

REPORT



LLOYD ECODISTRICT ENERGY STAR PERFORMANCE

2018 ENERGY STAR PORTFOLIO MANAGER DATA ANALYSIS

SUBMITTED TO

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EXECUTIVE SUMMARY



The Lloyd EcoDistrict Roadmap outlines goals for the next 25 years of development and growth in the Lloyd EcoDistrict (Lloyd). While an additional 22 million square feet of new commercial, retail, institutional and residential development is planned over the next 25 years, Lloyd set an ambitious energy goal of “no net increase” in energy use above 2010 levels by 2035. To reach this goal, the Lloyd EcoDistrict Energy Action Plan targets a 33 percent reduction in the total energy use of existing buildings over the 25-year period.

Since 2014, RWDI has assisted Lloyd with the implementation of the Energy Action Plan. Each year, RWDI provides energy benchmarking and analysis at the district level to help Lloyd track progress toward its goals. Understanding current and past energy use is key to identifying opportunities to improve performance, reduce emissions, and make informed efficiency investments.

Lloyd utilizes the U.S. Environmental Protection Agency's ENERGY STAR® Portfolio Manager® program to track and assess energy and water consumption, as well as greenhouse gas (GHG) emissions for the district. The program enables Lloyd building owners and operators to assess and share performance metrics for analysis on an annual basis.

ENERGY STAR Portfolio Manager is a no-cost, resource management tool for benchmarking and tracking energy and water consumption. Building owners and operators can set goals, track consumption, and compare performance to similar buildings in the U.S. Buildings can receive recognition through certification as well. ENERGY STAR Certification is achieved when a property's ENERGY STAR Score is 75 or greater.

This report summarizes the data collection, analysis and results for Lloyd's fifth year of ENERGY STAR Portfolio Manager data analysis. RWDI' analysis focuses on benchmarking energy and water performance and GHG emissions by property type and several other attributes. The results show continued progress and opportunities for improvement at the building-specific and district-wide level. Recommendations and next steps are presented at the end of this report.

EXECUTIVE SUMMARY - 2018 HIGHLIGHTS



- Of the 25 commercial properties sharing access to data with Lloyd's ENERGY STAR Portfolio Manager master account, RWDI received data from 24 properties for the calendar year 2018, resulting in a reporting rate of 96 percent.
- The area weighted site EUI in Lloyd is 65.8 kBtu/ft², while the Portland median EUI is 68.7 kBtu/ft² for office, retail, hospitality, public assembly, and healthcare properties, based on figures in the 2018 Energy Performance Information for Individual Commercial Buildings Spreadsheet.
- Properties in Lloyd achieved higher energy performance than similar properties across Portland.
- Of the properties generating an ENERGY STAR Score, 64 percent have scores of 75 or above, making them eligible for ENERGY STAR Certification.
- Buildings in Lloyd achieved 12 percent better ENERGY STAR scores than the overall Portland median score.
- GHG emissions have reduced roughly 18 percent in 2018 from the 2010 baseline.
- Average water use intensity in Lloyd has decreased by 13 percent since 2015.

Benchmarking Metrics

Metrics used for reporting performance include energy use, weather normalized site energy use intensity (EUI), ENERGY STAR Score, greenhouse gas (GHG) emissions, water use, and water use intensity (WUI).

- Site energy use intensity (EUI) represents a building's total annual energy use divided by gross floor area. EUI is measured in kBtu/ft² and signifies overall building energy performance.
- All EUI figures are area weighted to give a more accurate representation of average EUI.
- ENERGY STAR Score considers EUI along with changes in weather conditions, utility fuel mix and building operations. A score of 50 represents the national median. Buildings with a score of 75 or higher may be eligible for ENERGY STAR Certification.
- Greenhouse gas (GHG) emissions, expressed in metric tons of carbon dioxide equivalent (MTCO_{2e}) are calculated by multiplying site energy values by emissions factors. Specific emissions factors for natural gas were obtained from EPA sources, whereas emissions factors from electricity were provided by Pacific Power.
- Water use intensity (gal/ft²) represents a building's total annual water use divided by gross floor area (not including parking or irrigated area).

LLOYD ENERGY STAR PORTFOLIO MANAGER PARTICIPANTS



At present, 25 commercial properties share access to data with the Lloyd EcoDistrict master Portfolio Manager account. The reporting properties make up 7,409,901 square feet (SF) of building floor area, representing 57 percent of building area in the district (approximately 13M square feet), and 95% of buildings 20,000 square feet and larger, based on figures in the 2018 Energy Performance Information for Individual Commercial Buildings Spreadsheet.

Lloyd EcoDistrict ENERGY STAR Portfolio Manager participants make up the district's largest commercial buildings. The current Portland Commercial Energy Performance Reporting Ordinance requires commercial buildings 20,000 SF and greater to use Portfolio Manager to track energy use. At the present, residential property data is not required by the ordinance nor is it included in this report.

Portfolio Manager participants are categorized in this analysis into five property types: Healthcare, Retail, Hospitality, Office, and Public Assembly. Figure 1 provides a breakdown by property type of the participants that have agreed to share energy data with Lloyd EcoDistrict.

Portfolio Manager Agreements
(as of November 2019; reported in square feet)

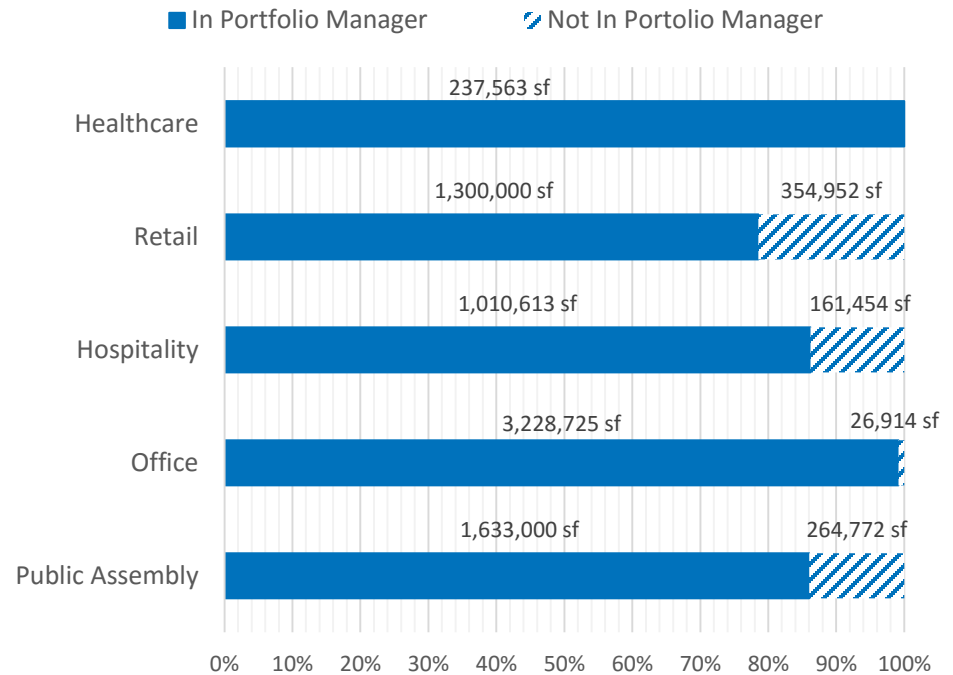


Figure 1. Portfolio Manager agreements by property type.

LLOYD ENERGY STAR PORTFOLIO MANAGER PARTICIPANTS



Of the participating commercial properties in Lloyd, office buildings represent the largest portion of floor area, followed by public assembly, retail, hospitality and healthcare, as shown in Figure 2 below.

PROJECT AREA BY MARKET SECTOR (FT²), 2018

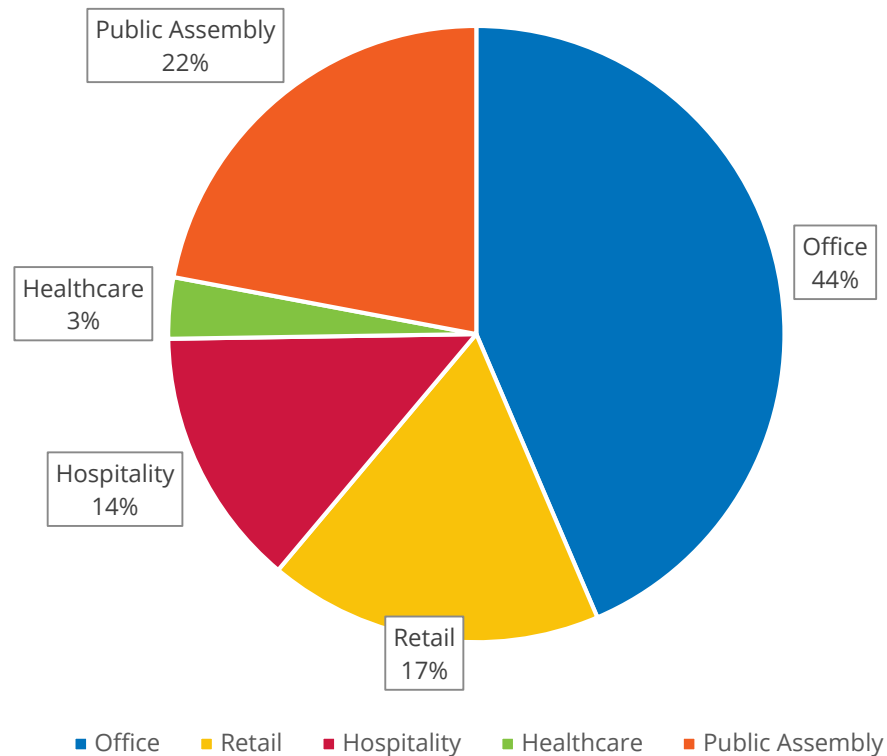


Figure 2. Percentage of building area by property type.

LLOYD ENERGY STAR PORTFOLIO MANAGER PARTICIPANTS



Figure 3 below shows the area by space type of properties that have reported data from years 2010 to 2018. Total reported square footage has increased 31 percent since 2010.

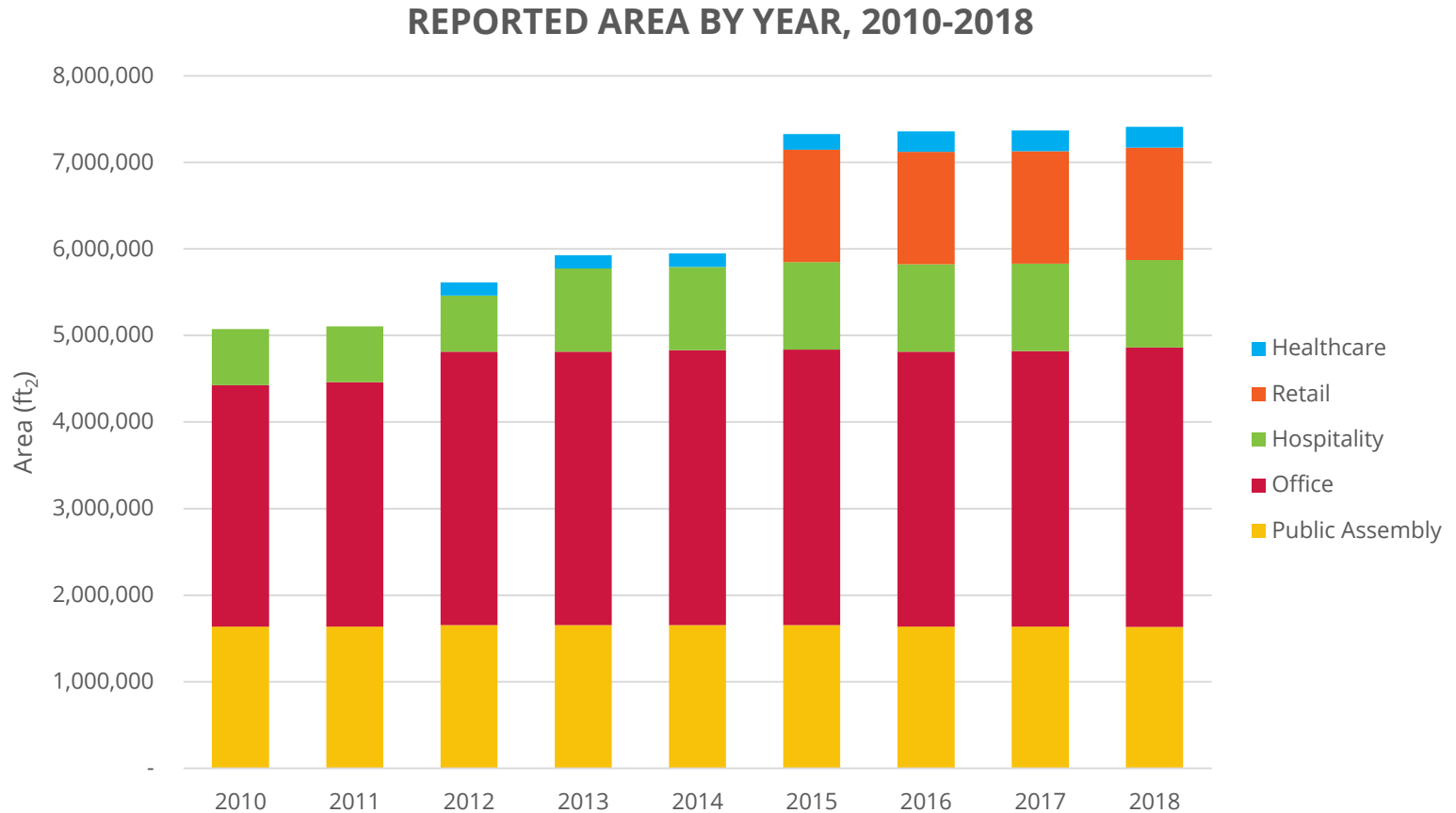


Figure 3. Building area by property type of reporting properties between 2010 and 2018.

LLOYD ENERGY STAR PERFORMANCE – SITE ENERGY USE INTENSITY



Building energy performance is measured by site energy use intensity (EUI), which expresses the total annual energy use, divided by the gross floor area measured in kBtu per square foot. Site EUI represents energy use based on the size of a building rather than in raw energy use. This analysis uses a **weather normalized site EUI**, which also accounts for changes in weather when accounting for changes in energy. The weather normalized site energy is the energy use a property would have consumed during 30-year average weather conditions. To maintain confidentiality, all properties in this analysis were assigned a “building number” designation.

Overall, most buildings in Lloyd EcoDistrict are performing well. A low EUI generally indicates good energy performance, while a higher site EUI shows greater energy use. As shown in Figure 4 on the next page, six buildings reported a low EUI in 2018 (below 40) and six buildings reported a higher EUI (above 70). Half of the buildings reported EUI values in the middle (between 40 – 70).

The reported site EUI for Building 10 is identified as an anomaly. Although the property type is categorized as “Healthcare” in this analysis, it is neither a hospital, a clinic, nor a medical office building. The site includes two buildings with multiple uses - behavioral health hospital, laboratory and clinical research with the majority of the square footage dedicated to lab spaces. Due to this unique combination of use types along with remodeling activity and variations in occupancy at the site over the past few years, a new baseline is being established. There are no conclusions to be drawn about the site energy use until more data is available.

Buildings 20, 21, and 22 have reported unusually low EUI's. However, these three buildings have gone through various stages of remodeling and vacancy causing EUI values to be lower than if they were fully occupied. New baselines will be established in the coming years.

LLOYD ENERGY STAR PERFORMANCE – SITE ENERGY USE INTENSITY



The median overall area weighted site EUI for this dataset in Lloyd EcoDistrict is 65.8 kBtu/ft².

The median overall EUI for Portland in regards to office, healthcare, hospitality, retail, and public assembly is 68.7 kBtu/ft², as published in the 2018 Energy Performance Information for Individual Commercial Buildings Spreadsheet.

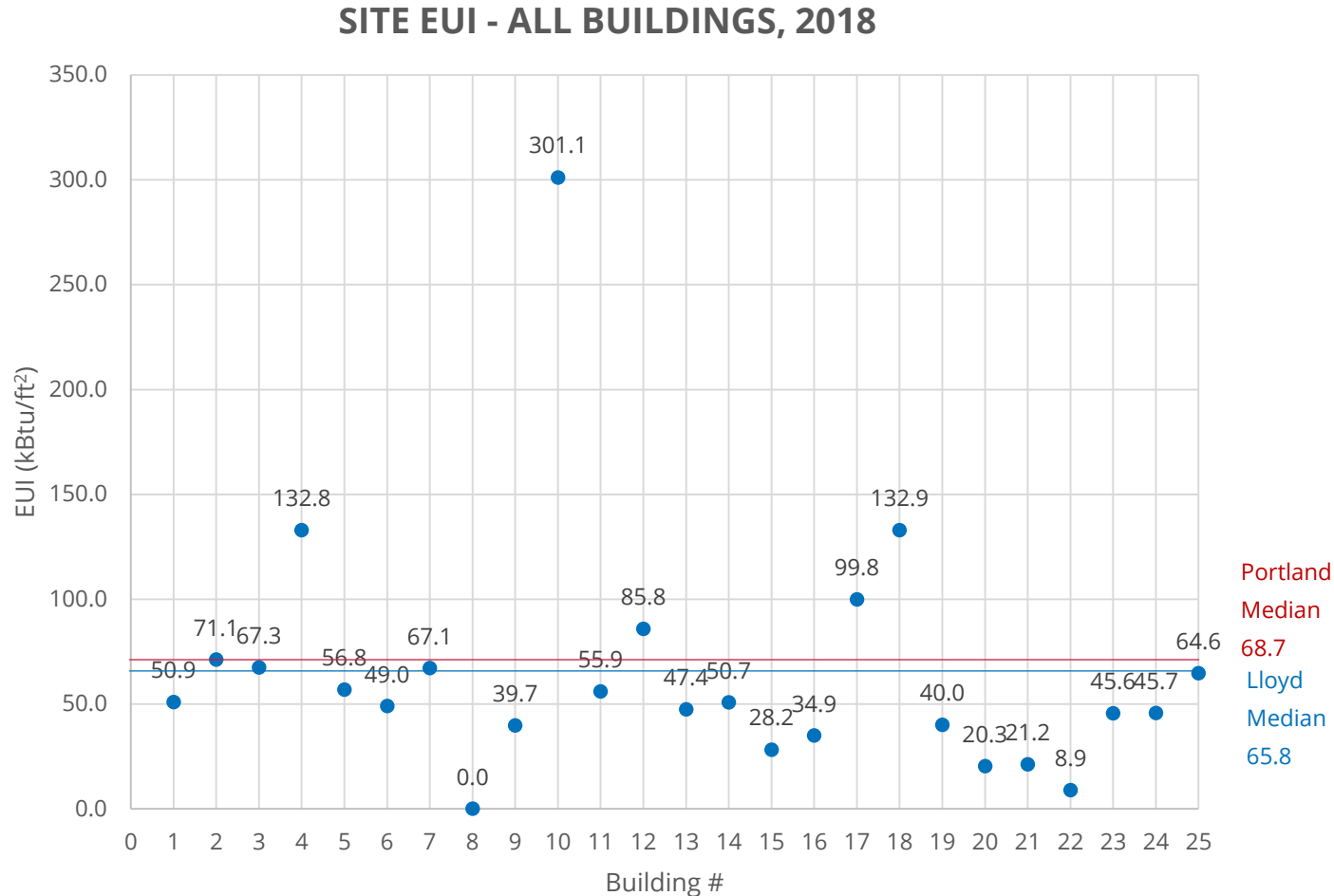


Figure 4. 2018 site EUI for all 25 participating commercial properties.

LLOYD ENERGY STAR PERFORMANCE – SITE ENERGY USE INTENSITY



RWDI compared site EUI to the Portland median EUI by property type. Figure 5 shows how the buildings compare to the median performance of buildings in each peer group. The Portland median is established using Portland’s 2018 Energy Performance Information for Individual Commercial Buildings Spreadsheet.

As displayed in Figure 5, public assembly, retail, hospitality, and office properties in Lloyd are performing better than the Portland median for their property type. The healthcare property type category was removed due to buildings with multiple distinctly different uses and lack of similar building types available for a valid comparison.

Properties in Lloyd have higher energy performance than similar properties across Portland. However, it should be noted that there are differences in how properties are characterized in this data analysis as opposed to the City’s reporting. For example, the 2018 Energy Performance Information for Individual Commercial Buildings Spreadsheet categorized a large retail property located in Lloyd as “Other” rather than “Retail”.

2018 EUI Compared to Portland Median by Market Sector

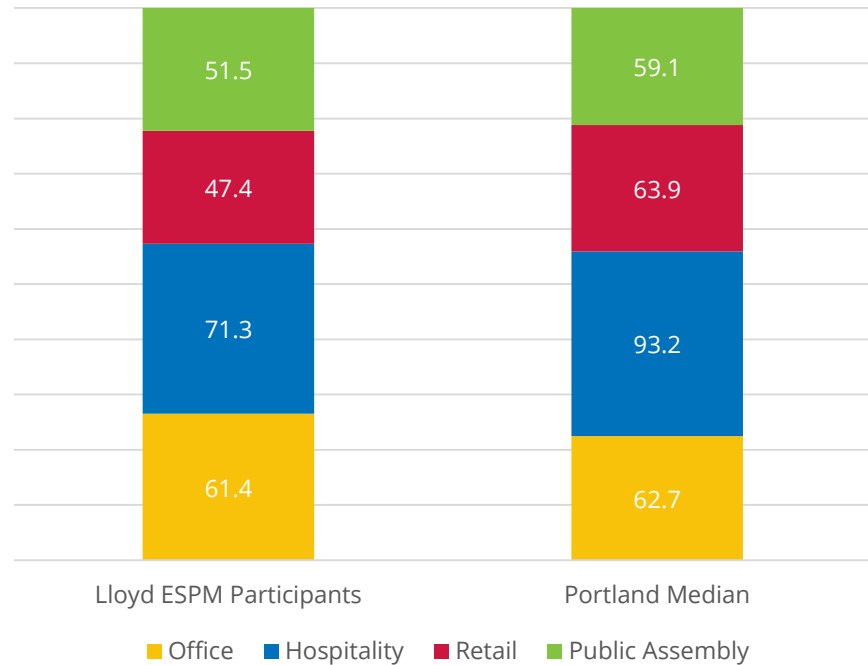


Figure 5. 2018 site EUI compared to Portland median EUI by property type (healthcare excluded).

LLOYD ENERGY STAR PERFORMANCE – ENERGY STAR SCORE



The ENERGY STAR Score measures a property's performance relative to similar properties, when normalized for climate and operational characteristics. Not all space types are eligible for an ENERGY STAR Score, such as hospital or assembly.

An ENERGY STAR Score was calculated for 14 of the 25 participating commercial properties in the district. These include office and hospitality properties in the dataset. As shown in Figure 6, nine of the buildings scored 75 or above. ENERGY STAR Certification can be achieved for projects scoring 75 or greater. These buildings are poised to be ENERGY STAR-certified and Lloyd can work to assist in and celebrate their efforts.

Buildings that received an ENERGY STAR Score lower than the national median of 50 are likely to have the greatest opportunity to improve energy performance. These buildings may benefit from technical assistance to evaluate operating performance and identify low-cost ways to boost efficiency.

The median overall ENERGY STAR Score for Lloyd is 80.5, whereas the median overall ENERGY STAR Score for Portland is 71.

ENERGY STAR SCORE, 2018

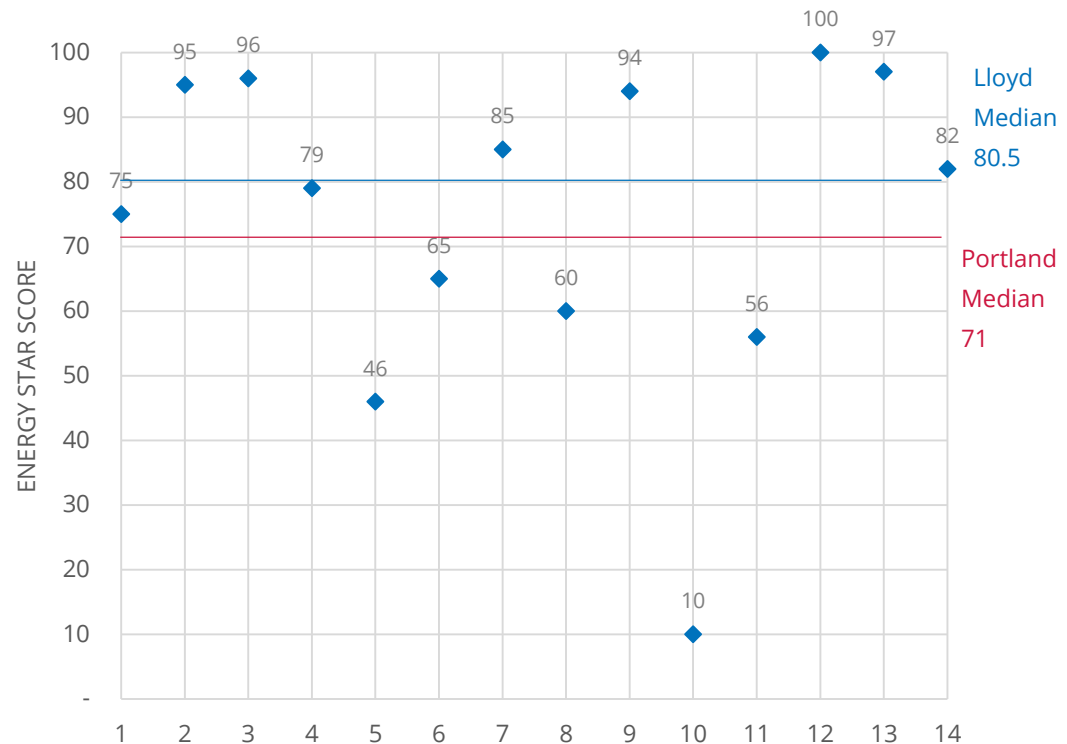


Figure 6. 2018 ENERGY STAR Score distribution for participating commercial properties eligible for an ENERGY STAR Score.

LLOYD ENERGY STAR PERFORMANCE – GREENHOUSE GAS EMISSIONS FROM ENERGY USE



In this analysis, greenhouse gas (GHG) emissions account for the carbon dioxide (CO₂), methane (CH₄), and nitrous oxide (N₂O) gases released into the atmosphere as a result of the property's energy consumption.

More than 16 percent of greenhouse (GHG) emissions in the U.S. come from energy used by commercial buildings (U.S. EPA, Inventory of Greenhouse Gas Emissions & Sinks).

Based on Portfolio Manager estimates, the 24 properties included in this analysis emitted 72,100 metric tons of carbon emissions equivalent (MTCO₂e).

Office buildings were responsible for the most GHG emissions in 2018, as shown in Figure 7. It should be noted that office buildings encompass 70 percent of the total square footage of reporting properties.

TOTAL GHG EMISSIONS BY MARKET SECTOR, 2018

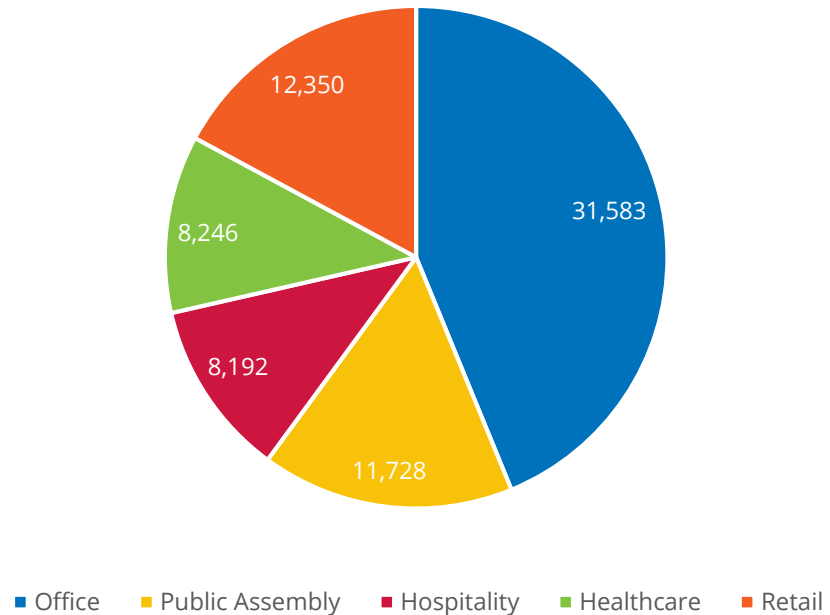


Figure 7. 2018 GHG emissions (MTCO₂e) by property type.

LLOYD ENERGY STAR PERFORMANCE – WATER USE



This 2018 Lloyd ENERGY STAR Portfolio Manager data analysis is the first year of measuring and reporting water use. RWDI obtained water consumption data from 23 properties in the district. These buildings consumed a total of 112,080 kilogallons (kGal) in calendar year 2018.

Figure 8 shows the total water use by property type and the number of properties in each category. While hospitality properties used the largest share of water as a district, only four properties are represented in the category.

In contrast, office buildings consumed 2,511 kGal less than hospitality properties, yet they represent 4 times the number of buildings.

TOTAL WATER USE BY MARKET SECTOR, 2018

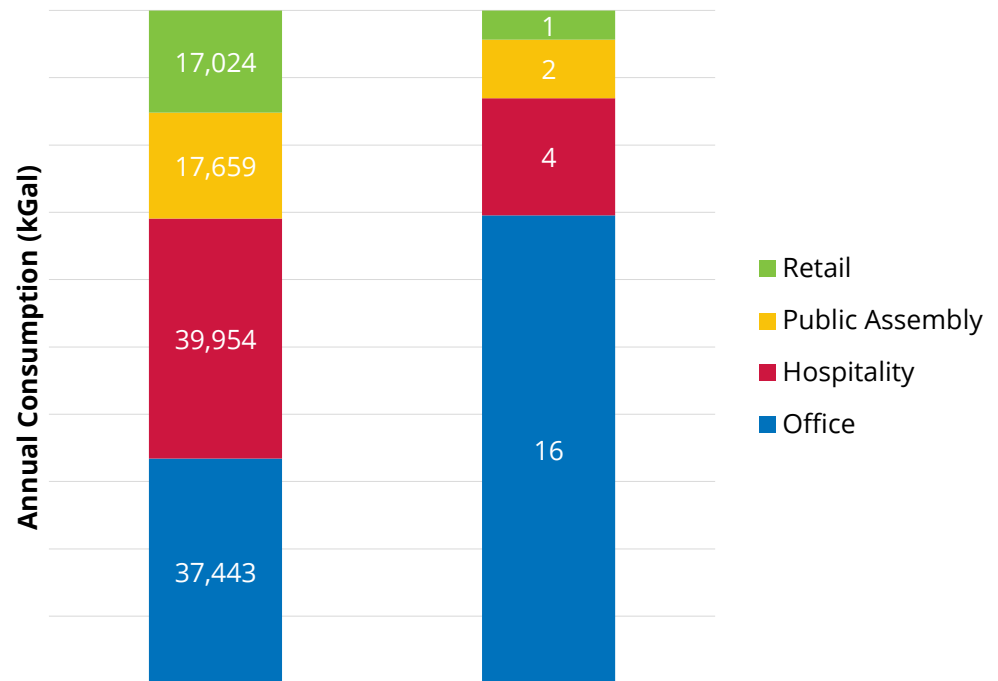


Figure 8. 2018 water use (kGal) and number of properties by market sector for 23 participating commercial properties.

LLOYD ENERGY STAR PERFORMANCE – ENERGY USE TRENDS



Understanding current and past energy use can help identify opportunities to improve energy performance and measure efficiency efforts. Although the amount of historical data in Portfolio Manager varies, RWDI evaluated energy use trends for the past eight years wherever possible. Figure 9 shows the average EUI for all properties. The increase in 2012 is the result of additional participating properties added to the portfolio that were performing at a higher EUI than the average in years before.

Figure 9 shows the average site EUI is 0.3 kBtu/ft² lower than in 2010. Overall building energy performance has improved each year since 2012 with a slight increase in 2016 and 2017.

From 2017 to 2018, 8 of 24 reporting properties had an increased EUI which resulted in an average of a 12.2 percent increase in EUI. During this same period, 16 of the 24 reporting properties had lower EUI's which was an average of a 5.2 percent drop in EUI.

SITE EUI - ALL BUILDINGS, 2010 - 2018

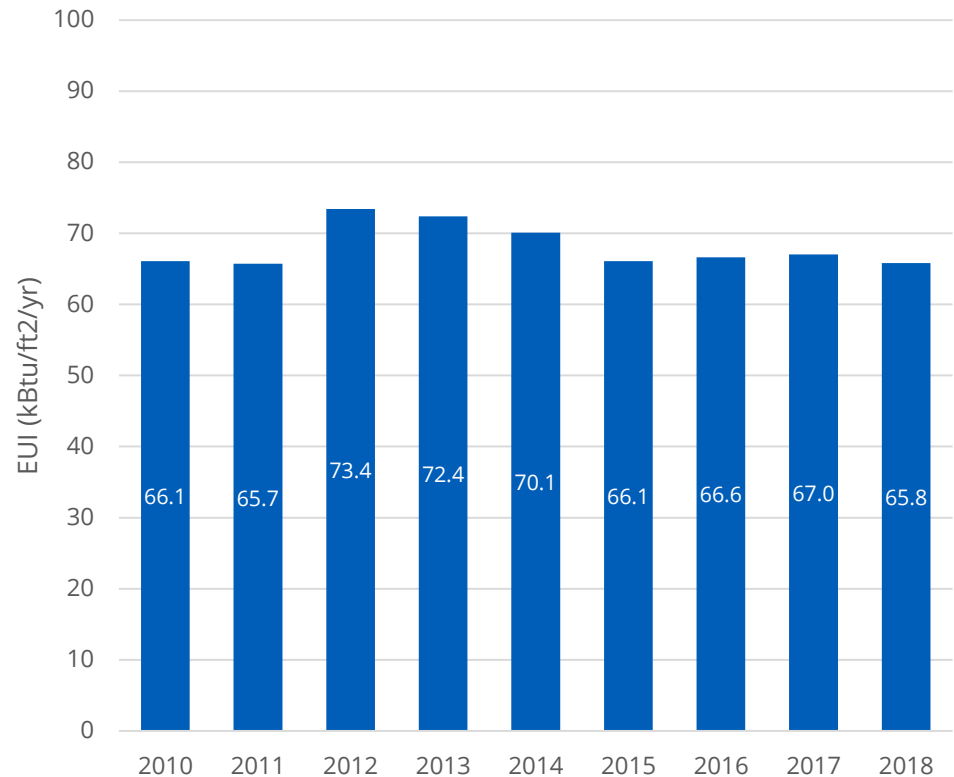


Figure 9. Site EUI for participating commercial properties between 2010 and 2018.

LLOYD ENERGY STAR PERFORMANCE – ENERGY USE TRENDS



Figure 10 shows the performance of each of the 25 reporting properties from 2010 to 2018. From here, it can be shown which buildings are improving in performance year of year and which are showing reduced energy performance.

SITE EUI BY BUILDING, 2010-2018

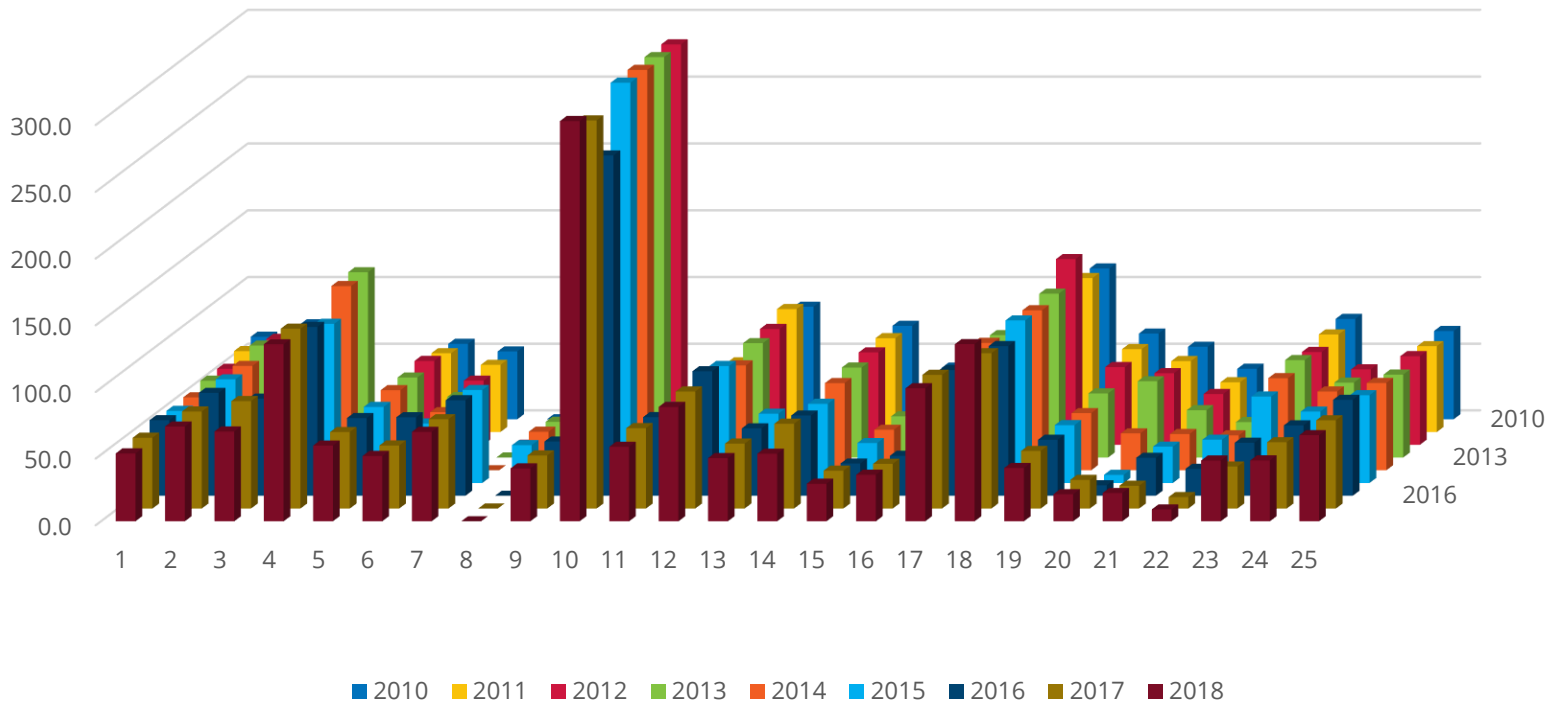


Figure 10. Site EUI for each year for all participating commercial properties between 2010 and 2018.

LLOYD ENERGY STAR PERFORMANCE - GREENHOUSE GAS EMISSIONS TRENDS



As displayed in Figure 11, GHG emissions intensity is measured in kilograms of CO₂ equivalent per square foot. On a per square foot basis, GHG emissions have reduced roughly 18 percent from the 2010 baseline. While reducing energy is important to reduce GHG emissions, it is not the only metric that has an effect on emissions. An electric utilities' source generation or power mix is an important part of reducing GHG emissions. Over the past eight years, Pacific Power's power mix has reduced emissions by about 3 percent since 2010.

GHG EMISSIONS INTENSITY, 2010-2018

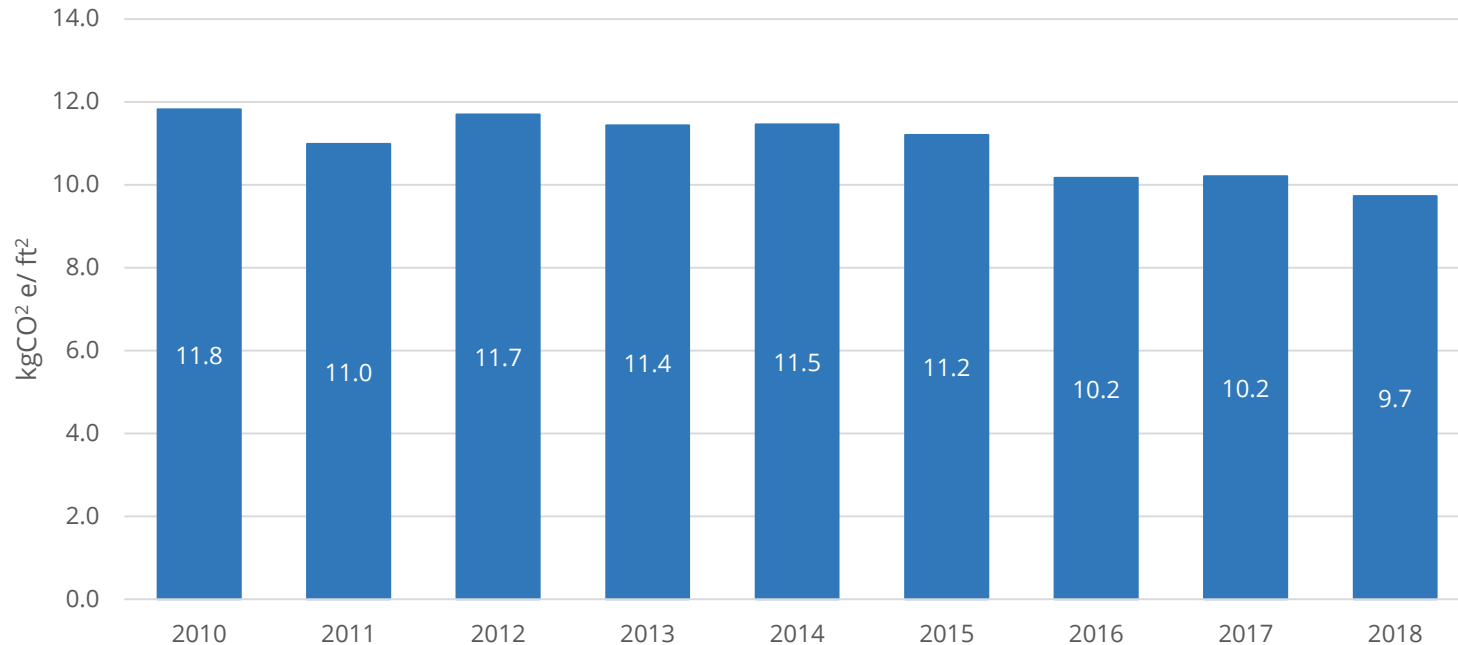


Figure 11. GHG emissions per square foot for participating commercial properties between 2010 and 2018.

LLOYD ENERGY STAR PERFORMANCE – WATER USE TRENDS



Water use intensity (WUI) represents a building's total annual water use divided by gross floor area (not including parking or irrigated area).

Although the amount of historical data in Portfolio Manager varies, RWDI evaluated water use trends for the past nine years wherever possible. Figure 12 shows the average WUI for 19 reporting properties.

Energy use is affected by occupancy, but not to the extent of water use. In fact, occupancy and property type are both major factors in water use.

The average water use intensity in 2018 is 1.1 Gal/ft² higher than in 2010, but has decreased every year since 2015.

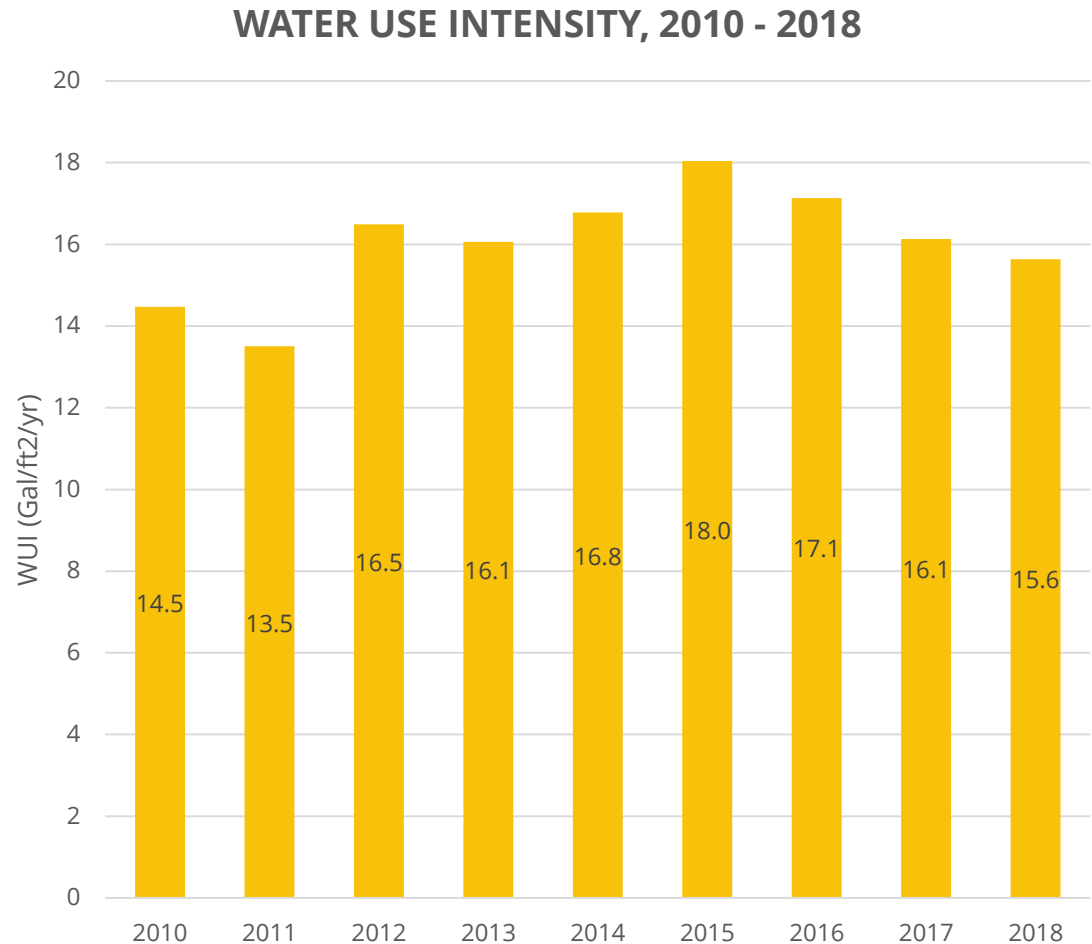


Figure 12. Water consumption per square foot for participating commercial properties between 2010 and 2018.

LLOYD ENERGY STAR PERFORMANCE – ENERGY USE TRENDS



Figure 13 shows progress towards Lloyd’s Energy Action Plan of “no net increase” of energy from 2010 with an estimated addition of 22M square feet by 2035. This results in an approximate 65 percent drop in EUI from 2010 to 2035 which is about a 2.5 percent decrease per year. For properties reporting in 2010, the EUI was 66.1. Using an EUI of 66.1 as a starting point, the EUI should be 22.7 by 2035. The current trend shows energy performance is not keeping pace with the established reduction targets. Average EUI across the district would need to decrease by 20%. Greater improvements are needed to adjust course and reestablish the path towards the Lloyd’s energy goal.

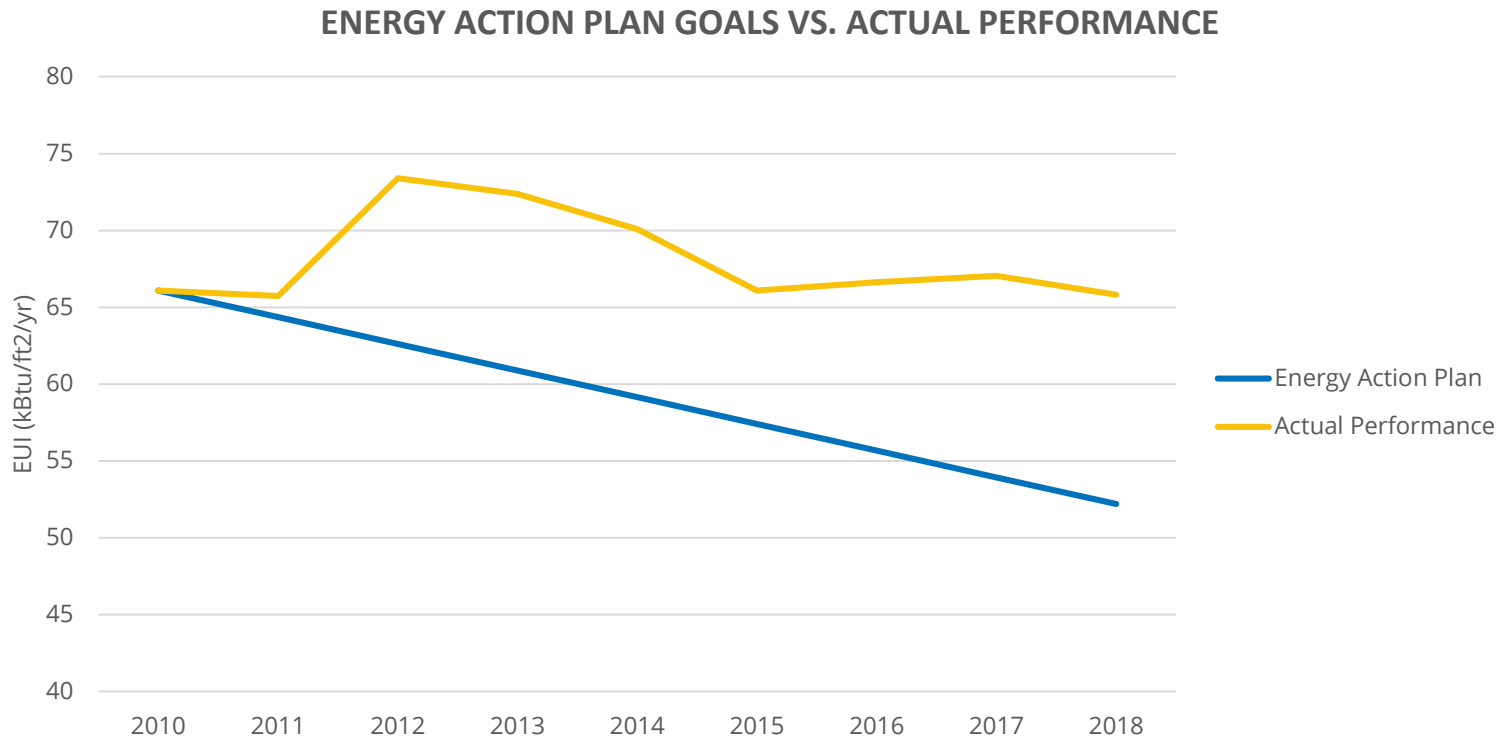


Figure 13. Energy Action Plan goal vs actual performance for all participating commercial properties between 2010 and 2018.

RECOMMENDATIONS



While the results show some progress on energy use reduction and GHG emissions within Lloyd EcoDistrict, the pace has not kept with goal of “no net increase” established in Lloyd’s Energy Action Plan. Energy consumption continues to increase as square footage is added to the district. Lloyd’s median site EUI is 65.8 kBtu/ft² which is 13.6 kBtu/ft² higher than the Energy Action Plan target for 2018. As the fifth year of energy performance benchmarking, these results show further opportunity to increase efficiency. RWDI will continue working with Lloyd to benchmark and analyze energy use patterns and trends. The following actions are recommended:

- Target outreach to properties 20,000 square feet and larger that report to the City, but do not currently share data with Lloyd’s Portfolio Manager account. Seven properties representing approximately 700,000 SF were identified for inclusion in the next reporting cycle.
- Expand participation in ENERGY STAR Portfolio Manager to smaller retail and multifamily residential properties to enable greater understanding of energy and water use, greenhouse gas emissions, and trends in the district.
- Support investments in existing building retrofits and renewable energy projects to capture inefficiencies and reduce energy costs. These efforts are critical to help Lloyd reach its energy goals.
- Connect building owners and operators of underperforming properties with technical resources and assistance to assess operating systems, conduct energy audits and identify strategies to boost efficiency.
- Recognize the results and achievements of high performing properties and communicate achievements and replicable practices.
- Increase Lloyd’s use of ENERGY STAR Portfolio Manager to include waste and materials tracking. Start by training building owners and operators of participating properties in how to track what waste they have, or are able to estimate, in Portfolio Manager. Then Lloyd can move forward in trying to obtain better data in the future.
- Utilize Lloyd Eco Action Forum (LEAF) as an information-sharing platform for building owners and operators seeking information, technical resources, and lessons learned.