subsequent training for permitting and inspection staff, as well as the private sector construction industry.	Ongoing	Ongoing
Key Progress: Through Technical Advisory Groups (TAG) and engagement of both public and private sectors, the Green Construction Code was approved by the DC Council in March, 2014.	2014	Complete
Next Steps: DCRA and DOEE will continue to grow capacity to support the Green Construction and Energy Conservation Codes. In addition, GBAC members and District staff will train and outreach to the greater community.	Ongoing	Ongoing
Sustainable DC Implementation:		
Action 1: GBAC will work to integrate the Sustainable DC implementation plan with priorities for the advisory council, including spending recommendations for the Green Building Fund.	Ongoing	Ongoing
Key Progress: DOEE successfully issued two rounds of grant applications for the Green Building Fund Grant program to fund innovation and research in FY13 and FY14. GBAC members also advised the green building related Sustainable DC Task Forces in FY14 in order to help the task forces complete their work plans.	2013-2014	Complete
Next Steps: GBAC will continue to advise on the recommendations that come out of the final Sustainable DC Task Force Report. GBAC will also continue to advise on the projects funded under the Green Building Fund Grant program.	Ongoing	Ongoing
Green Building Innovation:		
Action 1: GBAC will continue to advise on deep green building innovation, including policies to support zero-energy and water construction, and Living Building Challenge certification, with a possible proposal to create a related incentive program.	2014	Ongoing
Key Progress: Funded by the Green Building Fund Grant program, a study was completed and published, which reported the incremental cost for achieving deep green building standards on three proto-typical projects.	2013	Complete
Next Steps: The GBAC will continue to support deep green building and investigate incentives and other funding structures for deep green building. An additional Green Building Fund Grant program project will look into various funding structures for deep green buildings, including	2014-2015	Ongoing

green banks, incentive structures and revenue neutral carbon pricing.		
Action 2: GBAC will consider and advise on the creation of a single family and low-rise residential green building standard or code for the District.	2015	Ongoing
Key Progress: DOEE supported the launch of the Mapdwell application in 2013, which allowed District residents to see the solar potential of single family homes. To date, approximately 1200 homes have installed solar panels, achieving more than 5 MW of renewable energy. The District also finalized the 2013 Energy Conservation Code in March of 2014, which applies to both single family and larger projects in the city.	2014	Complete
Next Steps: DOEE will be assembling a single family working group of public and private sector individuals to look at policy, standards, and training for individuals living in or working on single family and low-rise residential properties.	2015	Pending
Green Building Process & Regulation		
Action 1: When called upon, GBAC will host interagency meetings for coordinating large scale development projects in the District, and provide advice on green building opportunities in requests for proposals on projects.	Ongoing	Ongoing
Key Progress: DOEE coordinates responses to PUD and Large Tract review applications through the Office of Planning. In addition, applicants are encouraged to request a PDRM meeting during Design Development to seek technical assistance from District personnel.	Ongoing	Ongoing
Next Steps: This practice will continue.	Ongoing	Ongoing
Action 2: GBAC will advise on any amendments to the Green Building Act that may be relevant given the adoption of the District's new Green Construction Code.	2015	Pending
Key Progress: No action in 2013.		
Next Steps: A task force will be assembled in 2014/2015 to revisit and update the Green Building Act.	2015	Pending
Action 3: GBAC will convene discussions with the District's utilities and the Public Service Commission to support green building advances in the public and private sectors.	Ongoing	Ongoing
Key Progress: District government personnel have engaged utility providers and the DCSEU to increase energy and water efficiency in the District. PEPCO has now installed smart meters on all buildings in the City. The District has also worked with PEPCO to create a structure where there would be direct upload of interval energy data to Portfolio Manager in order to streamline benchmarking requirements. DCSEU's energy	Ongoing	Ongoing

sustainability programs, including home energy audits, the affordable solar program as well as retrofitting and education programs led to a 50,000 MWh savings in total electricity, $12.5 million gallons of water saved and more than $5.6 million dollars of investment in low-income services in 2013 alone.		
Next Steps: DOEE, in consultation with GBAC, is working on an idea to do "virtual" energy audits for every building in the District.	2015	Pending

Green Building Fund:		
Action 1: GBAC will continue to advise on the use of the Green Building Fund--including the ideas to be funded in the Green Building Fund Grant program.	Ongoing	In Process
Key Progress: Three grant proposals were awarded in the inaugural round of the Green Building Fund Grant program in 2013. The projects are intended to drive innovation and progress in green building throughout the District. Detailed information about these grants are included in this report.	2013	Complete
Next Steps: The GBAC will work together to award additional grants in 2014 and 2015.	2014 & 2015	Ongoing

GBAC Outreach:		
GBAC will publish the Green Building Report for 2012.	2013	Complete
GBAC will publish the Green Building Report for 2013.	2014	Complete
GBAC will publish the Green Building Report for 2013.	2015	In Progress

Appendix B: GBAC Appointees

Private Sector Appointees

Sean Cahill, *Property Group Partners*
Ethan Landis, *Landis Construction*
Anica Landreneau, *HOK*

Non-profit Private Sector Appointees

Patricia A. Rose, *Greenspace NCR*
Sandy Wiggins, *BALLE (Board Chair)*
Jessica B. Zimbabwe, *Urban Land Institute*

Public Sector Appointees

Bill Updike, *District Department of the Environment*
Director Michael P. Kelly, *Department of Housing and Community Development*
Rabbiah Sabbakhan, *Department of Consumer and Regulatory Affairs*
Director Harriet Tregoning, *Office of Planning*
Director Brian J. Hanlon, *Department of General Services*

Appendix C: LEED Certifications, 2013

Project Name	Zip	Rating System	Cert Level	Points	Gross Area
Carnegie Endowment for Intl Peace	20036	LEED-EB:OM v2009	Gold	64	89000
Confidential	20005	LEED-NC 2.2	Gold	39	76276
Baker McKenzie	20006	LEED-CI v2009	Gold	63	62192
New Sibley Cancer Center	20016	LEED-NC v2009	Gold	60	37281
Confidential	20004	LEED-EB:OM v2009	Certified	41	1213119
CMG DC Relocation	20001	LEED-CI v2009	Certified	49	60538
UNCF	20001	LEED-CI v2009	Silver	56	35931
Starbucks 1225 Eye Street	20005	LEED for Retail (CI) Pilot	Certified	25	1400
Confidential	20001	LEED-EB:OM v2009	Silver	50	355129
St. Elizabeth West Campus	20032	LEED-NC 2.2	Gold	42	1217000
750 First Street	20002	LEED-EB:OM v2009	Gold	63	386890
440 First Street	20001	LEED-CS 2.0	Platinum	48	141929
WTorre Nacoes Unidas 3	20036	LEED-CS 2.0	Silver	32	237246
Confidential	20024	LEED-CI v2009	Gold	62	45034
1350 I Street NW	20005	LEED-EB:OM v2009	Gold	61	410864
Neighbor Works America	20002	LEED-CI v2009	Silver	56	58340
Office Renovation-2011268-00	20522	LEED-CI v2009	Silver	56	6853
Business Roundtable	20001	LEED-CI v2009	Gold	67	21293
Confidential	20005	LEED-EB:OM v2009	Platinum	83	231089
The Advisory Board Company	20037	LEED-CI v2009	Certified	48	34980
2175 K Street NW	20036	LEED-EB:OM v2009	Gold	60	146455
1250 Eye Street	20005	LEED-EB:OM v2009	Gold	60	187269
Janney Elementary School Modernization	20016	LEED for Schools	Gold	48	84400
Confidential	20036	LEED-CS 2.0	Gold	35	153159
Intuit DC	20004	LEED-CI v2009	Certified	40	5200
Confidential	20010	LEED-CI v2009	Gold	63	22247
1800 K Street	20006	LEED-EB:OM v2009	Gold	64	224865

Confidential	20005	LEED-EB:OM v2009	Gold	62	305868
One Metro Center	20005	LEED-EB:OM v2009	Gold	63	456936
Unity Health Care - Anacostia	20020	LEED-NC v2009	Silver	57	27934
DHS Consolidated Training Center	20002	LEED-CI v2009	Silver	57	40225
Confidential	20003	LEED for Retail (CI) Pilot	Gold	32	2146
Confidential	20001	LEED for Retail (CI) Pilot	Silver	34	2800
Manulife DC- 1100 NY Ave	20005	LEED-EB:OM v2009	Gold	65	569143
Franklin Court	20005	LEED-EB:OM v2009	Gold	60	508315
740 15th Street NW	20005	LEED-EB:OM v2009	Gold	60	199815
Confidential	20007	LEED-NC 2.2	Gold	43	44000
Scott Montgomery	20001	LEED FOR SCHOOLS v2009	Certified	44	81331
Sutherland Asbill and Brennan LLP	20001	LEED-CI v2009	Silver	51	136495
360H Street	20002	LEED-NC 2.2	Silver	33	251355
Confidential	20006	LEED-CS 2.0	Platinum	45	250000
Capital Area Food Bank	20017	LEED-NC 2.2	Silver	34	121608
1050 K Street	20001	LEED-EB:OM v2009	Platinum	82	159304
1776 EYE	20006	LEED-EB:OM v2009	Gold	66	253112
VA at 90 K Street	20002	LEED-CI v2009	Silver	52	45600
1818 N Street	20036	LEED-EB:OM v2009	Gold	68	108209
Confidential	20001	LEED-CI v2009	Silver	54	5850.9
Confidential	20002	LEED-NC 2.2	Gold	45	331415
TD Bank - Washington DC	20036	LEED-CI Retail v2009	Gold	65	4300
455 Massachusetts Avenue NW	20001	LEED-EB:OM v2009	Platinum	81	247330
Progression Place	20001	LEED-CS v2009	Silver	52	195748
Global DC	20036	LEED-CI Retail v2009	Silver	53	9677
1701 Pennsylvania Avenue	20006	LEED-EB:OM v2009	Gold	63	218478
Columbia Square Recertification	20004	LEED-EB:OM v2009	Gold	66	682000
90K - CBP Phase II	20002	LEED-CI v2009	Silver	59	96000
Confidential	20004	LEED-CI v2009	Certified	42	27000
Confidential	20006	LEED-NC 2.2	Silver	33	178247
Meridian Public Charter School	20009	LEED FOR SCHOOLS v2009	Certified	43	61220
Ariel Rios Federal Building	20004	LEED-EB:OM v2009	Silver	54	475570
Educare of Washington DC	20019	LEED-NC v2009	Silver	55	32352
Manulife - 1850 M Street	20036	LEED-EB:OM v2009	Gold	65	259948
National Office Furniture - DC	20001	LEED-CI v2009	Silver	57	2390
1800 M Street	20036	LEED-EB:OM v2009	Gold	60	619836
1601 K Street	20006	LEED-EB:OM v2009	Silver	50	231423

AFGE 10th Floor	20001	LEED-CI v2009	Gold	69	9625
The Executive Building	20005	LEED-EB O&M	Gold	52	351009
2000 M Street	20036	LEED-EB:OM v2009	Gold	66	304110
DC Consolidated Forensic Lab	20024	LEED-NC 2.2	Platinum	52	263500
Nuclear Energy Institute (NEI)	20005	LEED-CI v2009	Gold	66	40847.5
DBIA Headquarters	20004	LEED-CI v2009	Silver	53	8538
SMITHGROUP JJR DC	20001	LEED-CI v2009	Platinum	86	30570
T Rowe Price WIC	20036	LEED-CI v2009	Silver	51	3680
2020 K Street	20006	LEED-EB:OM v2009	Gold	61	431581
AIA/DC	20007	LEED-CI v2009	Gold	73	10588
Confidential	20431	LEED-EB:OM v2009	Platinum	80	791100
Dept of the Interior - Childcare Center	20240	LEED-CI v2009	Platinum	90	9264
Regents Hall	20057	LEED-NC 2.2	Gold	47	153600
Francis Gregory Library	20020	LEED-NC 2.2	Gold	40	24275
1909 K Street	20036	LEED-EB:OM v2009	Gold	73	242937
90K - CBP	20002	LEED-CI v2009	Certified	47	73226
Confidential	20006	LEED-CI v2009	Platinum	86	145965
Verizon Wireless Union Station	20002	LEED-CI v2009	Platinum	83	1699
1899 L Street	20036	LEED-EB:OM v2009	Silver	50	159817
District of Columbia Courts Building C	20037	LEED-NC v2009	Gold	66	53821
Confidential	20036	LEED-CI v2009	Gold	76	10400
90K - USPC	20002	LEED-CI v2009	Silver	54	31423
Confidential	20003	LEED-CI v2009	Silver	54	16375
CoStar DC-5th 7th 8th 9th and 10th Flrs	20005	LEED-CI v2009	Platinum	90	88250
PNC Bank Branch - 800 17th Street	20006	LEED-CI 2.0	Platinum	44	6685
One Thomas Circle	20005	LEED-EB:OM v2009	Gold	64	238444
Inter-American Foundation	20004	LEED-CI v2009	Certified	45	11959
Confidential	20202	LEED-EB:OM v2009	Silver	59	607259
Capitol View	20024	LEED-EB:OM v2009	Gold	60	252361
McPherson Building	20005	LEED-EB:OM v2009	Platinum	81	319388
Open Society Institute - Expansion	20005	LEED-CI v2009	Silver	54	4975
Manulife - 555 12th Street NW	20004	LEED-EB:OM v2009	Gold	63	887642
1130 Conn NW	20036	LEED-EB:OM v2009	Gold	61	228126
Confidential	20001	LEED-CI v2009	Silver	55	248432
KPMG -DC	20006	LEED-CI v2009	Silver	50	89140
DHS at Union Square	20002	LEED-CI v2009	Gold	68	5921
DBI DC OFFICE	20036	LEED-CI v2009	Gold	62	7554

Washington Highlands Library	20032	LEED-NC 2.2	Gold	42	22250
Confidential	20003	LEED-CI v2009	Platinum	82	269508
Deloitte DC National Tax and Touchdown	20004	LEED-CI v2009	Silver	51	60000
Confidential	20018	LEED-CI v2009	Gold	60	15201
Confidential	20036	LEED-EB:OM v2009	Gold	69	171727
The HSC Headquarters Building	20006	LEED-NC 2.2	Gold	41	33884

Appendix D: ENERGY STAR, 2013

Building Owner	Property Manager	Address	Rating(s)	Square Feet	Year Built
Liberty Property Trust		1129 20th Street NW	82	182220	2009
Liberty Property Trust		1100 17th Street NW	75	151599	1963
601 Thirteenth Street, ALP		601 13th Street, NW	76	604301	1990
National Association of Housing and Redevelopment Officials	Akridge	630 I Street NW	81	18341	1994
ASLA		636 Eye Street NW	89	12800	1994
USAA Real Estate Company		700 Sixth Street, NW	83	306459	2009
Akridge		900 Seventh Street NW	79	318853	2004
GLL Real Estate Advisors	Akridge	975 F Street NW	80	187954	2006
APA LLC	Cushman Wakefeild	10 G Street NE	90	280169	1997
Monument Realty		100 M Street SE	80	256777	2008
TIAA-CREF	Hines	1001 Pennsylvania Ave, NW	75	835878	1985
JBG/Jefferson Court LLC - c/o JBG/Commercial Management, LLC		1025 Thomas Jefferson Street, NW Suite 160G	89	365917	1984
Carr Properties		1025 Vermont Avenue, NW	79	109878	1963
K-11 Partners	The Lenkin Company Management Inc.	1050 K Street NW	81	153440	2008
USGBGF Waterfront Station LLC, c/o Cushman & Wakefield		1100 4th Street SW	77	355846	2010
John Hancock Life Insurance Company (USA)		1100 New York Avenue, NW	90	580706	1991
American Realty Advisors	Cushman && Wakefield	1101 14th St NW	82	119962.7	1981
USGBGF Waterfront Station LLC, c/o Cushman & Wakefield		1101 4th Street SW	79	296748	2010
RG-1101 K, LLC	Lincoln Property Company	1101 K Street, NW Suite B110	84	313852	2006
1101 New York Holdings LLC		1101 New York Ave NW	77	391370	2007
Columbia DC 1111 19th Street Office Properties, LLC	Cushman & Wakefield	1111 19th St NW	76	290402	1979
TF Cornerstone, Inc.		1156 15th St, NW	82	177404	1967
Brookfield Properties		1200 K Street NW	93	429455	1992
AAAS	Akridge	1200 New York Avenue NW	82	231089	1996

Forsterlane Realty Inc	Hines Interest Limited Partnership	1200 19th St. NW	94	339100	1964
1201-1225 New York Ave SPE LLC	Lincoln Property Company	1201 New York Avenue, NW	85	510400	1988
Washington Real Estate Investment Trust		1220 19th Street, N.W.	85	103501	1978
Brookfield Properties		1250 Connecticut Ave NW	87	195087	1964
Principal Global Investors	Polinger	1200 1st Street NE	92	303703	2007
Carr Properties		1255 23rd Street, NW	92	358737	1983
Inter-American Development Bank		1300 New York Ave, NW	88	1018508	1982
Quadrangle Management Company		1301 Pennsylvania Ave. NW	80	231902	1981
Gaedeke Group LLC (Corporate Office)		1310 G Street, NW Suite 790	80	227165	1991
TIER REIT, Inc		1325 G Street Suite 740	85	333484	1968
Boston Properties Washington Regional Office		1330 Connecticut Ave., NW	83	335991	1984
Inter-American Development Bank		1350 New York Ave, NW	82	143590	1983
Brookfield Properties		1400 K Street, NW	89	212651	1982
1401 NYA REO, LLC	Cassidy Turley	1401 New York Ave NW	87	251116	1982
Ponte Gadea Washington, LLC	Cushman && Wakefield	1445 New York Avenue NW	90	205656	1985
Carr Properties	Cushman && Wakefield	1575 Eye Street, NW	85	225112.6	1979
PPF OFF 1601 K Street, LLC	Property Group Partners, LLC	1601 K Street NW	83	231860	2005
TF Cornerstone, Inc.		1620 I St, NW	75	117509	1971
Brookfield Properties		1625 Eye Street NW	83	421736	2003
Shorenstein Realty	Shorenstein Realty	1625 K Street, NW	79	109300	1943
Grosvenor Americas	Cushman && Wakefield	1701 Pennsylvania Ave.	76	220603	1962
The Tower Companies		1707 L Street, NW	86	109926	1960
Matomic Operating Co.	STOLADI	1717 H St. NW	76	302225	1990
Willco Companies	Willco Companies	1722 Eye Street	80	180564	1982
Tishman Speyer		1730 Pennsylvania Ave NW	84	319420	1969
Washington Real Estate Investment Trust		1775 Eye Street NW	83	198893	1969
1776 Eye SPE LLC	Cushman && Wakefield	1776 I St NW	85	236105	1987
PRISA Acquisition, LLC	Cushman & Wakefield	1800 M Street, NW	81	615281	1975

Service Employees International Union (SEIU)	Cushman && Wakefield	1800 Massachusetts Avenue, NW	82	217543	1979
Lenkin - N LP	The Lenkin Company Management Inc.	1818 N St NW	80	108209	1984
The Tower Companies		1828 L Street Street, NW	81	338520	1965
John Hancock Life Insurance Company (USA)		1850 M St., NW	85	254980	1986
Shorenstein Reality Services, L.P.	Shorenstein Reality Services, L.P.	1875 K Street, NW	75	208952	2002
Paramount Group		1899 Pennsylvania ave. N.W.	81	205741	1915
TIAA-CREF	Hines	1900 K Street	83	379324	1996
1901 L Street, LLC	Cushman & Wakefield	1901 L Street, NW	75	138244	1982
Washington Real Estate Investment Trust		1901 Pennsylvania Ave	88, 82, 82, 78	109909	1959
Deka Immobilien Investment GMBH	Cushman & Wakefield	1999 K Street NW	76	266515	2009
Government Properties Income Trust	The RMR Group	20 Massachusetts Avenue NW	89	343324	1973
2000 L EAT Owner LLC	Cushman & Wakefield	2000L St N.W	76	411505	1968
ARA GREEN	Quadrangle Management Company	2033 K Street N.W.	80	134457	1975
Tishman Speyer		2100 Pennsylvania Avenue	76	322250	1966
Boston Properties Washington Regional Office		2200 Pennsylvania Avenue	91	516737	2011
Washington Real Estate Investment Trust		2445 M Street N.W.	80	305149	1986
425 Eye Street NW, LP, C/O Paramount Group, Inc.		425 I St.,NW	97	376559	1973
BREOF 450H Street REO, LLC	Cassidy Turley	450 H Street, NW	75	30125	1988
Square 516S Office Venture, LLC	Cushman && Wakefield	455 Massachusetts Ave NW	81	247330	2008
Boston Properties Washington Regional Office		500 E Street, SW	84	280118	1987
Boston Properties Washington Regional Office		500 North Capitol Street NW	92	231958	2012
Liberty Property Trust		1425 New York Ave NW	85	284845	1992
Boston Properties Washington Regional Office	Cushman && Wakefield	505 9th Street NW	77	347262	2007
CLPF - CC Pavilion, LP	Cushman && Wakefield	5335 Wisconsin Avenue	88	204621	1990
Jones Lang LaSalle Americas, Inc.		555 12TH STREET NW	92	864085	1994
Polinger Shannon & Luchs		601 New Jersey Avenue	94	275102	2001

Brookfield Properties		650 Massachusetts Avenue NW	87	346973	1988
700 Thirteenth Street LLC	Jones Lang LaSalle	700 13th Street	81	251138	1988
JBC Funds 740 LLC	Buck Management Group LLC	740 15th Street NW	82	199912	1907
John Hancock Life Insurance Company (USA)		750 17th St., NW	76	136452	1989
Brookfield Properties		77 K Street NE suite 100	92	338929	2008
Brookfield Properties		799 9th street N.W.	76	219877	2001
Columbia Property Trust		80 M Street , SE	88	319955	2001
800 K Street Associates, LLC	The JBG Companies	800 K Street, NW	78	536839	1989
BREOF 801 North Capitol REO, LLC	Cassidy Turley	801 North Capitol Street, NE	81	120921	1966
801 17th Holdings LLC	Property Group Partners, LLC	801 17th Street NW	77	245597	2010
810 Seventh Avenue SPE LLC	PM Realty Group	810 7th St N.W.	77	282901	1991
UNIZO Real Estate DC Three LLC	CBRE, Inc. (DC)	820 1st ST NE	89	298533	1990
CIM Urban REIT Properties VI L.P.	The CIM Group, LP	830 First Street, NE	79	252992	2001
Union Square 825 Property LP		899 North Capitol Street	86	314858	1973
Carr Properties		901 K Street	85	247723	2009
Boston Properties Washington Regional Office		901 New York Ave., NW	82	604549	2004
American Chemical Society		1550 M St. NW	90	85277	1987
American Chemical Society		1155 16th Street, N.W.	84	115470	1954
American Society for Microbiology		1752 N STREET N.W. SUITE LL 5 - C LEVEL	84	94580	1979
American Society of Hematology	AtSite	2021 L Street	89	81032	2010
John's Hopkins University	Cassidy Turley	1619 Mass ave	88	64843	1963
Johns Hopkins University	Cassidy Turley	1717 Mass Avenue, NW	85	122460	1962
Blenheim DC I LLC c/o Jones Lang LaSalle	Jones Lang LaSalle - 1801 K Street	1801 K Street, NW	84	578052	1971
Boston Properties Washington Regional Office		600 Maryland Ave., SW Suite 150W	91	572811	1982
Carnegie Endowment for International Peace	Carnegie Endowment for International Peace	1779 Massachusetts Ave NW	82	89223	1997
Alecta Pensionsforsakring Omsesidigt	Transwestern	815 Connecticut Avenue	81	231784	1963
TREA 1401 H, LLC	Cushman & Wakefield	1401 H Street, NW	79	374817	1992
13th & F Associates Limited Partnership		555 13th Street N.W Suite 420West	78	629670	1987
Carr Properties		1100 15th Street, NW	79	146228	1982

American Realty Advisors	Cushman && Wakefield	810 First Street NE	83	232126	1987
Pepco Holdings, Inc.	Cushman & Wakefield	701 9th Street, NW	86	398837	2001
Embassy of France		4101 Reservior Road	92	217442	1983
T-C 1101 Pennsylvania Avenue Owner, LLC	Jones Lang LaSalle	1101 Pennsylvania Ave. NW. Suite 250	85	244160	1898
Rosche/888 First Street, NE, LLC	Union Center Plaza Management Corp.	888 First Street, NE	87	558620	1995
Franklin Court, Inc.	Lincoln Property Company	1099 14th Street NW	84	538084	1991
TIAA -CREF	Cushman & Wakefield	1300 Eye Street	84	517464	1989
Black Rock	Cushman & Wakefield	1401 I St NW	81	237258	1991
Oxford BIT Gallery Place Property Owner, LLC	Cushman & Wakefield	616 H Street NW	75	297002	2004
Carr Properties	Carr Properties	2233 Wisconsin Ave. NW	91	127028.49	1964
Piedmont Office Realty Trust		300 E St SW	75	659773	1991
FSP Hamilton Square, LLC	Common Wealth Partners	600 14th Street, NW	82	343755	1929
National Property Board Sweden	PM Realty Group	2900 K Street NW	82	69950	2006
Hyatt Hotels		400 New Jersey Ave NW	75	715075	1975
International Monetary Fund (IMF) HQ	Sodexo	1900 Pennsylvania AVe NW	80	791100	2005
Internal Revenue Service		1111 Constitution Ave., NW	92	1428147	1932
International Finance Corporation	Brandywine Realty Trust	2121 Pennsylvania Ave., NW	92	882174	1997
2115 Wisconsin Ave, LLC		2115 Wisconsin Avenue	77	208052	1905
JBG/2121 Wisconsin, LLC		2121 Wisconsin Avenue	92	122884	1958
DC Jefferson Building LLC	Lincoln Property Company	1225 19th Street	77	70316	1963
Korean International Trade Association	Jones Lang LaSalle	1660 L Street NW	88	134672	1968
JBG/Potomac Creek Associates, LLC		955 L'Enfant Plaza, SW	77	382503	1968
Lafayette Center Property LLC	Cassidy Turley	1120 20th Street, NW	90	371287	1983
Lafayette Centre Property, LLC	Cassidy Turley	1133 21st Street, NW	75	147456	1984
Liberty Place Owner, LP, C/O Paramount Group Inc.		325 7th St., NW	76	190680	1990
Columbia Property Trust		701 and 801 Pennsylvania Avenue, NW	79	736052	1990
Boston Properties Washington Regional Office		401 9th Street, NW Suite 150	82	475190	2000

Clarion Partners	Cushman && Wakefield	901 15th Street NW	93	308250	1987
Boston Properties Washington Regional Office		655 15th Street, NW	81	718241	1982
National Education Association	National Education Association	1201 16th St., NW	88	394087	1957
Quadrangle Management Company		1331 Pennsylvania Ave. NW	83	594315	1984
National Geographic Society		1145 17th St, NW and 1600 M Street, NW	75	746237	1964
Northwestern Development Company C/O Blake real Estate, Inc.	Blake Real Estate Inc	1800 G Street NW	86	737365	1970
Rhode Island and M Streets Limited Partnership C/O Blake Real Estate, Inc	Blake Real Estate Inc	1730 Rhode Island Ave. NW	87	182134	1968
CS Office One, LLC	StonebridgeCarras Management	1275 First Street, NE	93	338645	2010
Hines		1301 K Street Nw	90	627511	1990
MEPT/FCP Patriots Plaza LLC	CBRE, Inc	395 E Street S.W.	82	294130	2005
MEPT/FCP Patriots Plaza LLC	CBRE, Inc	355 E Street, SW	80	414177	2009
Republic Properties Corporation		1280 Maryland Avenue, SW Suite 280	84	583876	1992
Republic Properties Corporation		1201 Maryland Avenue, SW	93	519213	2005
Clarion Partners	Cushman && Wakefield	701 8th Street, NW	75	149062	2005
Potomac Center North/Jones Lang LaSalle		500 12th Street SW	96	504155	2005
Potomac Center CF LLC	Jones Lang LaSalle	550 12TH STREET SW	89	443078	1968
T-C Republic Square Owner, LLC		25 Massachusetts Ave, NW	87	402012	2006
U.S. Department of State		2401 E Street, NW	82	573058	1972
Saul Subsidiary II, Limited Partnership LLC		601 Pennsylvania Ave, NW	78	250503	1986
William C. Smith & Co.		1100 New Jersey Avenue, S.E.	90	303517	2003
Boston Properties Washington Regional Office		1615 M Street NW	85	228520	1984
Beacon Capital Partners	Cushman & Wakefield	575 7th Street, NW	86	511302	2003
GLL L-Street 1331, LLC	Lincoln Property Company	1331 L Street, NW	89	198452	2008
GNAREI	Cushman && Wakefield	900 17th Street NW	97	160109	1963
JBG/Foundry Office LLC	The JBG Companies	1055 Thomas Jefferson Street, NW	81	244850	1976

The Tower Companies		1909 K Street	86	242937	1999
The Mills Building Associates	Akridge	1700 Pennsylvania Avenue	78	172603	1966
National Association of Home Builders	Transwestern	1201 15th Street, NW	95	240863	2001
LHL Realty Co DC LLC	CBRE, Inc.	601 D Street, NW	77	541518	1973
The Pew Charitable Trusts		901 E Street NW	82	262019	1989
Carr Properties		1455 Pennsylvania Ave. N.W.	88	262770	1986
Polinger Shannon & Luchs		One Thomas Circle	84	238444	1982
TWO CON, LLC	StonebridgeCarras Management	145 N Street, NE	88	623532	2010
UFCW International Union		1775 K Street, NW	89	214784	1970
United States Institute Of Peace		2301 Constitution Ave, NW	92	161361	2010
NSP Ventures Corporation - 801	J Street Companies	801 9th Street NW	89	238127	1999
The JBG Companies		1200 New Jersey Ave., SE	96	1583819	2005
Brookfield Properties		750 9th Street NW	84	349687	2000
Quadrangle Management Company		1001 G Street NW	77	366607	1989
World Wildlife Fund	Cushman && Wakefield	1250 24th Street, NW	88	254156	1986

Appendix E: LEED Public Buildings, 2013

Project Name	Street	Zip	LEED System	Points	Cert Level	Gross SF
DC Consolidated Forensic Lab	E Street & 4th Street, SW	20024	LEED-NC 2.2	52	Platinum	263500
St. Elizabeth West Campus	2700 Martin Luther King Ave, SE	20032	LEED-NC 2.2	42	Gold	1217000
Washington Highlands Library	115 Atlantic Ave., SE	20032	LEED-NC 2.2	42	Gold	22250
Francis Gregory Library	3660 Alabama Ave. SE	20020	LEED-NC 2.2	40	Gold	24275
Eisenhower Executive Office Bldg Phase 3	1700 Pennsylvania Avenue, NW	20006	LEED-NC 2.2	33	Silver	178247
Janney Elementary School Modernization	4130 Albemarle St. NW	20016	LEED for Schools	48	Gold	84400
District of Columbia Courts Building C	410 E Street NW	20037	LEED-NC v2009	66	Gold	53821
Educare of Washington DC	650 Anacostia Ave NE	20019	LEED-NC v2009	55	Silver	32352

Dept of the Interior - Childcare Center	1849 C Street NW	20240	LEED-CI v2009	90	Platinum	9264
Meridian Public Charter School	2120 13th St. NW	20009	LEED FOR SCHOOLS v2009	43	Certified	61220
Office Renovation-2011268-00	2201 C Street, NW	20522	LEED-CI v2009	56	Silver	6853
Inter-American Foundation	1331 Pennsylvania Avenue, NW	20004	LEED-CI v2009	45	Certified	11959
USAID	1300 Pennsylvania Ave	20004	LEED-CI v2009	42	Certified	27000
Lyndon B Johnson Federal Building	400 Maryland Avenue, SW	20202	LEED-EB:OM v2009	59	Silver	607259
Ariel Rios Federal Building	1200 Pennsylvania Avenue, NW	20004	LEED-EB:OM v2009	54	Silver	475570
EPA East-West Building	1301 Constitution Avenue, NW	20004	LEED-EB:OM v2009	41	Certified	1213119