



Lloyd EcoDistrict ENERGY STAR Portfolio Manager Data Summary

2015 Report



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GREEN BUILDING SERVICES

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EXECUTIVE SUMMARY

GBS has been working with the Lloyd EcoDistrict (Lloyd) to assist in the implementation of its Lloyd EcoDistrict Energy Action Plan. A primary focus in this effort has been the use of the Lloyd EcoDistrict ENERGY STAR Portfolio Manager program to gather building data and better understand and quantify progress toward Lloyd's established energy goal of "no net increase" in energy use by 2035 (based on 2010 energy use) set in the Lloyd EcoDistrict Roadmap. Portfolio Manager is a free and easy tool for benchmarking and tracking energy and water usage in buildings. ENERGY STAR certification is achieved when a project's ENERGY STAR score is 75 or greater.

This report summarizes the current status of Portfolio Manager participation in the Lloyd EcoDistrict, reviews key findings that were revealed in the data, and identifies the next steps in continuing to expand the scope of data analysis within the Lloyd EcoDistrict. This outlook into the performance of buildings within the Lloyd EcoDistrict provides a critical opportunity to evaluate progress toward Lloyd's short- and long-term energy goals. To achieve the "no net increase" target existing buildings are projected to reduce energy use by 33% over the 25-year period, according to the Lloyd EcoDistrict Energy Action Plan.

Outcomes of the ENERGY STAR Portfolio Manager 2015 data analysis include the following:

Portfolio Manager Participants

- Twenty-five property owners have shared their Portfolio Manager accounts or energy data with the Lloyd EcoDistrict. These properties account for 7,582,940 square feet of existing buildings, representing 11.7% of all properties (213 properties) and 65.7% of the total building area (11,529,831 sf) based on figures provided in the Lloyd EcoDistrict Energy Action Plan.
- Office uses account for the majority of buildings in Portfolio Manager.

2015 Energy Use

- 2015 energy data was analyzed for 24 of the 25 Portfolio Manager participants. One property was excluded for high vacancy rates. The 24 properties consumed a total of 471,668 mmBtu (an mmBtu is equal to 1,000 kBtu's) in 2015, with 67.6% (345,821 mmBtu) for electricity and the remaining 32.4% (125,847 mmBtu) for natural gas. 2015 energy use for these buildings accounts for 47% of the Lloyd EcoDistrict Energy total energy budget (975,000 mmBtu), as reported in the Lloyd EcoDistrict Energy Action Plan.
- Fifteen of the 24 buildings (62.5%) with energy data were office buildings. Office buildings used 40.1% (189,072 mmBtu) of the Portfolio Manager 2015 total energy.
- 2015 Energy Use Intensity (EUI) was calculated for 23 of the 24 buildings with energy data. One property was excluded due to the individual nature of the land use and unique energy requirements. EUI is a measure of energy use (kBtu) per square foot. Overall the buildings in Lloyd District are performing well. The majority of buildings fell within the 50-75 EUI range and the median EUI was 57.



- 2015 EUI by market sector was compared to the national median. EUI values for Office (11.4%), Hospitality (7.23%), and Retail (44.5%) uses are below the national median for their market sector while Public Assembly (17.6%) and Healthcare (35%) EUI values are above the national median for their respective sectors.
- An ENERGY STAR score was calculated for fourteen buildings with 2015 energy data. 64.3% of these buildings scored 75 or above. ENERGY STAR Certification can be achieved for projects scoring 75 or greater.

Energy Use Trends

- Since 2010 total energy use for 16 buildings with historical data has decreased from 351,667 mmBtu to 308,869 mmBtu, a reduction of 12.2%. Energy use has steadily decreased over the past three years. Savings have been observed in both electricity and natural gas usage.
- EUI for this cohort of buildings has steadily decreased over the past three years.
- Generally EUI for office buildings in the Lloyd District have steadily decreased with EUI values 20% lower than reported in 2011.

Recommendations/Next Steps

Overall, the data reviewed above demonstrate significant progress on energy use reduction within the Lloyd EcoDistrict. Still, there is much to do to improve the ability of the Lloyd EcoDistrict to evaluate building performance, and continue to make progress towards its goals.

- Expand participation in ENERGY STAR Portfolio Manager within the Lloyd EcoDistrict.
- Establish target EUI's for each market sector informed by current performance, regional and national trends, and the Lloyd EcoDistrict Energy Action Plan energy use goals.
- Pursue research funding for the following projects:
 - Provide building owners using Portfolio Manager with a summary of energy performance and potential strategies for improvement. Prioritize underperforming properties.
 - Create a benchmarking one-pager for building owners using Portfolio Manager to compare their performance to peers within Lloyd.
 - Determine which building energy efficiency measures have had the largest impact on the energy performance.
- Devise a plan for incorporating retail building owners and tenants (as relevant) into the energy management/tracking efforts.
- Continue to showcase progress made to-date through case studies and celebrate successes.



INTRODUCTION

Since early 2014, GBS has been working with the Lloyd EcoDistrict (Lloyd) to assist in the implementation of its Lloyd EcoDistrict Energy Action Plan. A primary focus in this effort has been the use of the Lloyd EcoDistrict ENERGY STAR Portfolio Manager program to gather building data and better understand and quantify progress toward Lloyd’s established target of “no net increase” in energy by 2035 (based on 2010 energy use). Portfolio Manager is a free and easy tool for benchmarking and tracking energy and water usage in buildings. ENERGY STAR certification is achieved when a project’s ENERGY STAR score is 75 or greater.

This report summarizes the current status of Portfolio Manager participation in the Lloyd EcoDistrict, reviews key findings that were revealed in the data, and identifies the next steps in continuing to expand the scope of data analysis within the Lloyd EcoDistrict. This outlook into the performance of buildings within the Lloyd EcoDistrict provides a critical opportunity to evaluate progress toward Lloyd’s short- and long-term energy goals. To achieve the “no net increase” target, existing buildings are projected to reduce energy use by 33% over the 25-year period, according to the Lloyd EcoDistrict Energy Action Plan.

ENERGY STAR PORTFOLIO MANAGER PARTICIPANTS

To date twenty-five property owners have shared their Portfolio Manager accounts or energy data with the Lloyd EcoDistrict. These properties account for 7,582,940 square feet, representing 11.7% of all properties (213 properties) and 65.7% of the total building area (11,529,831 sf) based on figures provided in the Lloyd EcoDistrict Energy Action Plan.

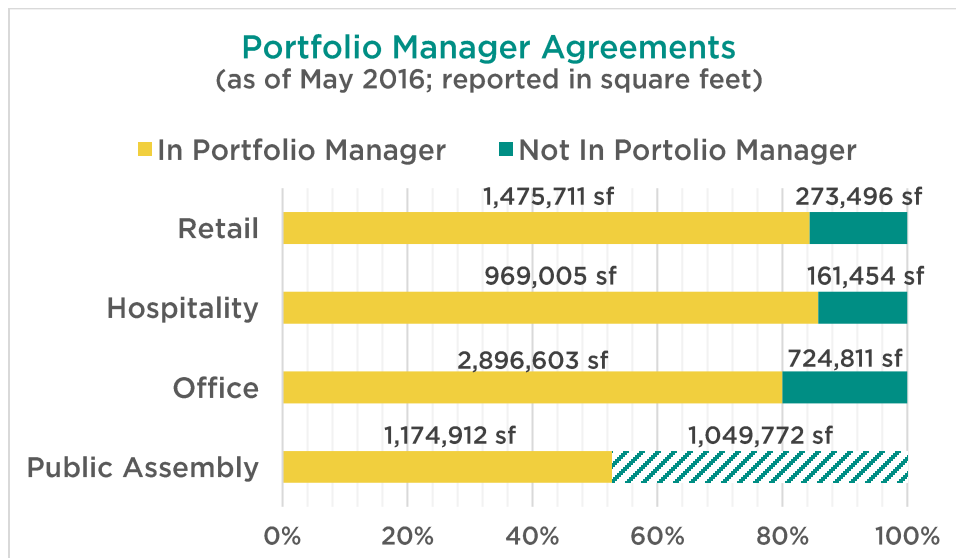


Figure 1. Portfolio Manager Agreements by market sector as of May 2016.

Figure 1 provides a breakdown by market sector of the properties that have agreed to share their Portfolio Manager accounts or energy data with the Lloyd EcoDistrict.

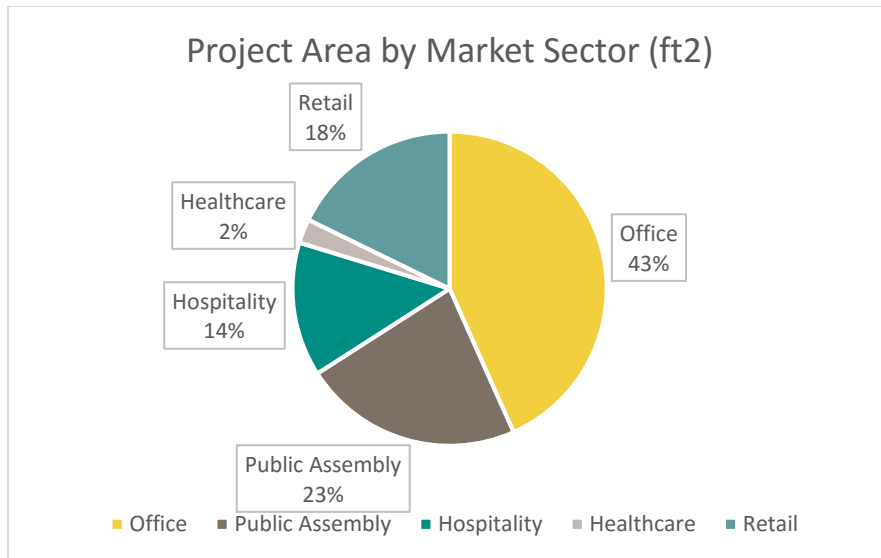


Figure 2. Portfolio Manager Participants by market sector.

Figure 2 shows a breakdown of the Lloyd EcoDistrict building types in Portfolio Manager, based on project area. Office buildings make up the largest percentage of properties in Portfolio Manager. With 15 properties, office uses account for 62.5% of all buildings and 43% of total building area in the district.

ENERGY STAR PORTFOLIO MANAGER DATA ANALYSIS

GBS conducted an extensive review of the energy data currently available in Portfolio Manager to determine 2015 energy use estimates and identify historical trends for all buildings. These estimates and historical trends were evaluated in the context of the Lloyd EcoDistrict Energy Action Plan to determine, wherever possible, progress toward those energy reduction goals. As participants continue to be added to Portfolio Manager and the amount and accuracy of data increases, the conclusions to be drawn will be more robust. However, valuable information can be drawn from the existing data set, as demonstrated below.

2015 Energy Use

The 2015 energy data was analyzed for 24 of the 25 shared properties. One property was excluded from the analysis due to high vacancy rates. These 24 properties consumed a total of 471,668 mmBtu (an mmBtu is equal to 1,000 kBtu's) in 2015 as demonstrated in Figure 3. Of this total energy use, 67.6% (345,821 mmBtu) was electricity and the remaining 32.4% (125,847 mmBtu) was natural gas.

The Lloyd EcoDistrict Energy Action Plan established a goal of maintaining energy use at 2010 levels over the 25-year Plan horizon. The total energy use within the district (i.e., energy budget) in 2010 was estimated at approximately 975,000 mmBtu. Therefore, the 2015 energy use of the 24 buildings in Portfolio Manager accounts for 47% of the Lloyd EcoDistrict total energy budget.

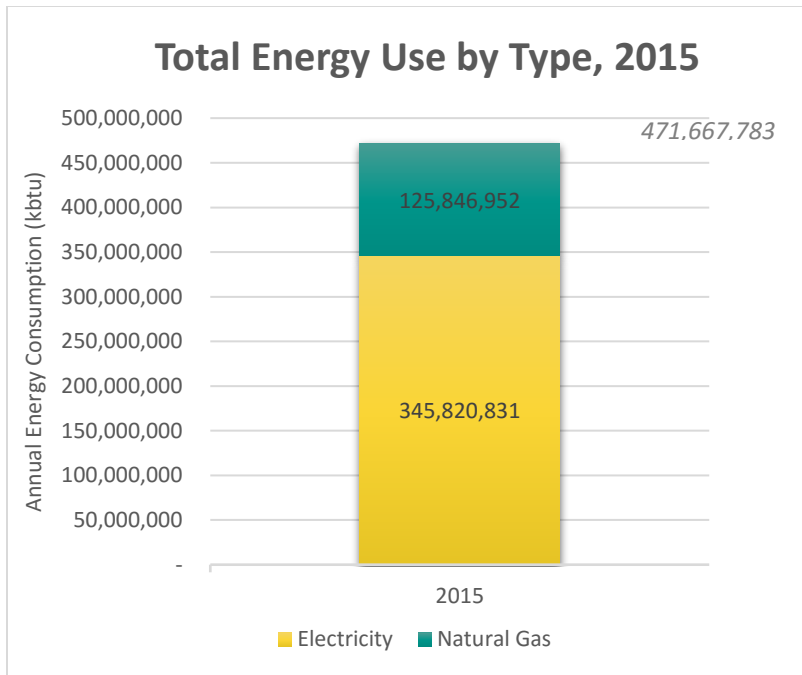


Figure 3. 2015 total energy use by source.

Fifteen of the 24 buildings (62.5%) were office buildings, which used only 40.1% (189,072 mmBtu) of the 2015 total energy (see Figure 4). Though office buildings use the most aggregate energy, their energy demand is less than their percentage of the whole, based on the number of buildings. The remaining nine buildings are Public Assembly (3 buildings), Hospitality (4 buildings), Healthcare (1 building), and Retail (1 building), which utilize 19.3%, 14.6%, 11.7% and 14.3% of 2015 energy use, respectively.

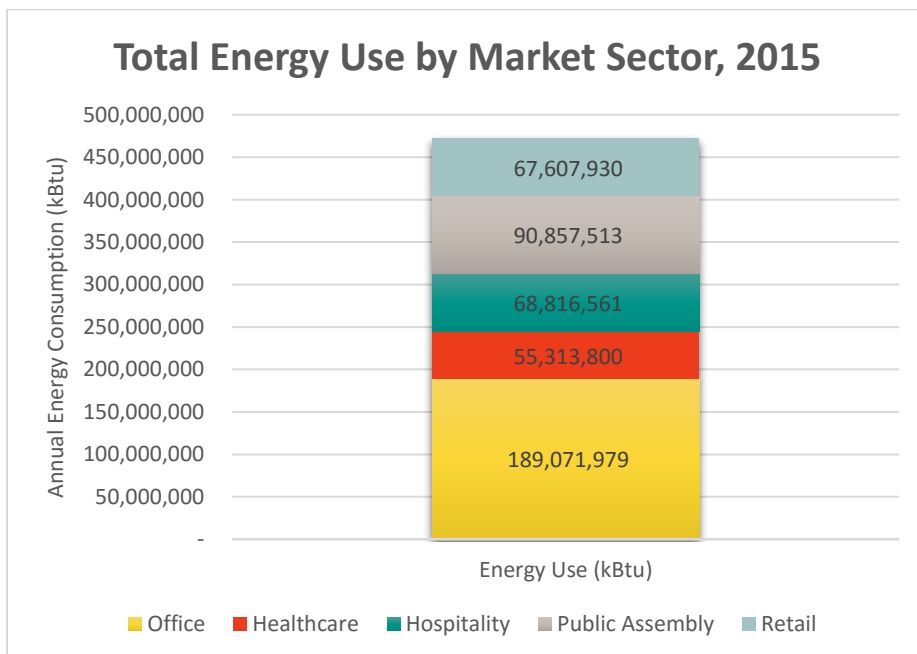


Figure 4. 2015 energy use by market sector.

Although total energy use by source type is useful, a more valuable measure of building performance is the Energy Use Intensity (EUI), which expresses energy use based on the size of a building rather than in raw energy use. EUI is a measure of energy use (kBtu) per square foot. This provides a more comprehensive description of building performance and allows for the comparison of energy performance across different building types and sizes.

GBS calculated the EUI for 23 of the 24 buildings with 2015 data. Figure 5 provides the EUI distribution of those projects. To maintain confidentiality all of the projects have been assigned a “building” designation. One property was removed due to the individual nature of the land use and unique energy requirements.

Overall, the buildings in the Lloyd EcoDistrict are performing well. As is demonstrated in Figure 5, six buildings registered a low EUI in 2015 (below 40) and four buildings have room for improvement (EUI above 70), but the majority of properties fall within the 50-75 EUI range. The median EUI across all of the buildings is 57. Efforts to reach out to those building owners with EUI greater than 70 should be made to establish the reasons that may be contributing to their energy use. As part of this effort, outreach should include connecting building owners with useful resources that could help improve their energy performance. Buildings 17 and 20 should be priority targets for reducing energy use moving forward, as they are above the median when compared to their market sector peers (Hospitality and Office, respectively).

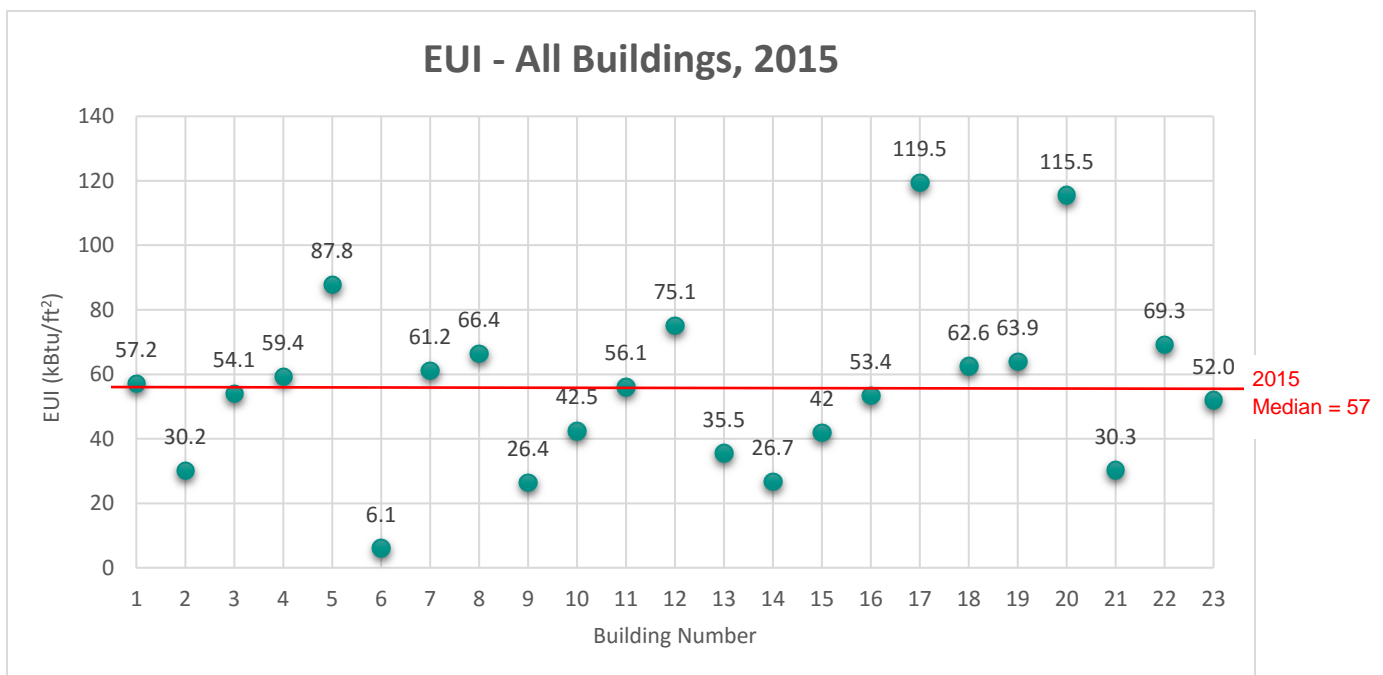


Figure 5. Energy use intensity for 2015 (one removed for confidentiality).

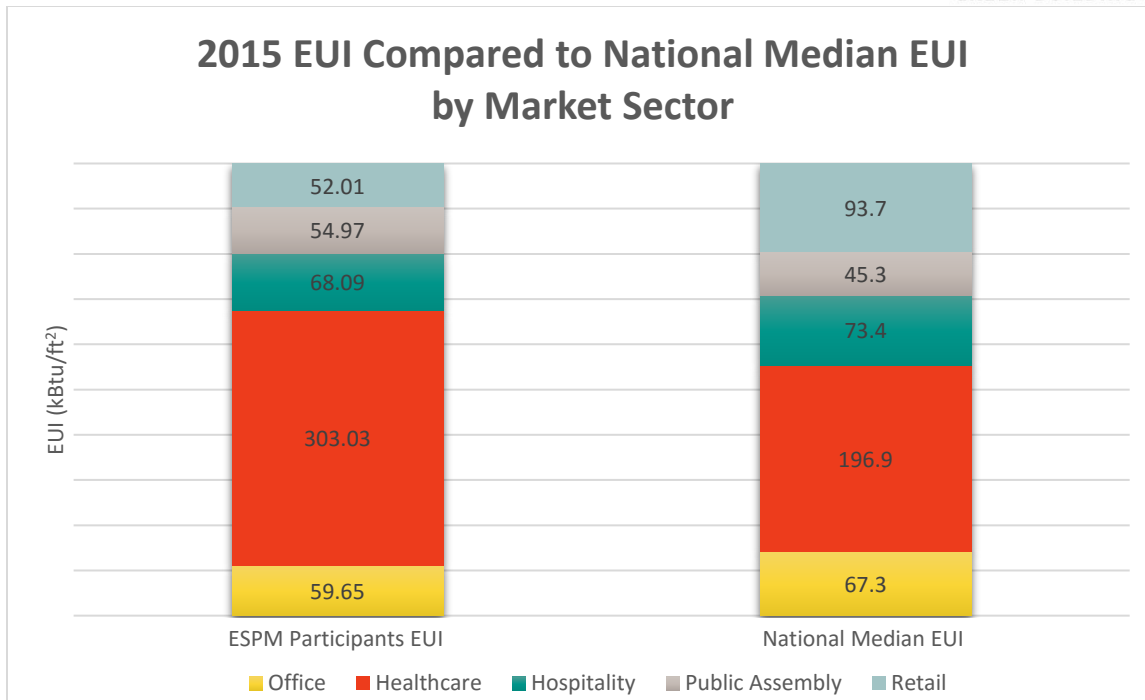


Figure 6. 2015 EUI compared to U.S. national median EUI by market sector.

The 2015 EUI was also compared to the national median EUI by market sector. Figure 6 shows how the buildings within the Lloyd EcoDistrict compare to the median performance of buildings in each peer group. The national median is determined by nationally representative data from the Commercial Building Energy Consumption Survey (CBECS). As demonstrated in Figure 6, the EUI values for Office (11.4%), Hospitality (7.23%), and Retail (44.5%) properties are below the national median for their market sector. Public Assembly (17.6%) and Healthcare (35%) properties EUI values are above the national median for their respective sectors.

An ENERGY STAR score has been calculated for 14 of the 24 buildings (see Figure 7). Of these, 9 buildings (64.3%) 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 should work to assist in and celebrate this effort.

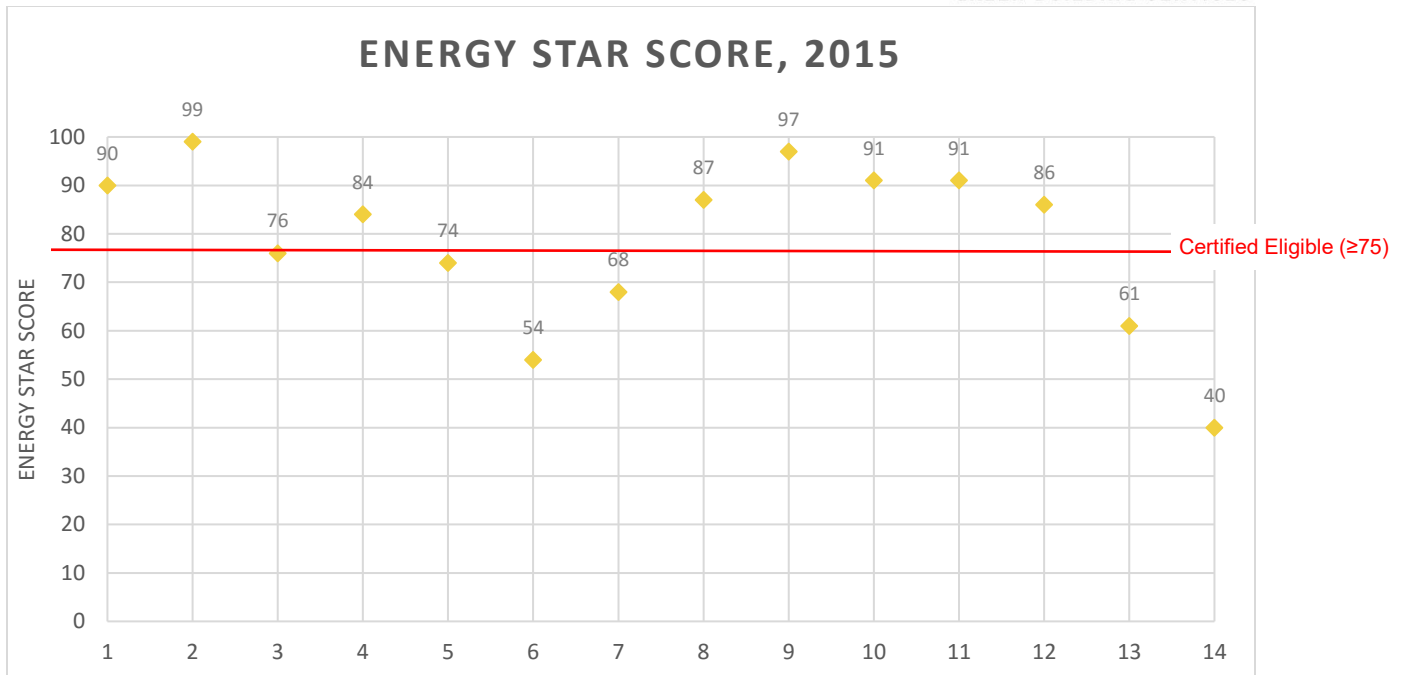


Figure 7. ENERGY STAR Scores, 2015.

Similar to the EUI values depicted in Figure 5, building 14 is significantly underperforming its peers (Hospitality) within the Lloyd EcoDistrict, with an ENERGY STAR score of 40. Buildings 5 and 7 are close to the certification threshold and energy efficiency measures should be investigated to allow them to reach the 75 point threshold.

Energy Use Trends

The amount of historical data in Portfolio Manager varies by project. Of the 24 properties, 16 properties have entered data for each year going back to 2010. Three have been tracking energy performance since 2012, another three have been tracking since 2013, and two additional participants began the process of tracking in 2015. This variability presents a challenge to fully understanding historical trends going back to the baseline year (2010) but GBS has evaluated trends over the last five years whenever possible. These trends are informative but generally limited to office and public assembly uses. Over time, as Portfolio Manager users continue to enter data for their buildings, the strength of these findings across all land uses in Lloyd will increase.

As demonstrated in Figure 8, total energy use for these 16 buildings has decreased from 351,667 mmBtu to 308,869 mmBtu, a reduction of 12.2% since 2010. Energy use has steadily decreased over the past three years. Savings have been observed in both electricity and natural gas usage. Over that span, electricity usage has decreased 9.6% while natural gas usage has gone down by 23%. These types of savings are critical to the achievement of the 33% reduction in energy targeted for existing buildings in the Lloyd EcoDistrict Energy Action Plan.

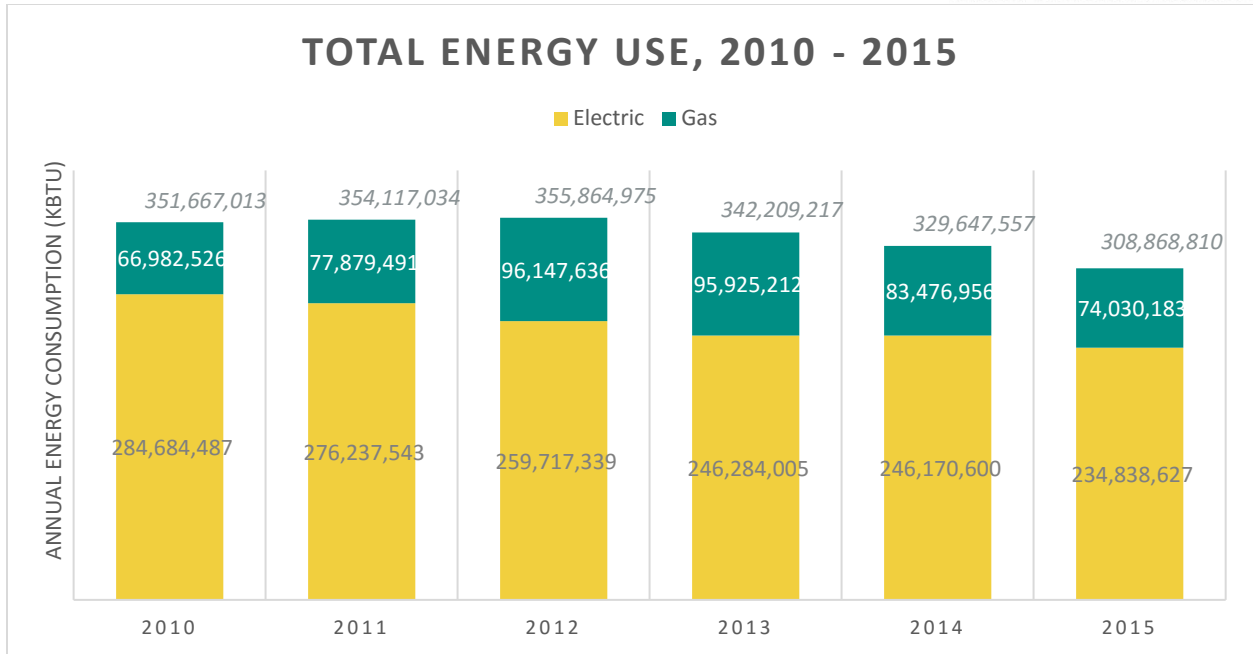


Figure 8. Total energy use for 16 properties with data for each year between 2010 and 2015.

As stated above, EUI is a more valuable metric for determining building energy performance because it incorporates building area into the energy use estimate and allows for a comparison of performance across buildings of various sizes. The EUI for 16 properties with data between 2010 and 2015 was analyzed (see Figure 9). The average EUI for this cohort of buildings is 12.2% lower than in 2010 and has decreased steadily over the past three years. These results show significant progress towards Lloyd’s existing buildings energy goal.

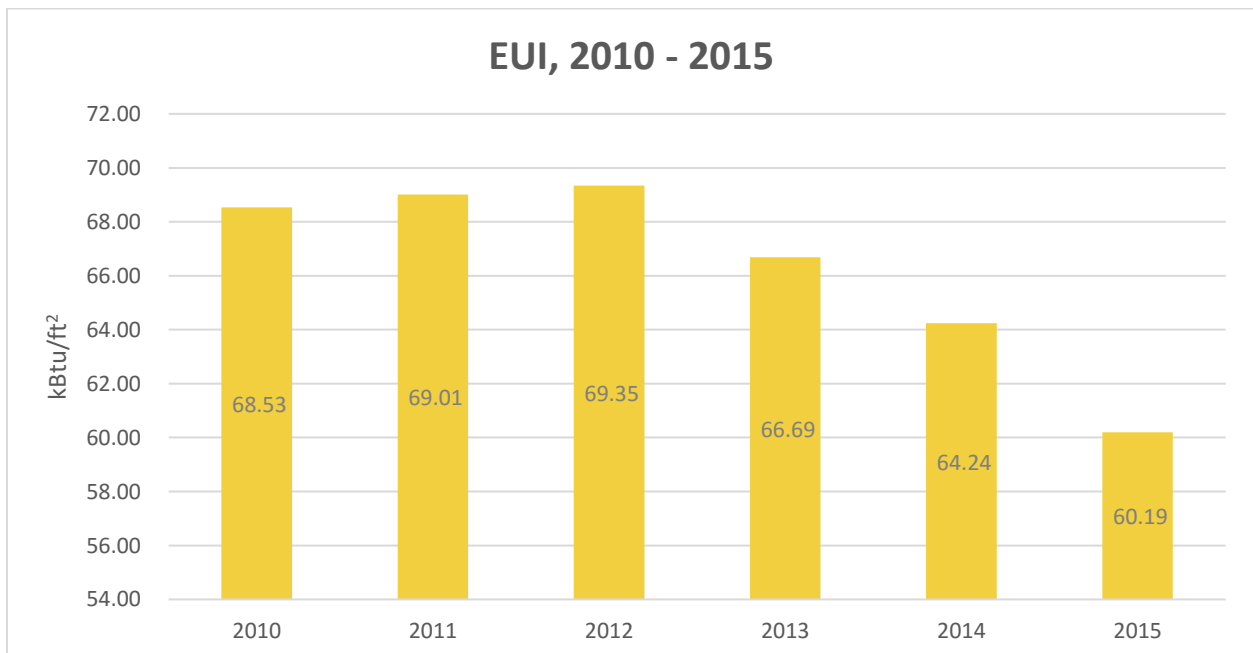


Figure 9. Energy use intensity for 16 properties with data for each year between 2010 and 2015.

Figure 10 depicts the calculated EUI for all buildings within the district for all years where data was available. Overall, EUI for existing buildings in the Lloyd EcoDistrict have significantly decreased since 2010. With the exception of a few properties, EUI in 2015 was consistently lower than in previous years.

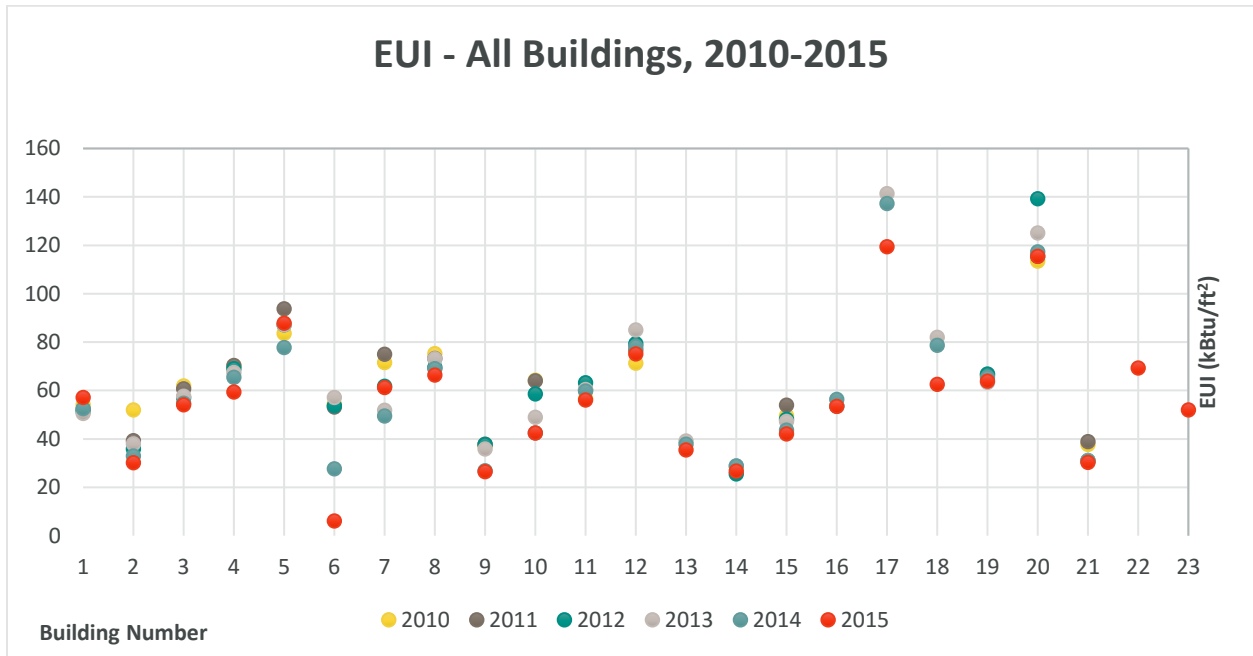


Figure 10. Energy use intensity from 2010 to 2015 (one removed for confidentiality).

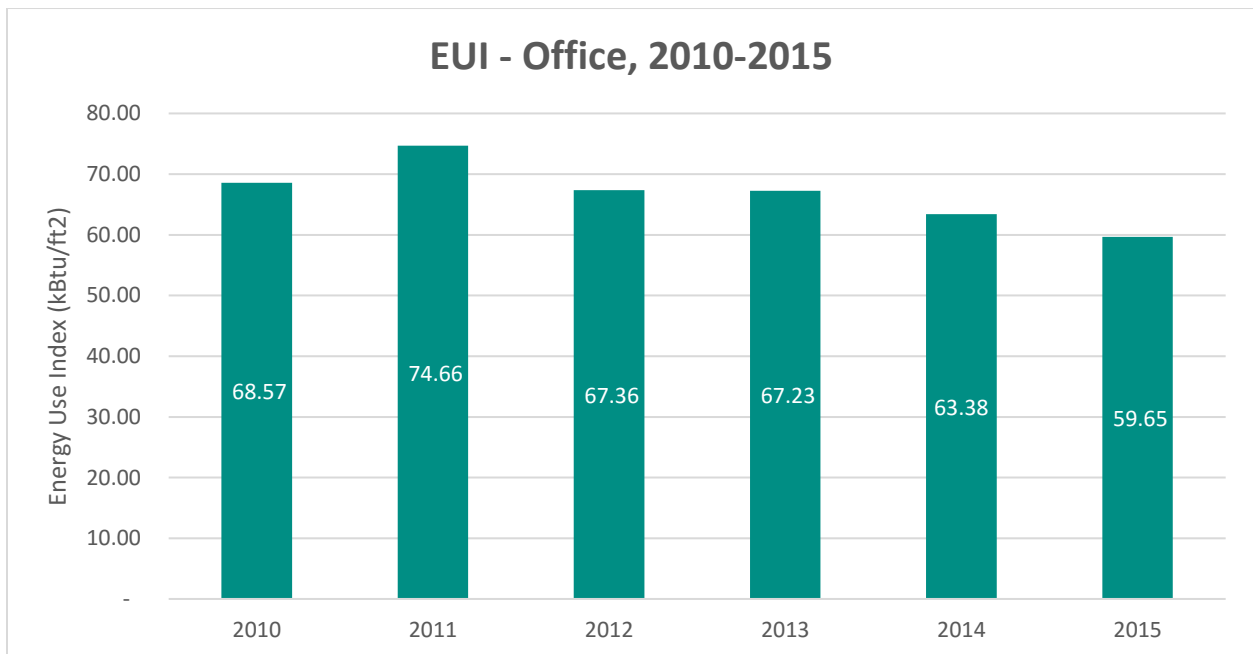


Figure 11. Energy use intensity for office uses from 2010 – 2015.



GBS calculated the EUI for all office uses to better understand office building performance within the Lloyd EcoDistrict. This analysis more specifically depicts energy use trends overtime within this market sector. Figure 11 shows that EUI for office buildings in the Lloyd EcoDistrict have steadily declined over the past five years, with EUI values 20% lower than reported in 2011.

Recommendations/Next Steps

Overall, the data reviewed above demonstrate significant progress on energy use reduction within the Lloyd EcoDistrict. Total energy use by buildings within the district has decreased substantially since 2010, reducing both overall electricity and natural gas usage. The median EUI for all buildings with 2015 data is 57, a commendable achievement for the Lloyd District and its building owners. The office, retail, and hospitality sectors are using less energy than the national median for buildings in their peer group. Within the office market sector, significant reductions in energy use have been observed and the EUI for office uses in Portfolio Manager have decreased by 13% since 2010. Again, a significant success for building owners in the district.

Still, there is much to do to improve the ability of the Lloyd EcoDistrict to evaluate building performance, and continue to make progress towards its goals.

- Expand participation in ENERGY STAR Portfolio Manager within the Lloyd EcoDistrict.
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