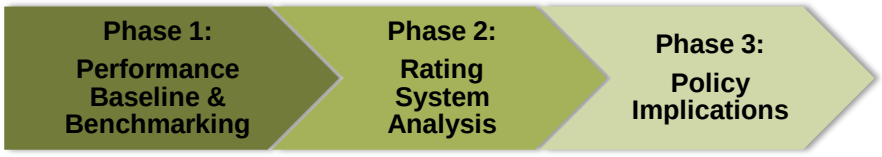
BRITISH COLUMBIA BUILDING PERFORMANCE STUDY

EXECUTIVE SUMMARY

British Columbia's existing buildings account for two-thirds of all energy consumed in the Province and 41% of the Province's total GHG emissions. Recognizing the significant role that buildings play in meeting the Province's efforts to address climate change, energy, and water consumption and waste generation, this study sought to evaluate the performance of buildings in British Columbia and provide special consideration to the potential impact of third-party rating systems on achieving public policy objectives.

The study reviewed energy consumption data for 281 buildings from across the Province, including 147 BOMA BESt certified buildings and 134 non-certified buildings. The majority of certified buildings were office buildings (121), followed by retail (19), multi-unit residential (5) and industrial (2)[1]. In contrast, the vast majority of non-certified buildings were multi-unit residential buildings (110), followed by office (14), hotels (6), retail (2) and other buildings (2). A further breakdown of the sample set is detailed in section 3 of the report.



KEY FINDINGS

General

- Bringing the bottom quartile of office buildings and MURBs in the study up to the median EUI for the respective building types would result in a reduction of 5% of total energy consumption in British Columbia.
- Extreme variations in energy use intensity, water use intensity, and waste exist across buildings.

[1] BOMA BESt only introduced a certification for multi-unit residential buildings in 2012, which accounts for why there were only five such buildings in the study.

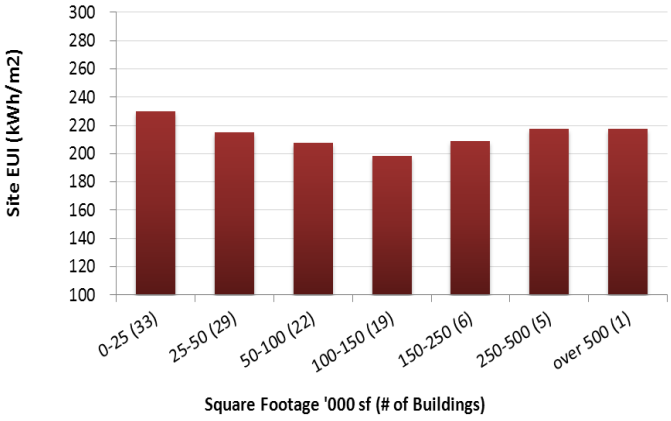
This study validates what we suspected internally. It's worth certifying not only our new buildings, but we are now considering all our existing buildings."

- Jonathan Meads
Sustainability Manager,
Concert Properties

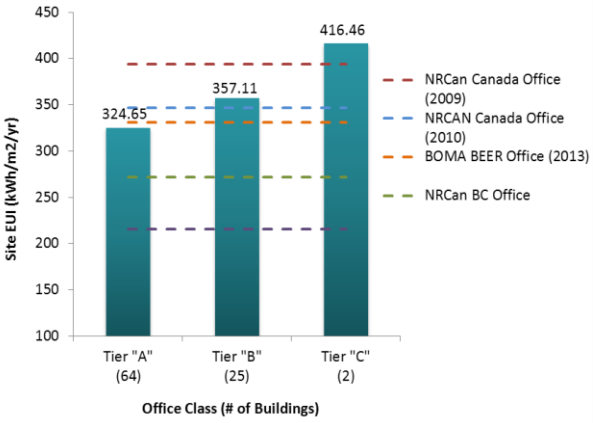
lighthouse

Office Buildings

- The average site energy use intensity (EUI) for all office buildings in the study was 335 kWh/m2/yr, 23% higher than the NRCan benchmark for buildings in BC and the Territories. The top 25th percentile had an average EUI of 261 kWh/m2/yr compared with 378 kWh/m2/yr for the bottom quartile.
- Bringing the bottom quartile of office buildings up to the median EUI for all office buildings in the study would result in a potential reduction of 5% of total energy consumption by all office buildings in the Province.
- The average water use intensity of all office buildings in the study was 1.32 m3/m2/yr, significantly higher than both comparative benchmarks (0.91 and 0.642 m3/m2/yr), with the bottom quartile of buildings exhibiting values exceeding 1.90 m3/m2.
- The average waste diversion rate for office buildings was 59% and the median 55%, below targets set by the Province and regional governments.
- Newer office buildings showed a slight reduction in GHG emission intensities.
- GHG emission intensity was positively correlated with the number of floors in office buildings. The greater the number of floors the higher the relative GHG emission intensity.



AVERAGE SITE EUI FOR MURBS BY FLOOR AREA



AVERAGE EUI OF OFFICE BUILDINGS BY BUILDING CLASS

Multi-Unit Residential Buildings

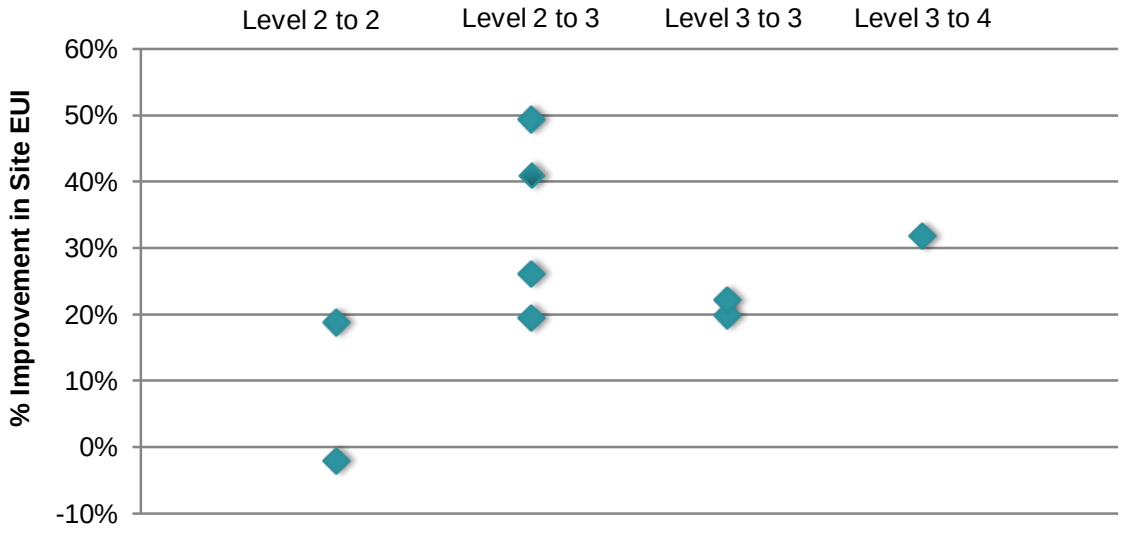
- The average site EUI for all MURBs was 215 kWh/m2/yr, much better than benchmarks in other comparative studies , with the top quartile achieving an average site EUI of 153 kWh/m2/yr and the bottom quartile averaging 259 kWh/m2/yr.
- In contrast to other studies, there was a slight negative correlation between building age and energy performance for MURBs, although tentative given the relative age distribution of buildings in the study.
- The energy performance of low-rise MURBs was 28% better than mid-rise MURBs and 22% better than high-rise MURBs.
- GHG emission intensity values mirrored energy use intensity levels.

BOMA BESt Certification

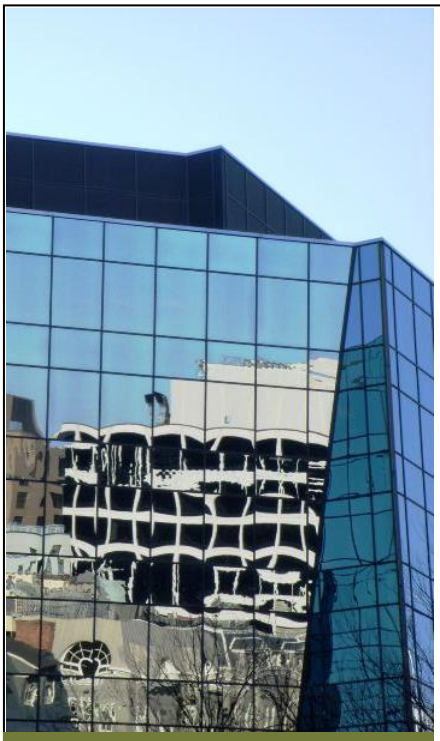
- BOMA BESt office buildings that recertified showed a 25% improvement in energy use intensity (EUI) over buildings that had only gone through the original certification process. Similarly, recertified buildings achieved a 30% reduction in annual building water usage per square meter of space and an average increase of 8% in diverted waste.
- BOMA BESt attracts all types of buildings and performers and is a useful tool not just for high performing buildings but is being used by many lower performing buildings as a means to start benchmarking environmental performance and work towards continual environmental improvement.
- Extrapolating findings with respect to BOMA BESt to LEED EB:O&M was not possible given the study's scope. A more detailed credit-level analysis of both rating systems is required to assess equivalencies between the two frameworks.
- Level 4 BOMA BESt buildings were the best performing buildings in the study;
- Almost all BOMA BESt buildings had some form of energy management policy (99.3%)
- Just over half (55%) of certified buildings were conducting waste audits every three years.

With respect to BOMA BESt, it must be stressed that certification is based on pre-certification data and serves as an exercise in benchmarking a building. First-time certification is not an indicator of performance improvement, but rather a tool to help building owners and managers benchmark and work towards continual improvements in environmental performance.

The study's findings indicate that there is significant room for improvement in most aspects of building performance across all building types. Findings also indicate that the act of recertifying is strongly associated with improvements in building performance.



PERCENTAGE IMPROVEMENT IN EUI AMONG BOMA BEST BUILDINGS THAT RECERTIFIED



Recommendations

The study presents the following key policy recommendations coming out of the report's findings and the process undertaken to complete the report[2]:

1. Improve access to energy consumption data from utilities.
2. Mandate reporting of building energy, waste and water data.
3. Incentivize and/or mandate auditing and retro-commissioning of all buildings.
4. Consider rating systems at the credit level to achieve policy objectives.
5. Focus efforts and support on Class B and C office buildings and residential buildings.

Project Partners

BOMA Building Owners and Managers Association of British Columbia

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Project Sponsors

metro vancouver

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CITY OF SURREY the future lives here.

CRD Making a difference...together

[2] The recommendations provided in this report are those of Light House and the report's authors and do not necessarily reflect the views and positions of the study's partnering and sponsoring organizations.