# EDMONTON'S 2016 BUILDING ENERGY BENCHMARKING REPORT.

Publication Date: March 1, 2018

CHANGE BUILDINGS FOR CLIMATE

Edmonton

**HIGH-PERFORMING GREEN BUILDINGS AND EXCELLENCE IN ENERGY PERFORMANCE ARE ALREADY TOP OF MIND FOR MANY OF EDMONTON'S BUILDING OWNERS AND OPERATORS.**

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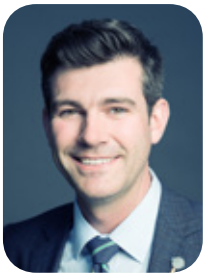
**BY PROVIDING OWNERS WITH INFORMATION ABOUT THEIR BUILDING, CITY OF EDMONTON'S BUILDING ENERGY BENCHMARKING PROGRAM CAN HELP IMPROVE BUILDING ENERGY EFFICIENCY, PROVIDE ENERGY SAVINGS, AND HELP REDUCE GREENHOUSE GAS EMISSIONS.**



Cities have what it takes to tackle some of the great challenges of our time. This is particularly true when it comes to confronting the causes and impacts of climate change. Edmonton has shown leadership in reducing carbon emissions, but we must be more ambitious with our efforts if we want to create the future our children and grandchildren deserve.

Many of the world's most innovative communities are striving to build low-carbon economies. Edmonton's Community Energy Transition Strategy is our answer to this challenge. The strategy and action plan defines the many pathways our city will take to reduce our carbon emissions, including the corporate and community programs necessary to achieve our climate goals. Edmonton's Building Energy Benchmarking Program is an integral part of this strategy and will significantly increase the energy efficiency of Edmonton's large buildings, a critical catalyst for reducing our carbon footprint.

**AS A BUILDING OWNER, THE CITY OF EDMONTON IS PROUD TO HAVE LED BY EXAMPLE WITH 24 CITY OF EDMONTON-OWNED-AND-OPERATED PROPERTIES PARTICIPATING IN YEAR ONE.**

Edmonton is the first Canadian municipality to launch a building energy benchmarking program, an approach that has proven valuable in other cities across the world. Many stakeholders from Edmonton's thriving building industry helped City of Edmonton staff design and deliver this program. I am grateful for their industry leadership and contributions to making this program's first year successful. Growing industry expertise in high-performing, energy efficient buildings is one of our greatest opportunities.

As a building owner, the City of Edmonton is proud to have led by example with 24 City of Edmonton-owned-and-operated properties participating in year one. We commit to increase the number every year as we continue to focus on sustainability in all stages of the building lifecycle.

Leadership on climate will create a greener economy and help secure long-term prosperity for future generations. To all those who participated in the benchmarking program, your leadership sets an example for others and demonstrates a willingness to take action. Thank you for your involvement and we hope you continue to support our energy transition initiatives.

Yours truly,

Don Iveson
Mayor

In our current marketplace, the importance of environmentally friendly buildings cannot be underestimated. Having had the opportunity to collaborate with the City of Edmonton on many energy transition initiatives, it is clear that BOMA Edmonton's vision for the commercial building sector aligns well with the City of Edmonton's. We are both working hard to realize this shared vision.

In 2007 we launched BOMA BEST, demonstrating our commitment to environmentally friendly buildings, which has since become Canada's most recognizable environmental assessment and certification program for existing buildings. With more than 1,600 certified buildings in Canada, BOMA BEST has proven itself a valuable tool for building owners to continuously improve the sustainable operations and maintenance of their facilities.

**BOMA BEST ENABLES BUILDINGS TO DEMONSTRATE THEIR COMMITMENT TO SUSTAINABILITY, PROVIDING THEM A ROADMAP OF BEST PRACTICES FOR IMPROVED PERFORMANCE RESULTING IN AS MUCH AS A 30% REDUCTION IN THE BUILDING'S ENERGY CONSUMPTION.**

BOMA BEST enables buildings to demonstrate their commitment to sustainability, providing them a roadmap of best practices for improved performance resulting in as much as a 30% reduction in the building's energy consumption.

As the voice of commercial real estate in Edmonton for more than 50 years, BOMA members are committed to sustainable building operations and we believe that Edmonton's Building Energy Benchmarking Program is valuable for building owners/operators. We know that benchmarking enables improved energy efficiency for buildings because it provides building owners and managers with an easy-to-understand measure of their building's performance and allows them to see where they stand compared to similar buildings. Evidence of the financial benefits of energy efficient buildings has grown substantially, with direct savings through energy bills and reduced operational costs as well as indirect benefits such as increased market value for leasing and sales.

Edmonton's benchmarking program and BOMA BEST are complementary. Our collaboration with the City of Edmonton in their delivery is mutually beneficial and ensures that Edmontonians continue to benefit from greener, more efficient buildings. Edmonton's Building Energy Benchmarking Program has been designed to fully integrate with the energy performance components of BOMA BEST 3.0, via ENERGY STAR Portfolio Manager, and as a result participating buildings will be well positioned to implement BOMA BEST standards within their facilities. As such, we encourage all buildings who undergo benchmarking to take the next step and pursue BOMA BEST certification.

We appreciate the City of Edmonton's commitment to green buildings and we look forward to continuing our joint efforts to make environmentally friendly buildings the new market norm.

Sincerely,

Percy Woods,
President & CEO, BOMA Edmonton.

# ACKNOWLEDGMENTS



## COLLABORATORS

The City of Edmonton would like to thank the many businesses and organizations who have contributed to the design and implementation of Edmonton's Building Energy Benchmarking Pilot Program. It is important to acknowledge the time and effort many individuals dedicated to ensuring that the most effective and relevant program could be launched locally. Some collaborators provided their expert advice and others support access to high-quality data – all of which was integral to our success.

**Specifically, we would like to thank:**

BOMA EdmontonBOMA Canada

City of Edmonton's Energy Transition Advisory Committee

Edmonton's Building Energy Benchmarking Industry Advisory Group

EPCOR

Natural Resources Canada

NAIOP

RealPac

Municipal Climate Change Action Centre

ATCO


## PARTICIPATING ORGANIZATIONS

The City of Edmonton would like to thank all of the following organizations for participating in the City's inaugural Building Energy Benchmarking Program. These organizations represented a wide range of industries, including property managers, universities, condominium corporations, hostels, financial services companies, cultural services, light industry, as well as provincial and municipal governments. The table below lists the participating organizations and the number of buildings they submitted. Please see the Appendices for a detailed list of participant buildings consenting to building-level disclosure, including the submitting organization, as well as energy and emissions performance data.

| ORGANIZATION | # PROPERTIES | # BUILDINGS |
|---|---|---|
| City of Edmonton | 24 | 39 |
| Government of Alberta | 21 | 21 |
| Bentall Kennedy | 6 | 6 |
| Humford Management Inc. | 4 | 4 |
| Morguard | 3 | 3 |
| Northern Alberta Institute of Technology | 3 | 3 |
| Triovest Realty Advisors Inc. | 3 | 3 |
| Aspen Properties | 2 | 2 |
| Callaghan Ravines | 2 | 2 |
| MacEwan University | 2 | 2 |
| Midwest Property Management | 2 | 2 |
| Oxford Properties | 2 | 2 |
| Francis Winspear Centre for Music | 1 | 1 |
| Hostelling International – Canada – Pacific Mountain | 1 | 1 |
| Ivanhoe Cambridge | 1 | 1 |
| Mammoet Canada | 1 | 1 |
| Melcor Developments Ltd. | 1 | 1 |
| QuadReal Property Group | 1 | 1 |
| Riverwind Strata Title Housing Cooperative Ltd. | 1 | 2 |
| Servus Credit Union Ltd | 1 | 1 |
| Station Lands LTD | 1 | 1 |
| **Totals** | **83** | **99** |

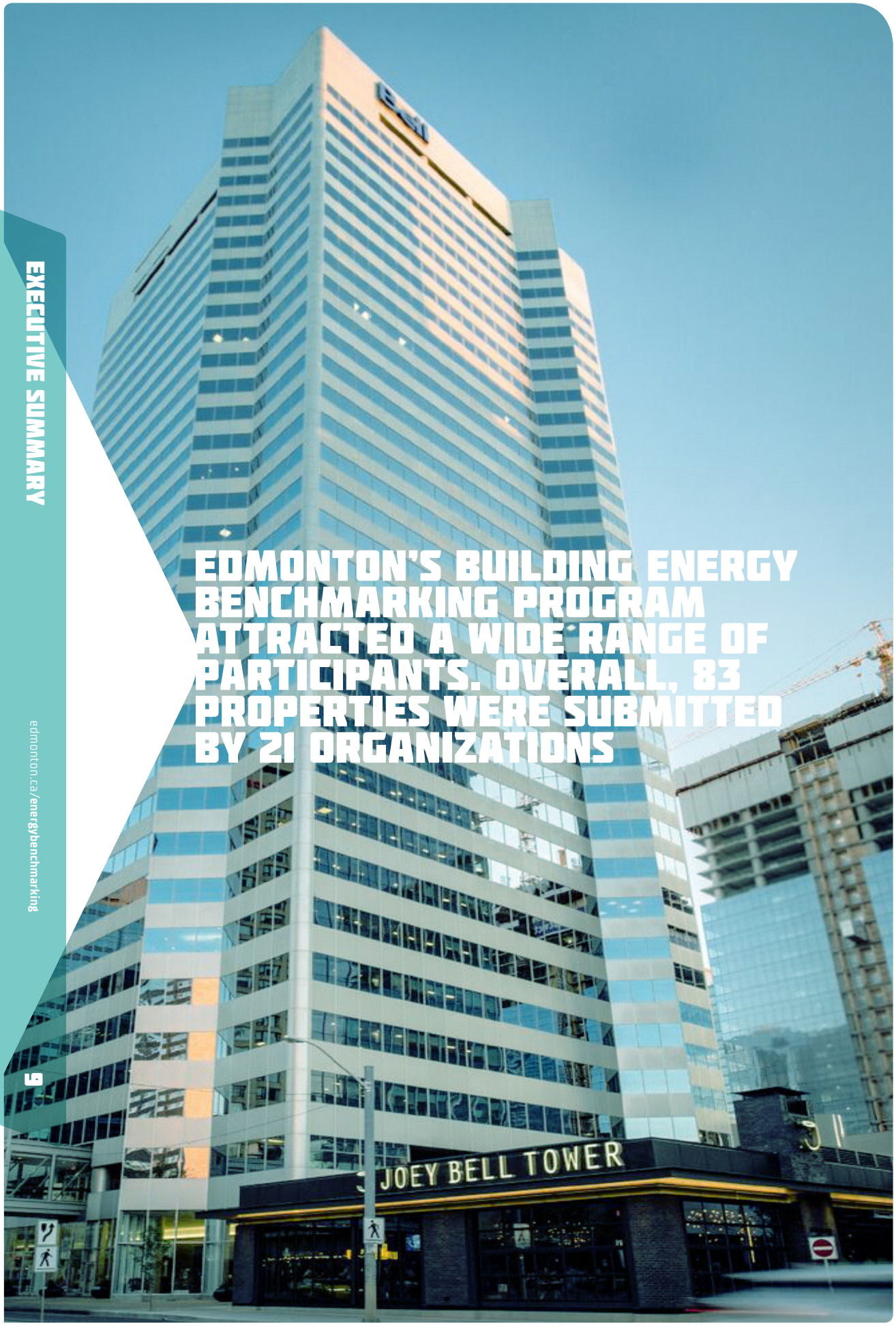
# EXECUTIVE SUMMARY

As a part of Edmonton's Community Energy Transition Strategy, the City of Edmonton launched a voluntary building energy benchmarking pilot program to help lay the foundation for Edmonton's transition to a low-carbon, sustainable energy future by making building energy performance information accessible to interested stakeholders. Using the ENERGY STAR Portfolio Manager online energy benchmarking tool, the program collected whole building energy consumption for calendar year 2016 across Edmonton's large building stock, and used this information to benchmark participant building energy performance in the hopes of facilitating energy efficiency improvements and greenhouse gas (GHG) reductions.

Year 1 of the City of Edmonton's Building Energy Benchmarking Pilot Program attracted a wide range of participants. Overall, 83 properties were submitted to the program by 21 organizations. The properties included both single-building and multi-building (i.e. campus) properties, covering 99 distinct buildings and 2,017,000 sq-m (21,702,000 sq-ft) gross floor area, equivalent to 7% of the total floor area identified in the City of Edmonton's Building Stock Analysis. This broad participation indicates that Edmonton's commercial real estate market is keenly interested in increasing market transparency regarding building energy performance. The City of Edmonton demonstrated leadership by "walking the talk" and submitting 24 properties to the Pilot, representing 26% of eligible building floor area in the CIty's portfolio.

Offices were the dominant property type among program participants, representing a third of all properties and just under half of all reported floor area. Recreation properties (including arenas and municipal multiplexes) represented the 2nd largest distinct property category at roughly 10% of the total submitted properties and floor area. Roughly two thirds of participant properties were built before 1990, with over 75% of the floor area reported by buildings larger than 23,234 sq-m (250,000 sq-ft).

**FIGURE 1: PARTICIPATING BUILDING GROSS FLOOR AREA BY PROPERTY CATEGORY**

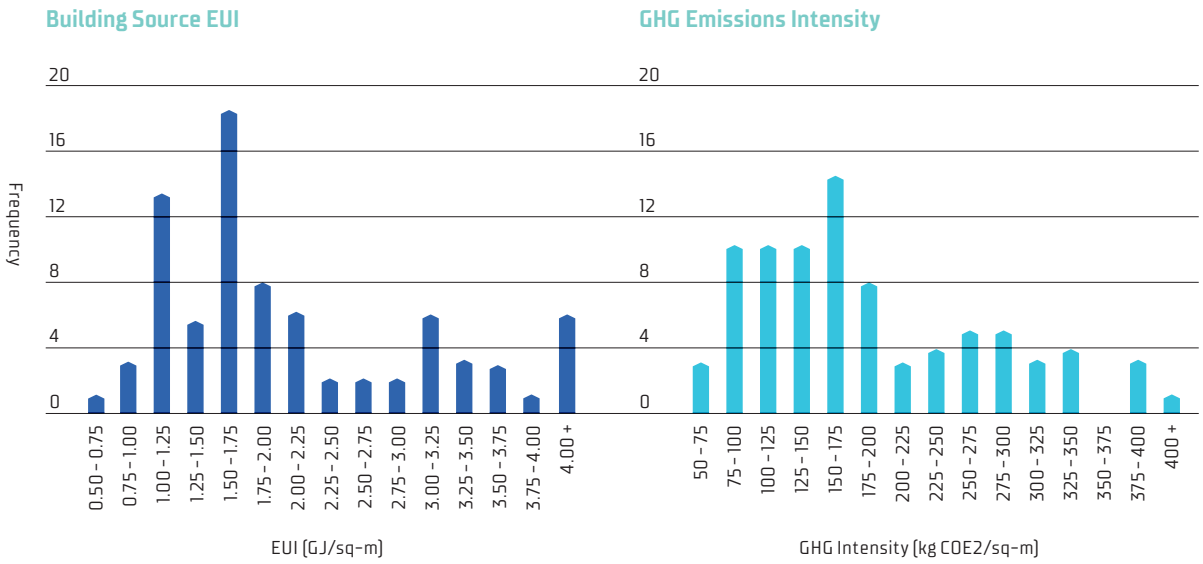



# EDMONTON'S BUILDING ENERGY BENCHMARKING PROGRAM ATTRACTED A WIDE RANGE OF PARTICIPANTS. OVERALL, 83 PROPERTIES WERE SUBMITTED BY 21 ORGANIZATIONS

# EXECUTIVE SUMMARY CONT'D

Participating buildings account for 11% of all energy consumption and 12% of all GHG emissions from commercial and institutional buildings within the City of Edmonton for 2016[1]. The histogram charts below show the distribution of energy use intensities (EUIs, in GJ/sq-m) and GHG emissions intensities (in kg/sq-m) for participating buildings. The EUI and GHG performance data were examined for correlation with trends related to building age and size, though no clear patterns were observed.

### FIGURE 2: DISTRIBUTION OF EUIs AND GHG-INTENSITIES – ALL BUILDINGS




## MACEWAN'S ROBBINS HEALTH LEARNING CENTRE

**MACEWAN'S ROBBINS HEALTH LEARNING CENTRE HAS ACHIEVED AN ANNUAL SOURCE ENERGY USE INTENSITY BELOW 1.6 GJ/SQ-M, AND HAS ACHIEVED AN ENERGY STAR SCORE OF 93.[2]**

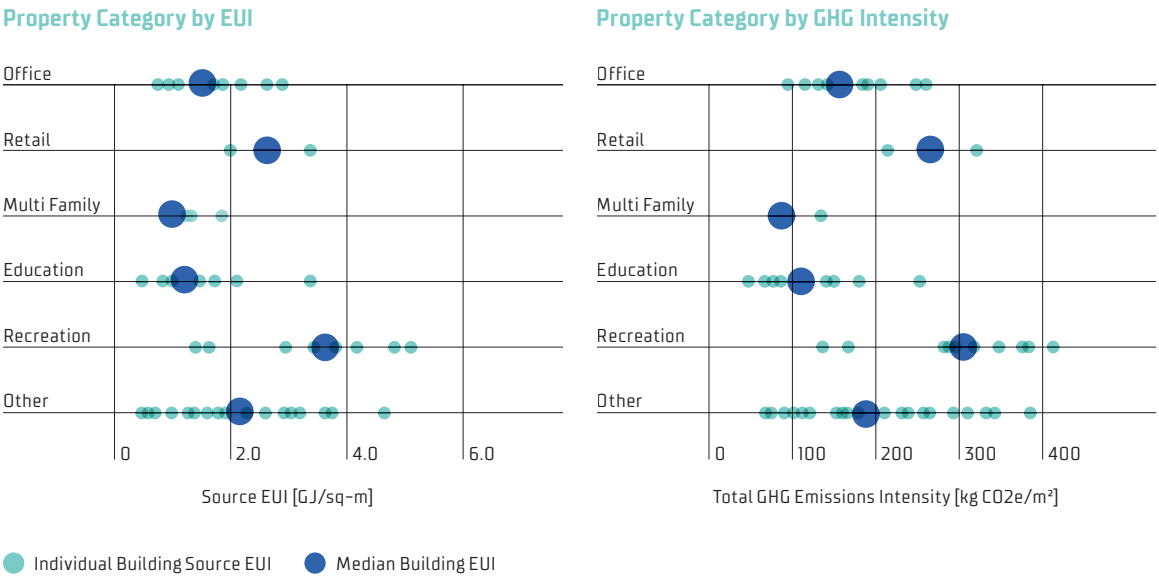
[1] City of Edmonton – 2016 Community Greenhouse Gas (GHG) Emissions Inventory Report – Table 8
[2] The Offices category was used to calculate the ENERGY STAR Score as there is currently no category for post-secondary buildings.

# EXECUTIVE SUMMARY CONT'D



Performance was also examined by property category, revealing that multi-family buildings have the lowest median EUI, followed by education buildings. Recreation buildings had the highest median EUI, owing to the inclusion of energy-intensive multiplexes, pools, and/or arenas in these properties.

### FIGURE 3: BUILDING EUIS AND GHG INTENSITIES BY PROPERTY CATEGORY




The City of Edmonton will be hosting an awards ceremony to recognize Year 1 participants and share the program's results. This recognition ceremony will be open to all Pilot participants, and various industry stakeholders, including BOMA Edmonton, City staff, utilities, and building owner's associations.

Recruitment efforts for Year 2 and 3 will focus on expanding program participation, especially in several key sectors. Of particular focus will be the multi-family residential building sector, which does not currently have robust energy and emissions performance benchmarks. Year 2 recruitment efforts will include a comprehensive recruitment strategy, similar to Year 1.

Following the three-year pilot, the City will evaluate the impacts of the pilot, will consider ways to maintain and expand benchmarking and disclosure to support market transformation objectives in the commercial building sector.

# PROGRAM OVERVIEW



# WHAT IS THE PROGRAM?

On June 5, 2017, the City of Edmonton launched a voluntary building energy benchmarking program to help lay the foundation for Edmonton's transition to a low-carbon, sustainable energy future by making building energy performance information accessible to interested stakeholders. As a part of **Edmonton's Community Energy Transition Strategy**, the program compiled and compared annual, whole building energy consumption across Edmonton's large building stock and will use this information to benchmark building energy performance, facilitate energy efficiency improvements and greenhouse gas (GHG) reductions.

## WHAT IS BENCHMARKING? THE PROCESS OF COMPARING A BUILDING'S ENERGY AND EMISSIONS PERFORMANCE TO SIMILAR BUILDINGS, AND TO ITSELF OVER TIME.

While transparency is an essential part of building energy benchmarking programs in other jurisdictions, disclosure at the building level is optional for all Edmonton participants and only anonymized data is published in this report, unless the building owner has consented to detailed disclosure. As a result, there are two types of participants referenced throughout this report – those whose performance will remain anonymous (only presented in aggregate) and those who consented to building level disclosure.

Comparing energy consumption between buildings should be done carefully as many factors affect the comparison of energy use. Buildings identified as being of the same type could have different energy use intensities for a number of reasons such as variable space use, occupancy and equipment use. Many factors are taken into consideration when undergoing energy benchmarking to ensure an accurate comparison, however these are not considered when looking strictly at EUI's. That being said, EUI still remains the best tool to use as a benchmark and will only strengthen as building databases grow from building energy reporting and disclosure programs

## ARE BUILDINGS A SIGNIFICANT SOURCE OF GHG'S?

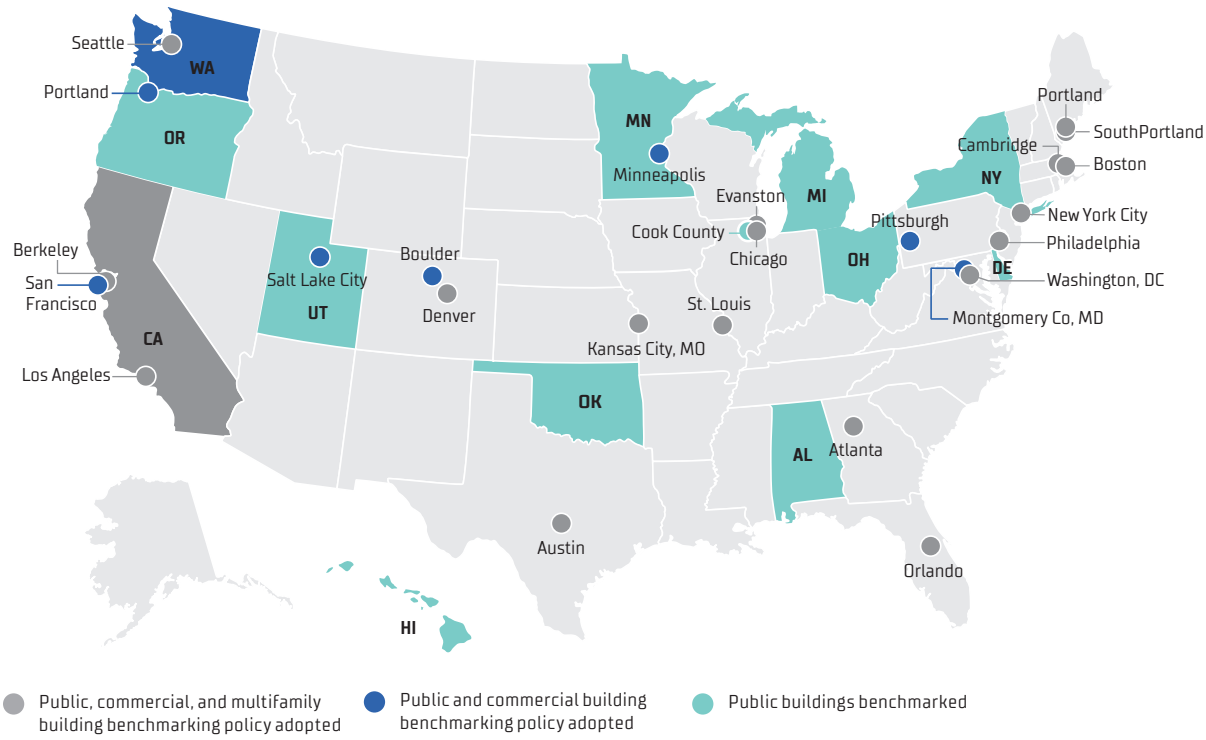
**Buildings account for significant proportion of our energy and GHG emissions – 42% of the Edmonton's energy use is in buildings (23% of which is from commercial buildings) and, 19% of Edmonton's community GHG emissions are a result of commercial and institutional buildings. Buildings GHG emissions are a result of natural gas use (most often for space and water heating) and electricity (which is carbon intensive due to Alberta's primarily coal-fired power grid). As a result, addressing energy and GHGs in buildings is essential to meeting long term energy and climate goals as buildings represent a significant portion of GHG emissions.**

# WHAT ARE THE BENEFITS OF ENERGY BENCHMARKING?

24 U.S. cities have instituted building reporting and disclosure policies, covering over 90,000 individual properties and 10.7 billion square feet of building area in America alone.

**FIGURE 4: U.S. BUILDING BENCHMARKING AND TRANSPARENCY POLICIES**






## MOMENTUM IS BUILDING IN CANADA

As of February 2017 the Government of Ontario became the first Canadian jurisdiction to require annual energy and water reporting for large buildings through an amendment to Ontario's Green Energy Act. Ontario's Energy and Water Reporting and Benchmarking regulation's first reporting deadline for commercial/industrial buildings of more than 250,000 square feet will be July 1, 2018 and include information from the 2017 calendar year. For more information see:

https://www.ontario.ca/page/measure-energy-and-water-use-large-buildings

# WHAT ARE THE BENEFITS OF ENERGY BENCHMARKING? CONT.

The rapid emergence of these policies and programs is helping establish a strong precedent that they are effective contributors to municipal GHG reduction efforts, in addition to the following benefits:

**Economic Benefits** There is a well-established body of research supporting the economic benefits of benchmarking, much of which is rooted in over a decade of research into the economic value of building energy efficiency.

**Energy Bill Savings** The most direct and obvious benefit to buildings that engage in benchmarking flows from the savings on energy bills that is achieved after implementing energy efficiency measures.

**Rental Premiums** Investments in energy efficiency have been shown to lead to an increase in rental fees and demonstrated that energy efficient buildings attract higher rental fees than less efficient buildings.

**Higher Building Value and Sales Prices** Evidence is also growing that the competitive advantages of green buildings translate into higher overall value in the marketplace and higher sales prices.

**Energy + Climate Benefits** Building energy benchmarking enables building owners, property managers, tenants, and other stakeholders to understand the energy performance and greenhouse gas usage of buildings and helps with incorporating energy performance into decision making.

**Increased Awareness of Energy Efficiency** Improved knowledge of a building's energy performance, combined with the competitive insight of the energy performance of other similar buildings, can motivate action to improve building energy performance. Competitive insights gained from benchmarking help prioritize efficiency upgrade opportunities across the building stock.

**Energy Efficiency Gains** A growing body of evidence from building benchmarking programs in the U.S. and Canada demonstrates that buildings engaged in benchmarking achieve consistent energy savings over time. Jurisdictional research found an annual average energy savings of 2% per building per year for all benchmarking program participants

**Market Transformation** Overtime, the greatest value of building benchmarking is its potential to provide information to the real estate market that can form the basis of a robust market for building efficiency that will drive deeper energy savings. Research has consistently found that limited access to information on building energy performance is one of the largest barriers to transformation of the market to support more energy efficient buildings.


## PERCY PAGE CENTRE

THE PERCY PAGE CENTRE HAS AN ANNUAL SOURCE ENERGY USE INTENSITY OF 1.06 GJ/SQ-M, WHICH IS 48% BELOW THE NATIONAL MEDIAN FOR OFFICES AND HAS ACHIEVED AN ENERGY STAR SCORE OF 98.

# BENCHMARKING IN EDMONTON

The City of Edmonton's Building Energy Benchmarking Program was developed to complement the Federal Government's policy objective for mandatory large building reporting requirements as outlined in the **Pan Canadian Framework on Clean Growth and Climate Change**. Similar large commercial building energy reporting programs are becoming commonplace in North America, with programs in over 50 jurisdictions in the US and a province-wide program in Ontario launching in mid-2018[3]. These programs are designed to encourage broad market transformation by providing transparency to the building energy performance market, increasing the value of energy efficiency, and reducing energy consumption and GHG emissions from the commercial and institutional building sector.

Beyond simply encouraging energy reductions in participating buildings, the program generates valuable data on Edmonton's building energy performance and energy saving opportunities. It will also be a chance to benchmark a broad range of buildings, spreading successful tracking and management practices beyond just the efficiency champions, to multi-family, retail facilities, light industrial buildings and other segments that are less engaged in energy benchmarking.

Data quality is addressed through a data verification stage after collection, where population outliers are contacted for confirmation or revision, as detailed in Appendix A. These data streams and practices will provide value beyond the Pilot period, offering the City data by which to design effective programs to support the Community Energy Transition Strategy goals.

In addition to generating valuable data for governments and markets, the Pilot program also offers a number of direct benefits to participants. The Benchmarking Support Services Help Desk provides one-on-one support to ENERGY STAR Portfolio Manager users (the data reporting tool for the Pilot), to help ensure that participant properties are set up with accurate property characteristics and energy utility information. Participants will receive benchmarking results, comparing their building to similar program participants or other relevant performance benchmarks. Participants are also recognized publicly for their involvement in the program, and receive targeted communications for other energy efficiency programs.

## TERWILLEGAR COMMUNITY RECREATION CENTRE

THE TERWILLEGAR COMMUNITY RECREATION CENTRE IS LEED SILVER CERTIFIED AND HAS MANY GREEN BUILDING FEATURES SUCH AS LOW FLOW WATER FIXTURES AND ACCESS TO TRANSIT. THE POPULAR FACILITY HAS A SOURCE ENERGY USE INTENSITY OF 3.43 GJ/SQ-M.

[3] See www.buildingrating.org for a complete list of ongoing Energy Reporting initiatives

# PILOT PROGRAM

The three-year Building Energy Benchmarking Pilot is designed to test approaches, processes, systems, and tools needed for commercial building energy performance benchmarking and reporting, create awareness and improve energy literacy among commercial building industry and partners in Edmonton, and to prove the feasibility and value of a permanent benchmarking program, paving the way to long-term market transformation and greenhouse gas (GHG) reductions. The program launched in June 2017, with activities planned into 2020, and will cover three calendar years of energy performance: 2016, 2017 and 2018.

The following participation targets were established for pilot program:

**FIGURE 5: PROGRAM TARGETS FOR BUILDING PARTICIPATION**

| Year | Participation Target (# buildings) |
|---|---|
| 1 | 100 |
| 2 | 200 |
| 3 | 300 |

It is expected that new participants will join the program in each year and they will benchmark their buildings every year following their registration. Participants will also be encouraged to benchmark past years for which they have energy data.

The City has established a **Building Energy Benchmarking Industry Advisory Group** with more than 15 members who provide input, advice, and guidance to the City on the evolution of the Pilot program. The committee will remain active throughout the Pilot duration, and will provide feedback in quarterly meetings. This group includes representatives from various different building types and sectors and includes both individuals with experience with building benchmarking and those newer to benchmarking to provide a comprehensive understanding of the issues, benefits, and challenges of benchmarking across the building industry. See edmonton.ca/energybenchmarking for a members list.

# WALKING THE TALK

The City of Edmonton set a target of including at least 20 City-owned and occupied buildings to benchmark their performance in Year 1, a number which will grow every year of the 3-year Pilot period. This will demonstrate the City's commitment to long term energy and GHG reductions, and will generate valuable experience that can be shared with the program participants.

## BOMA BEST CERTIFICATION IN CITY OF EDMONTON FACILITIES

**Approved in May 2017, City of Edmonton's corporate Sustainable Building Policy (C532) includes pursuing BOMA BEST certification for eligible existing City-owned and operated facilities. The BOMA BEST program is intended to complement existing internal operations and maintenance programs, by helping to drive continuous improvement through benchmarking, external validation and recognition.**

BOMA BEST®

# DATA SUBMISSION PROCESS

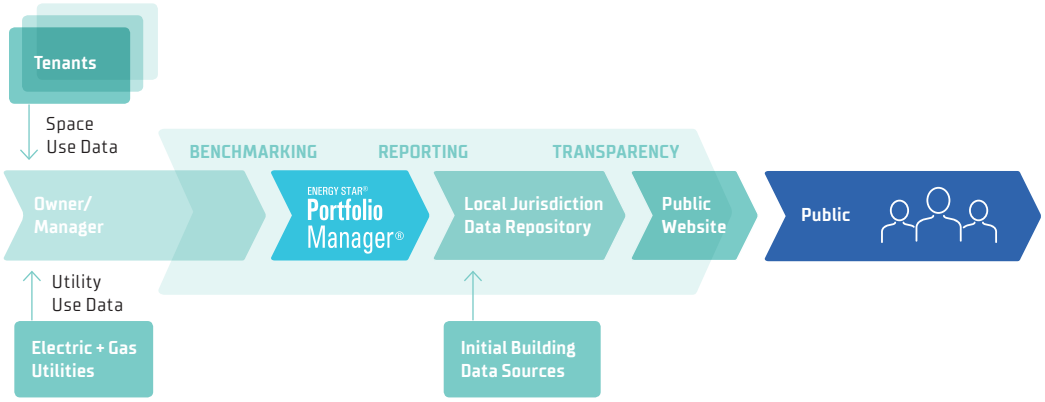
**ENERGY STAR Portfolio Manager** was selected as the tool for reporting building, energy, and GHG data for the Pilot. Portfolio Manager is a free, secure, web-based building energy benchmarking tool. The tool supports users to compare building energy consumption and energy performance metrics and ratings, as well as GHG emissions, for a single building, a campus of buildings, or across a portfolio of properties.

## WHAT IS ENERGY STAR PORTFOLIO MANAGER?

Originally created by the United States Environmental Protection Agency (US EPA), Natural Resources Canada (NRCan) adapted Portfolio Manager to include Canadian features such as Canadian source energy factors, GHG emissions factors, and weather data in August 2013. NRCan is the manager of the tool in Canada, and supports the ongoing development of the Canadian adaptation of Portfolio Manager. Portfolio Manager already had broad acceptance in the marketplace before the City's Pilot launched, with more than 16,500 buildings in Canada (350 in the Edmonton) using the tool as of December 31, 2016.

In order to submit data, Pilot participants created an online account in Portfolio Manager (if they did not already have an existing account) and set up a property profile for each participating building. After entering the required building and energy consumption data data, participants then followed a data request link provided by the City of Edmonton to participants upon registration. Submitting a response to the City's data request takes a "snapshot" of participant building data for 2016, and sends it to the City's Energy Transition Unit Portfolio Manager account. Portfolio Manager technical support was made available to participants via the Benchmarking Support Services Help Desk, which monitored a central program email address and phone number.

**FIGURE 6: BENCHMARKING WITH PORTFOLIO MANAGER PROCESS [4]**




[4] Adapted from a diagram produced by 3 Pacific Coast Collaborative

# DATA SUBMISSION PROCESS CONT'D

The City also facilitates data aggregation for multi-tenant participant buildings. In support of the program, EPCOR and ATCO agreed to provide aggregated building energy data for properties with multiple electricity or gas meters. In order to preserve privacy for buildings with fewer than 20 units, individual tenant consent was required. This data aggregation service was particularly valuable for several multi-family residential buildings, enabling their participation in the program. See the building showcase on page 33 for more information on these success stories.

Leading up to the data submission deadline, the City of Edmonton monitored the data submission process. As the submission deadline approached, users who had registered buildings that had not yet responded to the data request were contacted for follow up. After the submission deadline passed, data request responses were analyzed for potential missing or incorrect data, and flagged participants were contacted for data verification (see Appendix A). Once the dataset had been cleaned and verified, final analysis was carried out, with the analysis results presented in the this report.

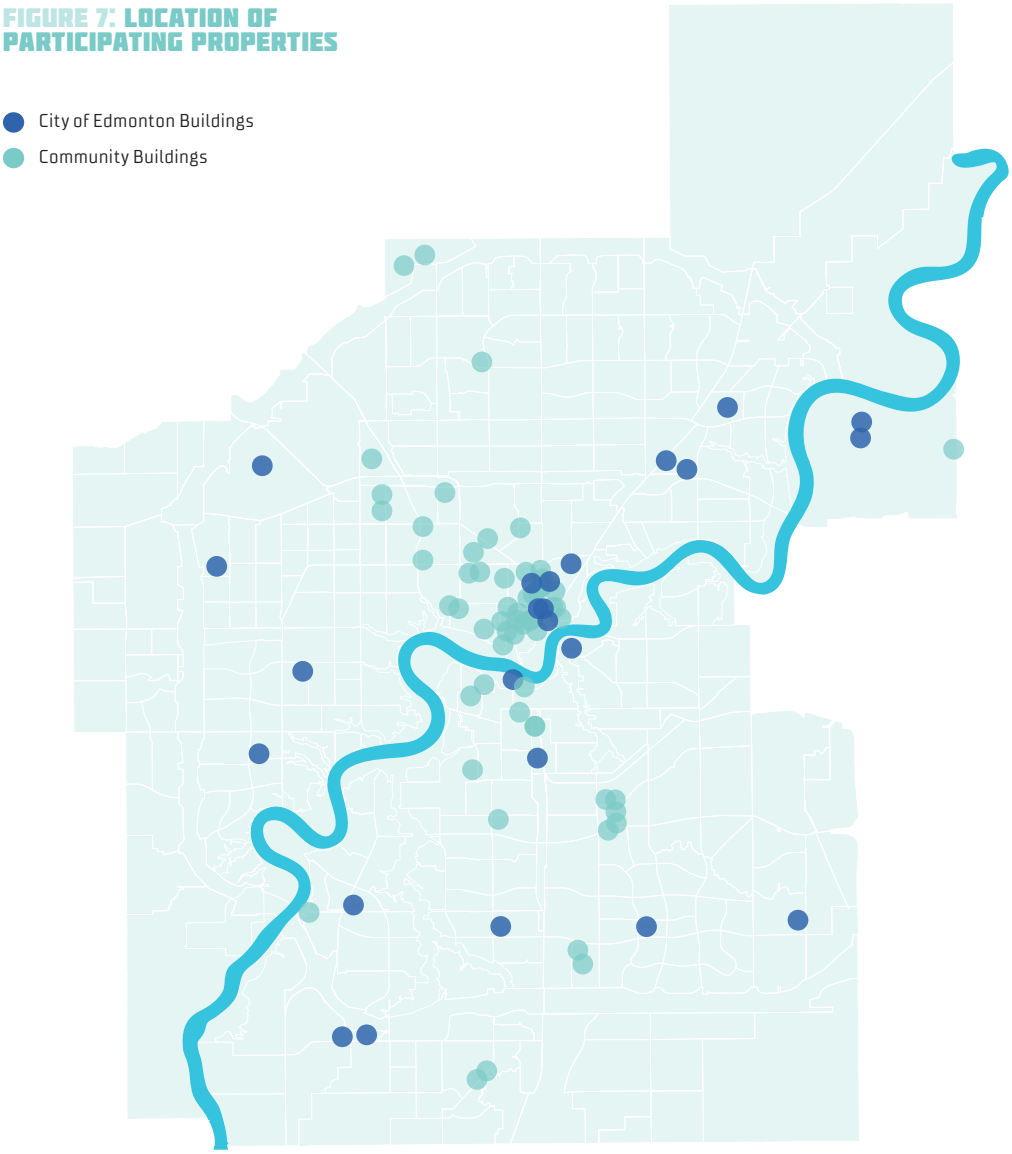
## EPCOR TOWER

IN ADDITION TO BEING LEED GOLD CERTIFIED, **EPCOR TOWER WON THE TOBY BUILDING OF THE YEAR AWARD FROM BOMA EDMONTON IN 2015.** ONE OF MANY SUSTAINABLE BUILDING FEATURES IS A SYSTEM OF EARTH TUBES HIDDEN DEEP UNDERGROUND THAT HELP HEAT AND COOL THE AIR. SINCE THE EARTH STAYS A CONSTANT 6°C, THE AIR PUMPED THROUGH THESE TUBES IS WARMED OR COOLED BEFORE BEING PUMPED AS FRESH AIR THROUGH THE BUILDING.


# WHO PARTICIPATED?

Year 1 of the City of Edmonton's Building Energy Benchmarking Pilot Program attracted a wide range of participants. Overall, 83 properties[5] were submitted to the program by 21 organizations. The properties included both single-building and multi-building (i.e. campus) properties, covering 99 distinct buildings and 2,017,000 sq-m (21,702,000 sq-ft) gross floor area, equivalent to 7% of the floor area identified by the City of Edmonton's Building Stock Analysis[6]. This broad participation indicates that Edmonton's commercial real estate market is keenly interested in increasing market transparency regarding building energy performance.

**FIGURE 7: LOCATION OF PARTICIPATING PROPERTIES**




[5] Over 110 properties were registered for the program, but roughly 27 later withdrew participation due to difficulties collecting data, reconsidered participation, and ineligibility (e.g. buildings < 20,000 sq-ft) [6] City of Edmonton conducted a building stock analysis as part of the program development process that identified 4,435 buildings over 20,000 SQF covering a total 313,130,000 sq-ft

# WHO PARTICIPATED? CONT'D

**ENERGY STAR Portfolio Manager** offers users over 80 different Property Use Types to choose from when describing the activities in their building. If a single property use type accounts for more than 50% of the building's Gross Floor Area (GFA), then that is considered the Primary Property Type and is used to form the peer comparison group of similar buildings. Participants submitted properties representing over 20 different primary property uses which have been grouped into six categories for clarity.

- **Offices** – Offices and Financial Offices
- **Retail** – Enclosed Malls
- **Multi Family** – Apartments and condominium buildings
- **Education** – Adult and other education buildings
- **Recreation** – Fitness Center Multiplexes (including pools), Arenas, Stadiums, and others
- **Other** – various cultural, light industrial, and municipal/provincial government buildings that do not fit into any of the other categories

As shown in the figure below, Offices are the dominant property type among program participants, representing a third of all properties and just under half of all reported floor area. Recreation properties (including arenas and municipal multiplexes) represent the 2nd largest distinct property category at roughly 10% of the total submitted properties and floor area.

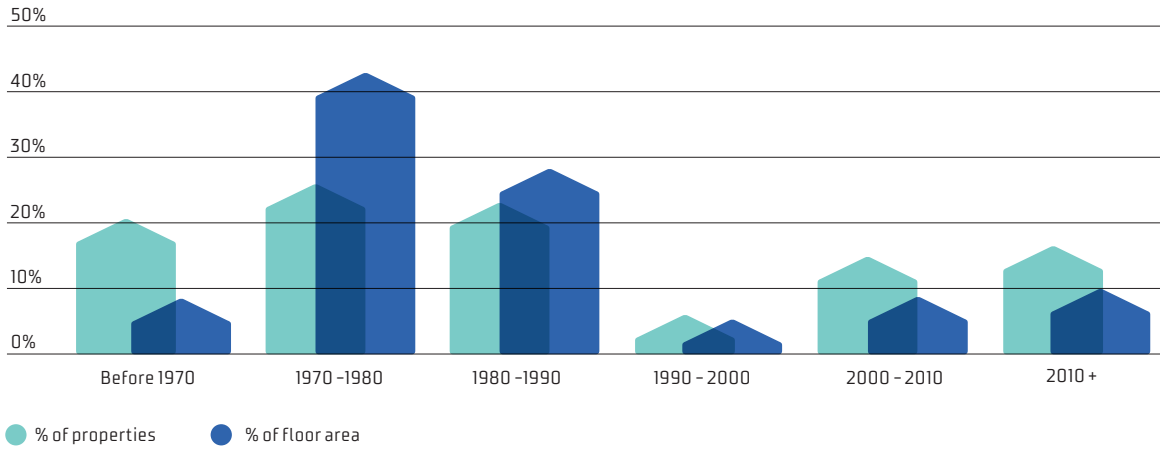
**FIGURE 8: PARTICIPATING BUILDING GROSS FLOOR AREA BY PROPERTY CATEGORY**

# WHO PARTICIPATED? CONT'D



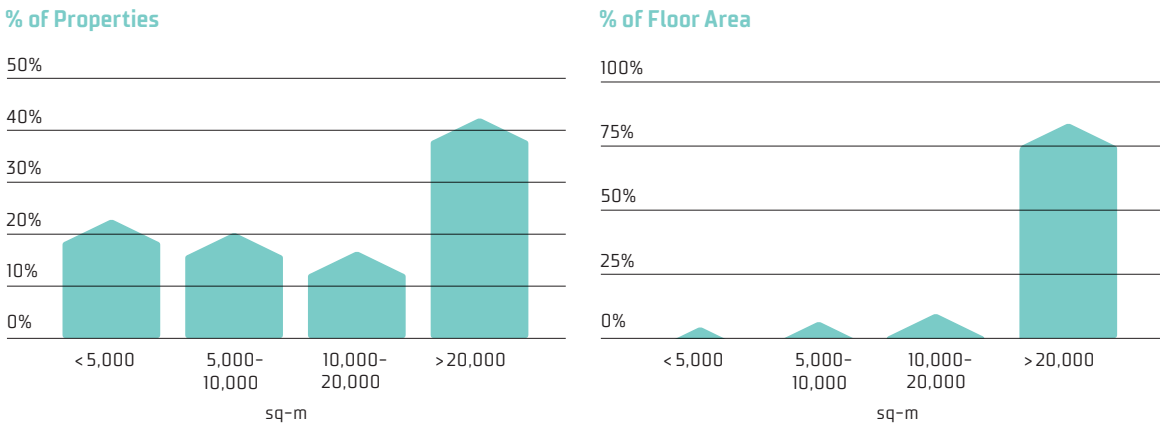
Examining the year of construction indicates that most participant properties were constructed before 1990, while the large majority of floor area was constructed between 1970 and 1990. In other words, the participating properties constructed between 1970-1980 were much larger on average than participants of different vintages.

### FIGURE 9: PROGRAM PROPERTIES AND GROSS FLOOR AREA BY VINTAGE




The participant data was also examined based on property size ranges. As shown below, there is good representation of properties less than 20,000 sq-m (215,000 sq-ft); however, the properties above 20,000 sq-m are much larger on average, and therefore account for over 80% of the total participant floor area.

### FIGURE 10: PARTICIPATING BUILDINGS GROSS FLOOR AREA BY SIZE CATEGORY

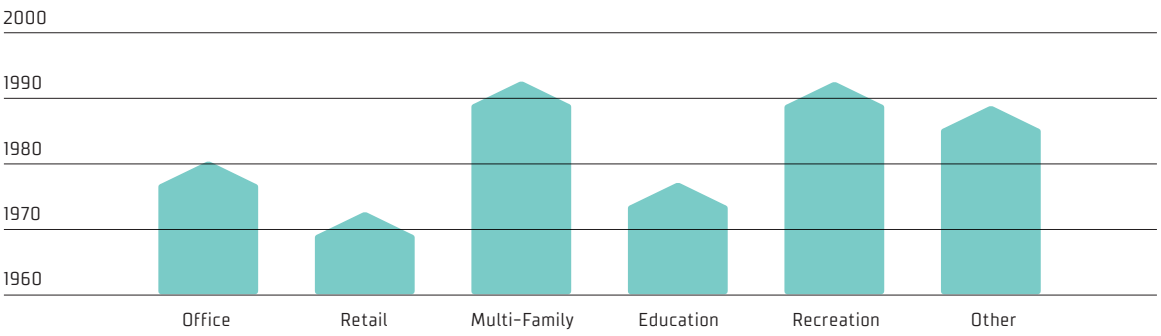


# WHO PARTICIPATED? CONT'D

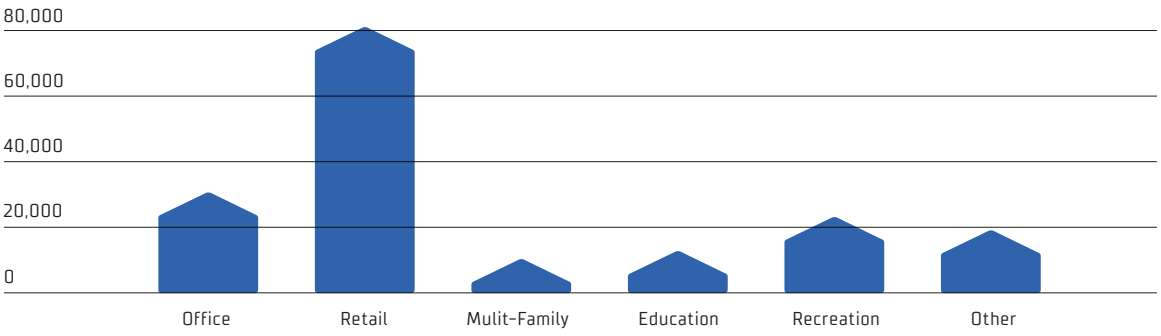
The average age and size of participants was also examined by property category. The average age is comparable among all property categories at roughly 35 years, with retail properties averaging 45 years old. The average size is also comparable between each property category, with average sizes ranging from 13,000 to 30,000 sq-m (roughly 200,000-300,000 sq-ft). Retail participant property are notably larger, though the sample contains only two properties in this category.

### FIGURE 11: AVERAGE YEAR BUILT AND SIZE BY PROPERTY TYPE

**Average Year Built**




**Average Building Area m²**




Note that the statistics here are intended to describe the Year 1 program population only, and are not intended to represent statistically significant samples of the broader City of Edmonton commercial real estate market. Some property types have only a small number of participants, which may skew age and size trends for that property type.

# CITY OF EDMONTON PROPERTIES

The City of Edmonton submitted 24 properties (representing 39 individual buildings) for participation in the program. These properties represent a typical cross-section of municipal properties, ranging from offices, to community recreation centres, arenas and waste management facilities. The complete list of participating facilities belonging to the City of Edmonton is shown below.

## FIGURE 12: CITY OF EDMONTON – PARTICIPATING PROPERTIES

| Property Name | Category | GFA [sq-m] | GFA [sq-ft][7] | Year Built |
|---|---|---|---|---|
| Ambleside Eco Station | Other | 2,300 | 25,000 | 2009 |
| Animal Care and Control Centre | Other | 2,500 | 26,000 | 2010 |
| Callingwood Arenas | Recreation | 6,800 | 73,000 | 1985 |
| Castle Downs Arena | Recreation | 7,100 | 76,000 | 1989 |
| Centennial Transit Vehicle Repair/Storage Garage | Other | 29,100 | 313,000 | 2010 |
| Century Park LRT Station | Other | 2,100 | 23,000 | 2009 |
| Century Place | Office | 27,900 | 300,000 | 1974 |
| Chancery Hall | Office | 13,700 | 147,000 | 1966 |
| City Hall | Office | 22,600 | 243,000 | 1992 |
| Clareview Community Recreation Centre | Recreation | 32,000 | 345,000 | 2013 |
| Commonwealth Recreation Centre + Commonwealth Stadium + Clarke Stadium | Recreation | 81,300 | 875,000 | 1978 |
| Engineering Services Building Materials Test Lab | Other | 3,800 | 40,000 | 2012 |
| Kennedale Eco Station | Other | 2,100 | 23,000 | 2014 |
| Kennedale Integrated Services Site | Other | 17,300 | 186,000 | 1980 |
| Kinsmen Sports Centre | Recreation | 20,100 | 216,000 | 1971 |
| Mill Woods Recreation Centre | Recreation | 13,000 | 140,000 | 1979 |
| Muttart Conservatory | Recreation | 8,500 | 92,000 | 1976 |
| Saint Francis Xavier Sports Centre | Recreation | 4,800 | 52,000 | 2010 |
| Southwest Transportation Yard Equipment Storage Garage | Other | 4,200 | 45,000 | 2009 |
| Stanley A. Milner Library | Other | 21,600 | 232,000 | 1967 |
| Terwillegar Community Recreation Centre | Recreation | 33,600 | 362,000 | 2010 |
| The Meadows Community Recreation Centre | Recreation | 23,300 | 251,000 | 2013 |
| Waste Management Equipment Storage +Maintenance Facility | Other | 2,200 | 24,000 | 2011 |
| Waste Management Integrated Processing +Transfer Facility | Other | 21,400 | 230,000 | 2009 |

*Both City Hall and the Animal Care +Control Centre are featured for their energy and emissions performance – see the building showcases on pages 38 and 39 to learn more!*

[7] Conversion to square feet is approximate due to rounding calculations.

# ALL PARTICIPATING PROPERTIES

## FIGURE 13: PARTICIPATING PROPERTIES – ALL OTHER

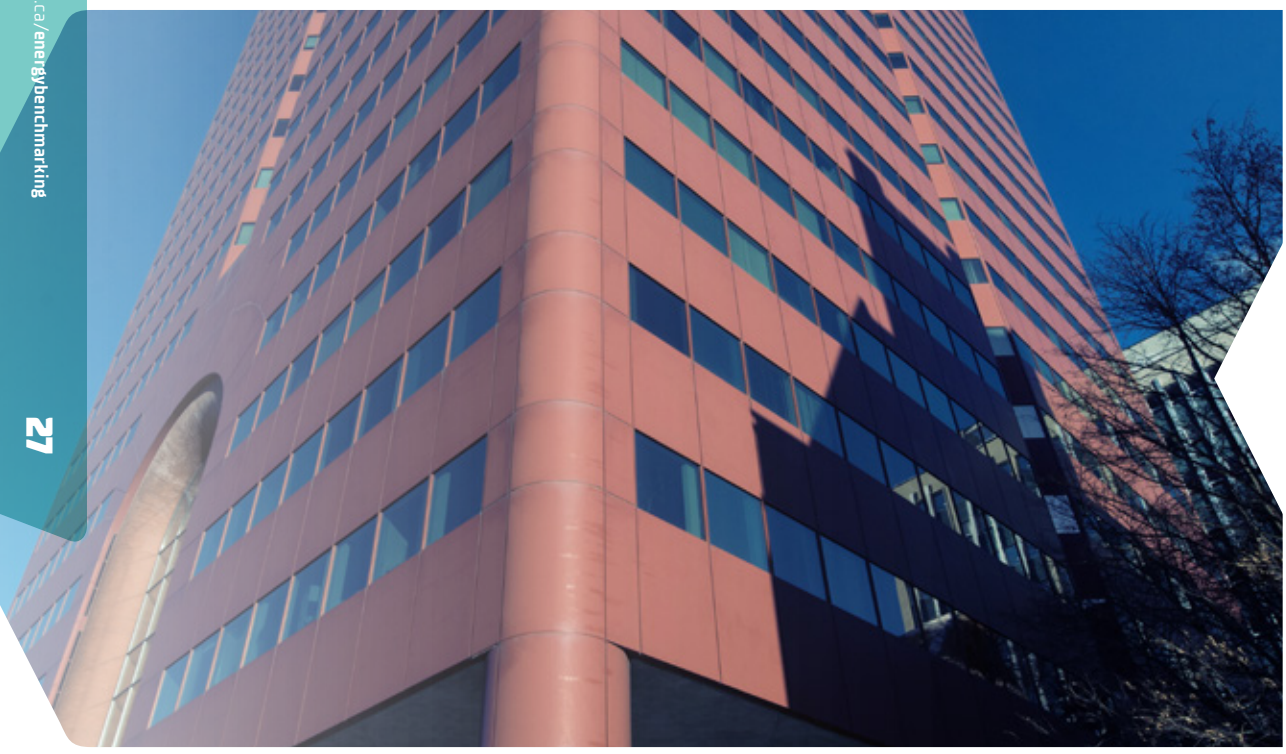
| Property Name | Category | GFA [sq-m] | GFA [sq-ft] | Year Built |
|---|---|---|---|---|
| 44 Capital Blvd | Office | - | - | - |
| 9925 Building | Office | - | - | - |
| Alberta Municipal Place | Office | 6200 | 67000 | 1981 |
| Alberta Research Council Millwoods | Other | 43600 | 469000 | 1984 |
| Alberta School For The Deaf | Education | 20700 | 223000 | 1955 |
| ATB Place | Office | - | - | - |
| ATCO Centre | Office | - | - | - |
| Bell Tower | Office | 51200 | 550000 | 1982 |
| Bonaventure Workshop | Other | 3200 | 34000 | 1968 |
| Canadian Western Bank Place | Office | - | - | - |
| Central Vehicle Service Garage | Other | 2700 | 29000 | 1971 |
| Commerce Place | Office | - | - | - |
| Commerce South Office Park - Bldg A | Office | - | - | - |
| Commerce South Office Park - Bldg B | Office | - | - | - |
| Commerce South Office Park - Bldg D | Office | - | - | - |
| Commerce South Office Park - Bldg E | Office | - | - | - |
| Compass Place | Office | 8800 | 95000 | 1974 |
| David Thompson | Multi-family | - | - | - |
| Edmonton City Centre East | Other | 135600 | 1459000 | 1974 |
| Edmonton City Centre West | Retail | 57200 | 616000 | 1974 |
| Edmonton House | MURB | - | - | - |
| Edmonton Remand Centre | Other | 56000 | 603000 | 2012 |
| EPCOR Tower | Office | - | - | - |
| Essex | Multi-family | 4700 | 50000 | 2011 |
| Francis Winspear Centre for Music | Other | 27900 | 300000 | 1997 |
| Gallery | Multi-family | 3300 | 36000 | 2009 |
| HI-Edmonton | Other | 1900 | 20000 | 1960 |
| Infrastructure Building (Shops) | Other | 8400 | 90000 | 1961 |
| Infrastructure Warehouse No. 3 | Other | 2200 | 24000 | 1950 |
| Intoxication Recovery Centre | Other | 2000 | 21000 | 1947 |
| John E. Brownlee Building | Office | 71400 | 768000 | 1983 |
| Land Titles Building Edmonton | Office | 5700 | 62000 | 1954 |
| Law Courts Edmonton | Other | 73000 | 785000 | 1972 |
| Learning Resources Centre | Education | 18800 | 202000 | 1963 |
| Limelight | Office | - | - | - |
| Mammoet Edmonton | Other | - | - | - |
| MNP Tower | Office | - | - | - |
| NAIT Patricia Campus | Education | 11400 | 123000 | 1975 |
| NAIT Souch Campus | Education | 13400 | 144000 | 1996 |
| NAIT W and Y Buildings | Education | 35200 | 379000 | 2002 |
| Northern Alberta Jubilee Auditorium | Other | 23400 | 251000 | 1956 |
| Old St. Stephens College | Office | 5600 | 60000 | 1911 |

# ALL PARTICIPATING PROPERTIES CONT'D

## FIGURE 13: PARTICIPATING PROPERTIES – ALL OTHER (CONT'D)

| Property Name | Category | GFA (sq-m) | GFA (sq-ft) | Year Built |
|---|---|---|---|---|
| Percy Page Centre | Office | 8800 | 94000 | 1971 |
| Petroleum Plaza | Office | - | - | - |
| Plaza 124 | Office | - | - | - |
| Queens Printer | Office | 4300 | 47000 | 1970 |
| Riverwind | Multi-family | 15700 | 169000 | 1989 |
| Robbins Health Learning Centre | Office | - | - | - |
| Royal Bank Building | Office | - | - | - |
| Scotia Place Co-Ownership | Office | - | - | - |
| Servus Corporate Centre | Office | 11700 | 126000 | 2006 |
| Single Mens Hostel Edmonton | Other | 4600 | 50000 | 1954 |
| Solicitor General Staff College | Education | 7100 | 76000 | 1961 |
| Southgate Centre | Retail | 106800 | 1149000 | 1970 |
| Sun Life Place | Office | - | - | - |
| University Service Centre | Other | - | - | - |
| Winnifred Stewart School | Education | 8700 | 93000 | 1988 |
| Yellowhead Youth Centre | Education | 9800 | 106000 | 1966 |
| Young Offender Centre Edmonton | Other | 12900 | 139000 | 1987 |

Please note that the Gross Floor Area (GFA) and Year Built are only included for buildings that consenting to detailed, building level disclosure.



# BUILDING SHOWCASES

The following buildings participated in Edmonton's Building Energy Benchmarking Program and are excellent examples of innovation, energy efficiency and sustainable operations in Edmonton.
The owners, managers and tenants responsible for these buildings are demonstrating their commitment to green buildings and excellence in energy management.

**Detailed energy performance results for these buildings can be found in the Appendices.**


10721

# SERVUS CORPORATE CENTRE

Originally a call centre for Dell Inc., the Servus Corporate Centre underwent a major renovation when the building's primary tenant moved out. In 2010, the 3-storey, 150,000 square foot building reopened as an attractive and environmentally sustainable building.

The Centre installed two layers of additional insulation over the brick and concrete exterior and installed LED fixtures throughout the interior to reduce energy consumption. The parking lot features dedicated parking for electric, hybrid, and carpool vehicles to foster an energy efficient culture for employees. On the high tech side, state-of-the-art building automation systems help control airflow rate, temperature, and lighting based on occupancy times. However simple additions like allowing meeting windows to open and allow fresh air have also made a significant impact.

Overall, the new sustainable strategies helped reduced power use by 42%, reduced gas use by 70% and saved approximately $300,000 annually in utility costs.

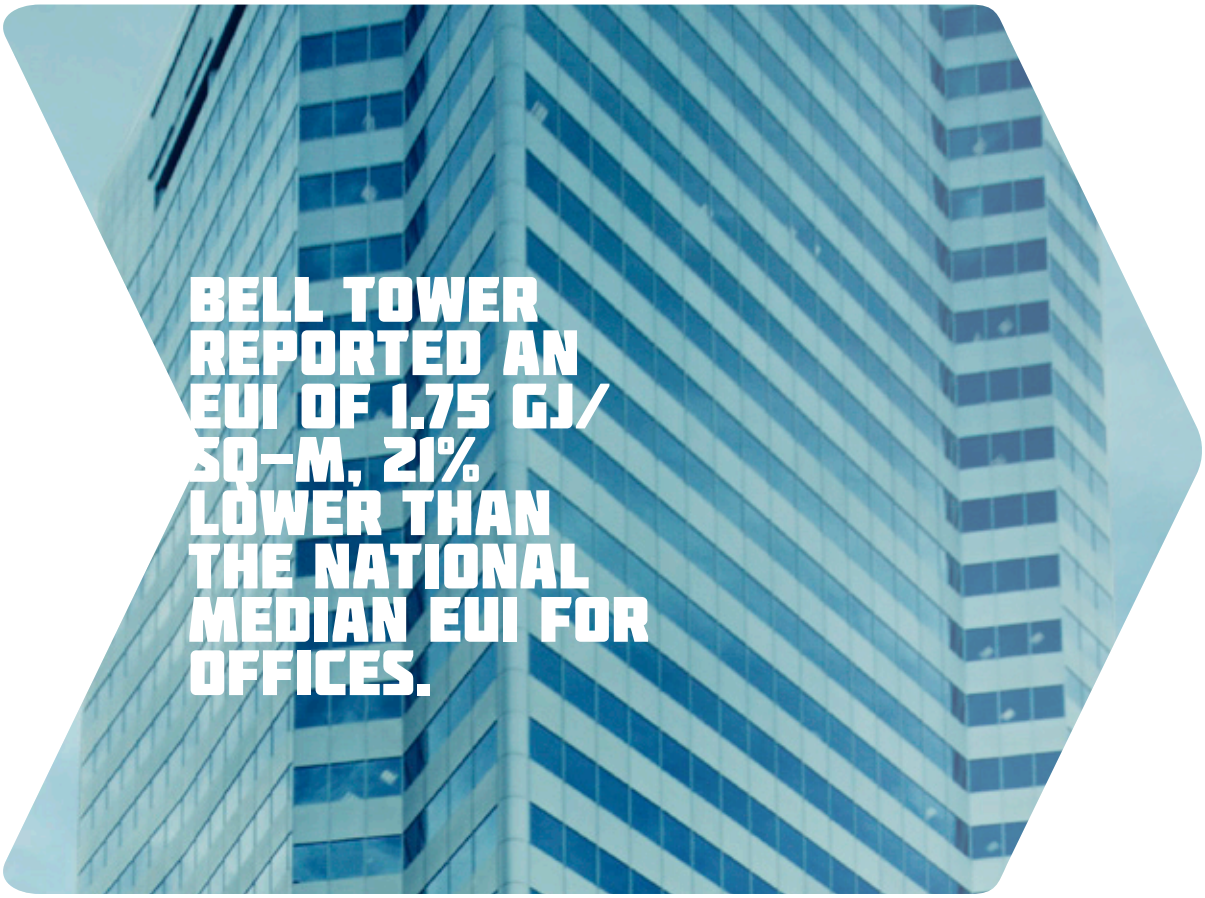
**THE SERVUS CORPORATE CENTRE REPORTED AN EUI OF 1.91 GJ/SQ-M, 16% LOWER THAN THE NATIONAL MEDIAN EUI FOR OFFICES.**

# BELL TOWER

Bell Tower is a 32-storey commercial office building located in downtown Edmonton. Built in 1982, the building has operated for over 30 years and is connected to numerous downtown offices through the City's pedway network. Bell Tower has won numerous awards including a TOBY Award for Building of the Year and BOMA BEST Platinum certification.

Bell Tower features high efficiency lighting, LED fixtures, and a lighting management system that turns off the lights in unoccupied areas after 6pm. The building also installed new boilers with 86% efficiency and operators regularly perform preventative maintenance on all equipment.

By closely monitoring the building's natural gas, power, and water consumption, operators have ensured that Bell Tower and it's 473,840 square feet of space are managed as an excellent example of a high-performing, energy efficient building.managed to the highest degree of standards.



# SOUTHGATE CENTRE

Southgate Centre is a two-storey sprawling complex comprised of over 160 retail stores across over 950,000 square feet of space. The retail Centre has operated for nearly 50 years, first opening in 1970 and re-opening in 2009 after a major expansion.

The Centre created an environmental policy aligned to ISO 14001 standards to ensure the building is run in an efficient and environmentally-friendly manner. LED fixtures, high efficiency heat pumps and efficient chillers are used throughout the complex and energy consumption is closely monitored and analyzed for new opportunities to reduce usage. Environmentally-friendly features are found throughout Southgate Center that are tailored to the use of the building and its users, including recycling bins for unopened condiments, separate bins to collect plastic cutlery, water bottle filling stations, and high efficiency hand dryers in washrooms. The Centre's agreement with Bullfrog Energy has also ensured that the building is powered by 40% renewable energy.

The efforts of the building managers and operators were recognized in 2014 when Southgate Centre was awarded BOMA BEST Gold certification.


**THE SOUTHGATE CENTRE REPORTED AN EUI OF 2.00 GJ/SQ-M, 42% LOWER THAN THE NATIONAL MEDIAN EUI.**

# RIVERWIND STRATA TITLE CO-OP

Riverwind Strata Title Co-op is a unique multi-family complex that has operated for nearly 20 years. The complex is comprised of two 19-storey buildings connected by a shared parkade and provides over 90 homes for Edmonton residents.

Building managers note that the cooperative structure of Riverwind Strata allow for better communication and shared decision making between the homeowners. This positive culture has led to the adoption of LED fixtures and high efficiency boilers for both towers. Residents are encouraged to take advantage of the natural breeze in the summer instead of using air conditioning units, and overall energy consumption for both towers are closely monitored by volunteers and Boards of the property.

Riverwind Strata residents are now working to get electric vehicle charging stations and solar panels installed in the property. The promotion of an environmentally-friendly culture has allowed the two towers to become uniquely energy efficient and a model for other complexes.

**THE RIVERWIND EAST +WEST BUILDINGS REPORTED AN OVERALL EUI OF 1.01 GJ/SQ-M.**

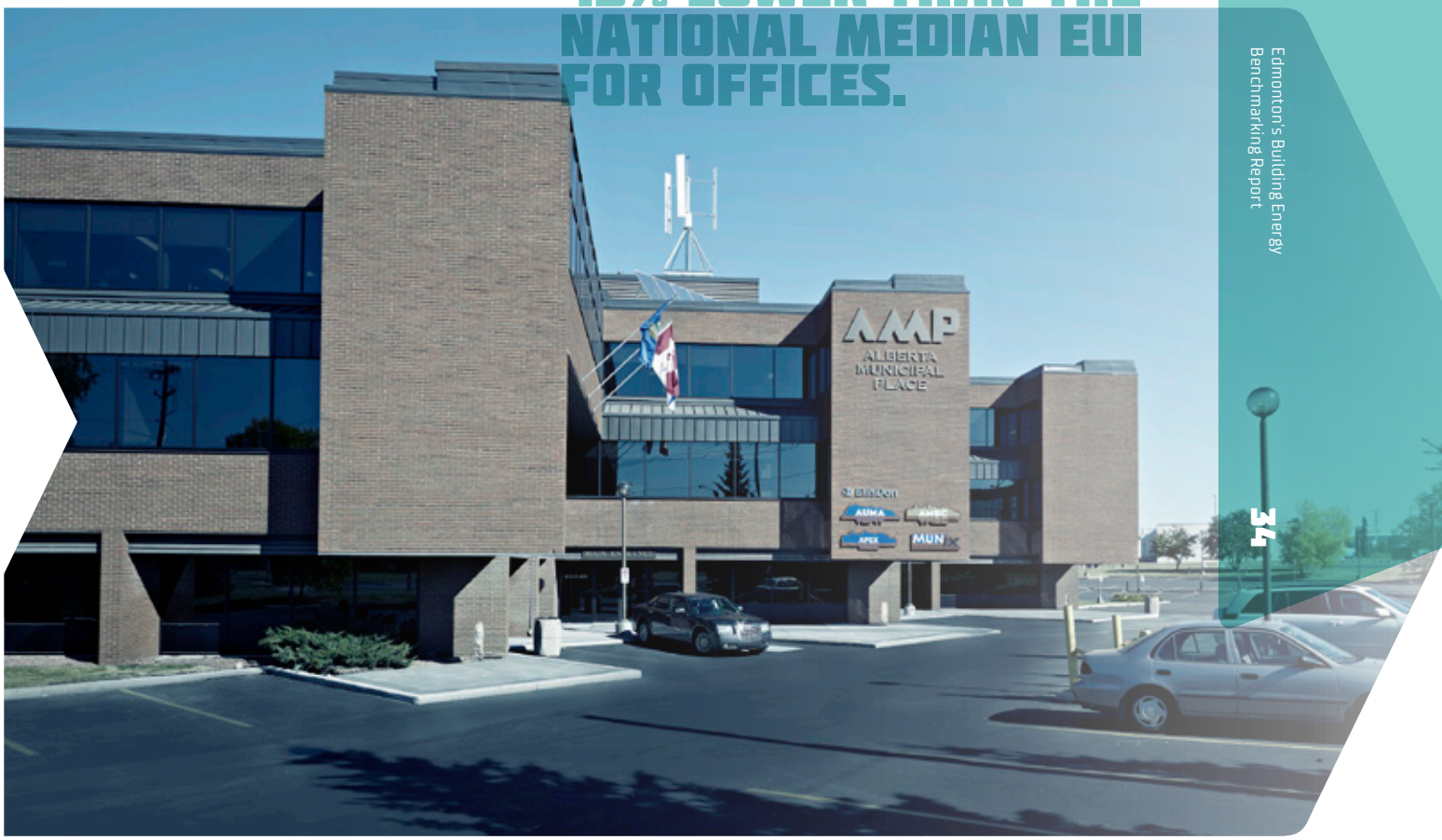
# ALBERTA MUNICIPAL PLACE

Alberta Municipal Place was constructed in 1982 and has had various commercial tenants over the years. In 2010 the 3-storey, 61,000 square foot building was retrofitted with new improvements to increase the building's overall energy efficiency.

The building was reinsulated and high efficiency lighting and boilers were installed throughout the complex. A unique building management system allowed control points on thermostats that only allowed tenants to adjust thermostats between a predefined range. To heat rooms quickly and efficiently, in-ceiling radiant heating panels were installed to take advantage of the natural direction of hot air. Possibly the most unique addition to the building was the installation of solar panels and wind turbines to provide a renewable source of electricity and cogeneration that provided supplemental electricity while also providing heat to the new boiler system.

Overall the retrofits have helped electricity and natural gas consumption by 50% and have led to over $700,000 saved in utility costs. The building achieved BOMA BEST certification in 2013 and received an impressive ENERGY STAR score of 97.

**THE ALBERTA MUNICIPAL PLACE REPORTED AN EUI OF 1.35 GJ/SQ-M, 43% LOWER THAN THE NATIONAL MEDIAN EUI FOR OFFICES.**

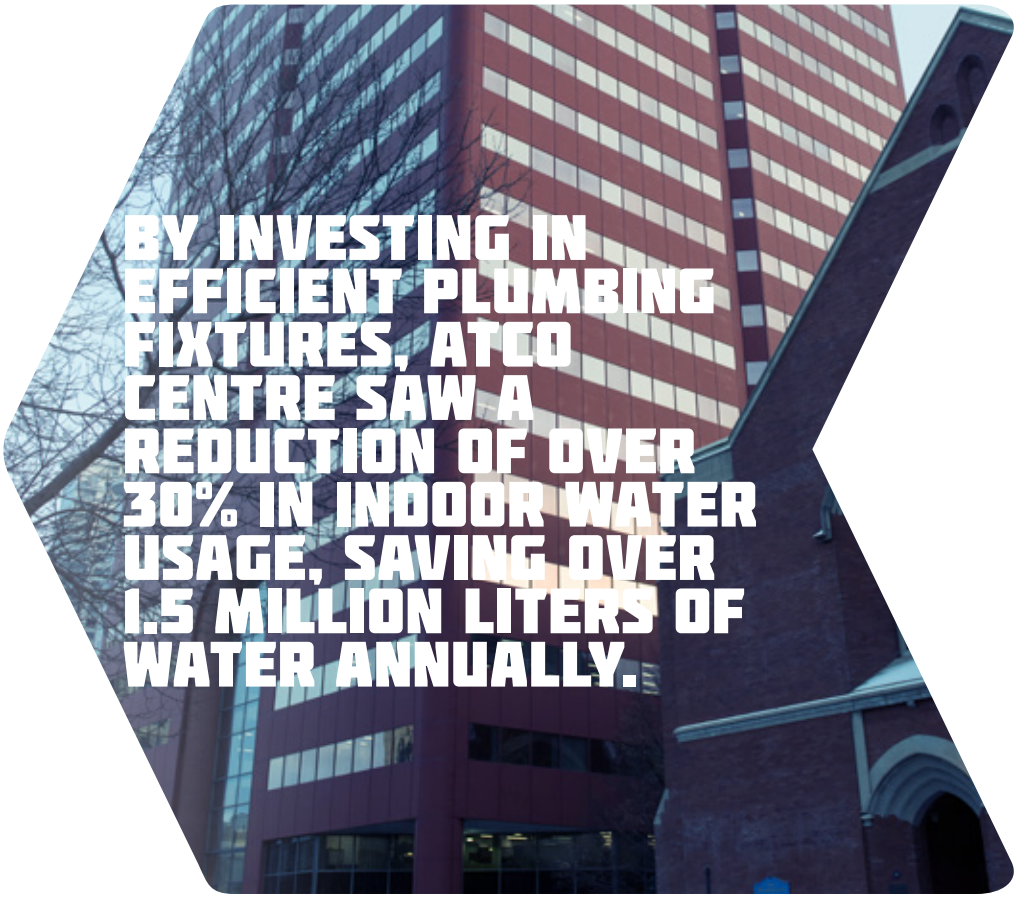


# ATCO CENTRE

Built in 1981, The ATCO Centre is a 20-storey office tower with retail space in downtown Edmonton. In 2016, the building underwent significant retrofits to become greener and more energy efficient.

The recommissioning project targeted upgrades to the building's air, heating, cooling, and lighting systems. The building reduced energy consumption by 12% by upgrading the lighting fixtures to LED lighting alone with significant savings anually. Each major water meter (irrigation, cooling towers, domestic hot water, and other process) were recalibrated for increased efficiency and are closely monitored by operators on a weekly basis. In addition, the building invested in efficient plumbing fixtures that helped see a reduction of over 30% in indoor water usage, saving over 1.5 million litres of water annually.

These advancements helped the ATCO Centre achieve LEED Gold certification and won a BOMA EARTH Award.



# OLD ST. STEPHEN'S COLLEGE

Constructed in 1911, Old St. Stephen's College was the first building on the grounds of Alberta's first university. At over 100 years old, many people are surprised to learn that this 4-storey wood frame building is highly efficient.

Located on the University of Alberta campus, the building had many uses over the past century. It was first used as a methodist college before being turned into a hospital. The building was then used as an army barracks, a student residence, and eventually an administrative centre as it is used today.

Old St. Stephen's College features LED lighting, a brand new roof, roof insulation, and efficient windows. Connected to the U of A's district energy system and without air conditioning, the building consumes very little power and has not required major operational changes. These features enabled the building to receive an ENERGY STAR score of 97.

**THE OLD ST. STEPHEN'S COLLEGE BUILDING REPORTED AN EUI OF 1.09 GJ/SQ-M, 46% LOWER THAN THE NATIONAL MEDIAN EUI FOR OFFICES.**

# FRANCIS WINSPEAR CENTRE FOR MUSIC

The Francis Winspear Centre for Music was built in 1997 and is home to the Edmonton Symphony Orchestra. The Centre hosts over 1,000 shows and unique community events annually for Edmonton and northern Alberta residents. At over 20 years old, the Centre has not had a major renovation to date.

Due to the nature of the event space, the building was designed to incorporate state-of-the-art acoustics and sound isolation. This design and construction profile doubles as environmentally-friendly in that it helps retain heat and reduce overall energy consumption.

Heavily insulated walls and stairwells, rubber sealed doors and adjustable curtains and canopies in the main hall not only help to dampen sound, but also prevent heat loss throughout the building. In addition to operations staff who actively manage their energy use, lighting fixtures in the Centre are also being replaced with higher efficient LED fixtures.

The Francis Winspear Centre has big plans for the future, with a major renovation and expansion designed to create more event space and gathering areas for the public.


**OWNED BY A NOT-FOR-PROFIT ORGANIZATION, THE FRANCIS WINSPEAR CENTRE FOR MUSIC REPORTED AN EUI OF 0.82 GJ/SQ-M, 67% LOWER THAN THE NATIONAL MEDIAN EUI FOR PUBLIC ASSEMBLY BUILDINGS.**

# ANIMAL CARE + CONTROL CENTRE

The CIty of Edmonton's Animal Care & Control Centre was constructed in 2010 and provides care and housing of lost and stray pets. The 22,800 square foot facility features unique energy efficient features that ultimately led to a LEED Silver certification in 2014.

During the construction of the Animal Care & Control Centre, the City of Edmonton showcased its commitment to green buildings by using locally-sourced concrete and recycled building materials such as wood, asphalt and metal. Over 90% of the waste generated from the construction of the building was diverted away from landfill using a combination of recycling and composting.

To help regulate indoor temperature, the building features a unique roof that contains white slate flakes that reflects sunlight and cools down the roof. The facility also features a geothermal heating and cooling system where a network of underground pipes collects the earth's natural heat and circulates the energy throughout the building. This geothermal system uses approximately 60% less energy than a traditional space heating system.

**DESIGNED TO ACHIEVE LEED SILVER, THE ANIMAL CARE & CONTROL CENTRE HAS A GEOTHERMAL HEATING AND COOLING SYSTEM WITH A NETWORK OF UNDERGROUND PIPES THAT COLLECTS THE EARTH'S NATURAL HEAT AND CIRCULATES IT THROUGHOUT THE BUILDING.**

# CITY HALL

Edmonton City Hall is home to civic leadership and is a significant gathering place in the community. The building was completed in 1992 and features two iconic, steel and glass pyramids that floods the building with natural light.

City Hall was one of the first facilities in the city to feature a digital building automation system to control lighting and temperature and reduce energy consumption. During the 25 years in operation, the City updated the building with efficient boiler heads, LED fixtures, and variable frequency drives on air processing units. These green features led to City Hall achieving an impressive BOMA BEST Level 1 certification in 2009 and received an ENERGY STAR score of 75.

Most recently, the facility has integrated its building automation data with cloud services for increased energy saving opportunities. This strategy has helped significantly as the building's Energy Use Intensity has decreased steadily year over year.

**THE CITY HALL BUILDING HAS AN EUI OF 1.69 GJ/SQ-M, 17% LOWER THAN THE NATIONAL MEDIAN EUI FOR OFFICES.**

# ENERGY & EMISSIONS PERFORMANCE RESULTS

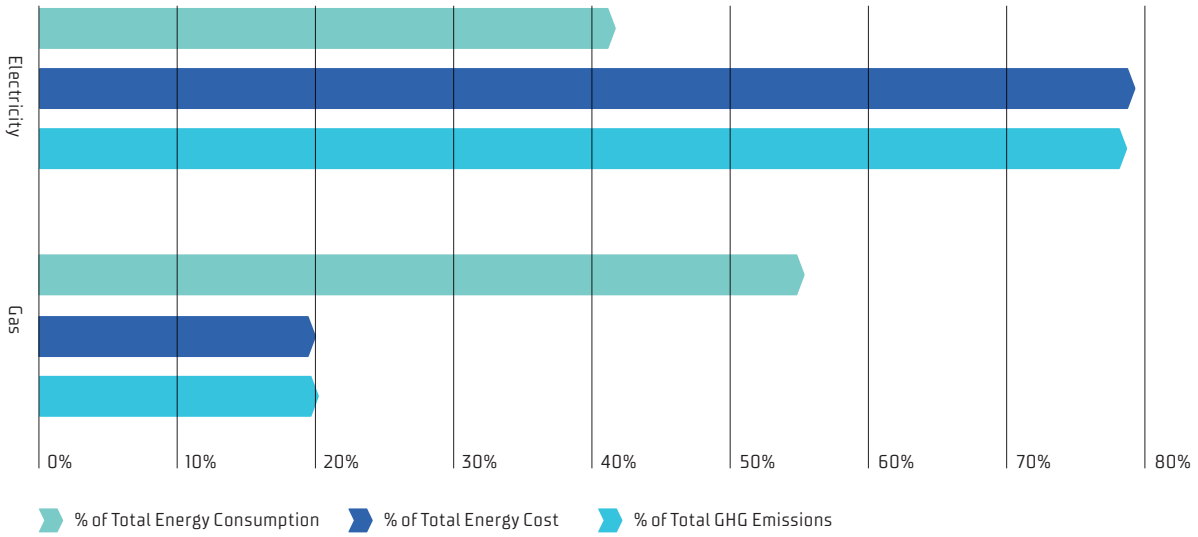
Participant's aggregate energy and emissions are compared to the City of Edmonton's 2016 corporate Greenhouse Gas Inventory to characterize the program's reach within the local commercial building sector. Then, energy and emissions intensities (i.e. energy use or GHG emissions on a per square meter basis) are examined for trends relating to property age and size. Comparisons to relevant benchmarks (program peer group, national/ provincial medians, industry benchmarks) are shown where available.

# AGGREGATE ENERGY CONSUMPTION + EMISSIONS

On an aggregate basis, the participating buildings consumed 344,000,000 kWh of electricity (43% of all participant site energy use), 1,619,000 GJ of natural gas (56% of all participant site energy), as well as minor contributions from district steam and chilled water in calendar year 2016. On an aggregate basis, the total energy consumed by program participants represents 11% of all the energy consumed by commercial and institutional buildings within the City of Edmonton in 2016[8]. The energy use from program participants is associated with 389 ,000 tonnes of $CO_2e$[9] greenhouse gas emissions, equivalent to 12% of all the emissions from Commercial and Institutional buildings within the City of Edmonton in 2016[10]. Expressed differently, the emissions from participant buildings are equivalent to the annual GHG emissions of roughly 85,000 cars[11]. Note that emissions are calculated using the Alberta-specific emissions factors within Portfolio Manager that are updated annually by Natural Resources Canada[12].

Assuming typical costs for these fuel types[13], the data show that electricity accounts for roughly 80% of all energy costs incurred by participants, followed by natural gas at 20% of all energy costs. Electricity also accounts for roughly 80% of all emissions from participant buildings (due to the GHG-intensive electricity generation mix in Alberta), while natural gas use accounts for 20% of total emissions.

**FIGURE 16: COMPARISON OF GAS + ELECTRICITY CONSUMPTION, COSTS, + EMISSIONS**

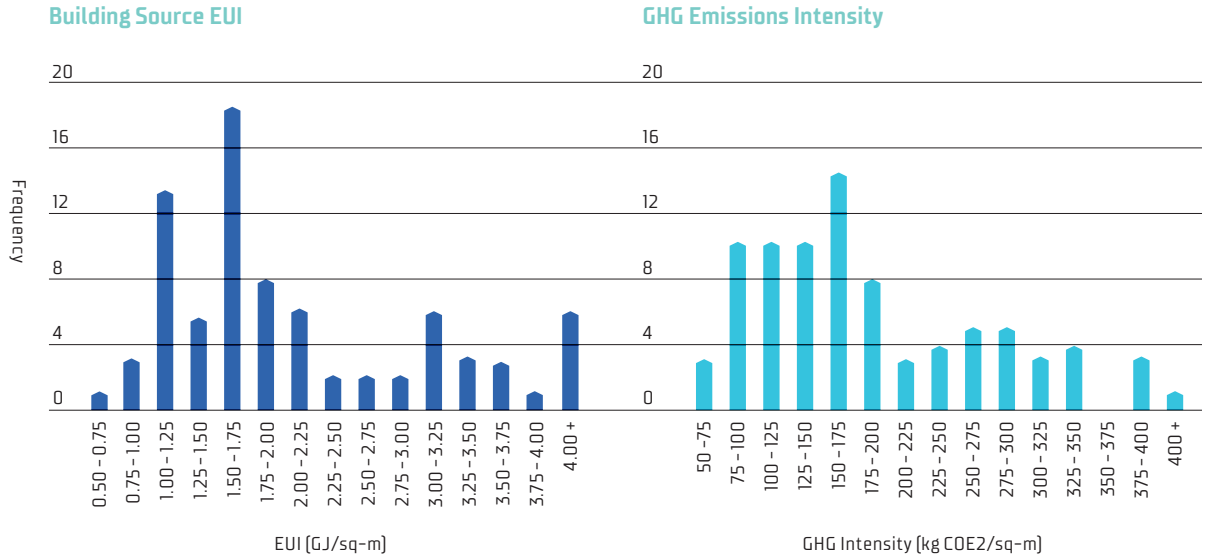



[8] City of Edmonton - 2016 Community Greenhouse Gas (GHG) Emissions Inventory Report - Table 8 [9] Carbon dioxide equivalent is a method of comparing the Global Warming Potential (GWP) of the different greenhouse gases (e.g. carbon dioxide, ammonia and nitrous oxide) released during combustion of fossil fuels. [10] City of Edmonton - 2016 Community Greenhouse Gas (GHG) Emissions Inventory Report - Table 8 [11] Based on an assumed 4,600 kg $CO_2e$ per car, per year (http://www.nrcan.gc.ca/energy/efficiency/transportation/cars-light-trucks/buying/16770) [12] Electricity - 244.45 kg $CO_2e$/GJ, Natural Gas - 50.46 kg $CO_2e$/GJ, Steam - 83.92 kg $CO_2e$/GJ, Chilled Water 16.29 kg $CO_2e$/GJ [13] Cost estimates are based on an assumed effective utility rate of $0.10/kWh for electricity and $5.48/GJ for natural gas.

# DETAILED ENERGY + EMISSIONS PERFORMANCE TRENDS

Participating buildings included a wide range of building sizes – in order to compare different sized properties, energy use and GHG intensities are calculated, which express each metric on a per square meter (or square foot) basis. **Energy use intensity (EUI)** is the most common metric for benchmarking building energy performance and can vary widely even among buildings of the same property type. The figures below show the distribution of energy use intensities (EUIs, in GJ/sq-m) and GHG emissions intensities (in kg/sq-m) for participating buildings.

**FIGURE 17: DISTRIBUTION OF EUIs AND GHG-INTENSITIES – ALL BUILDINGS**




## JOHN E. BROWNLEE BUILDING

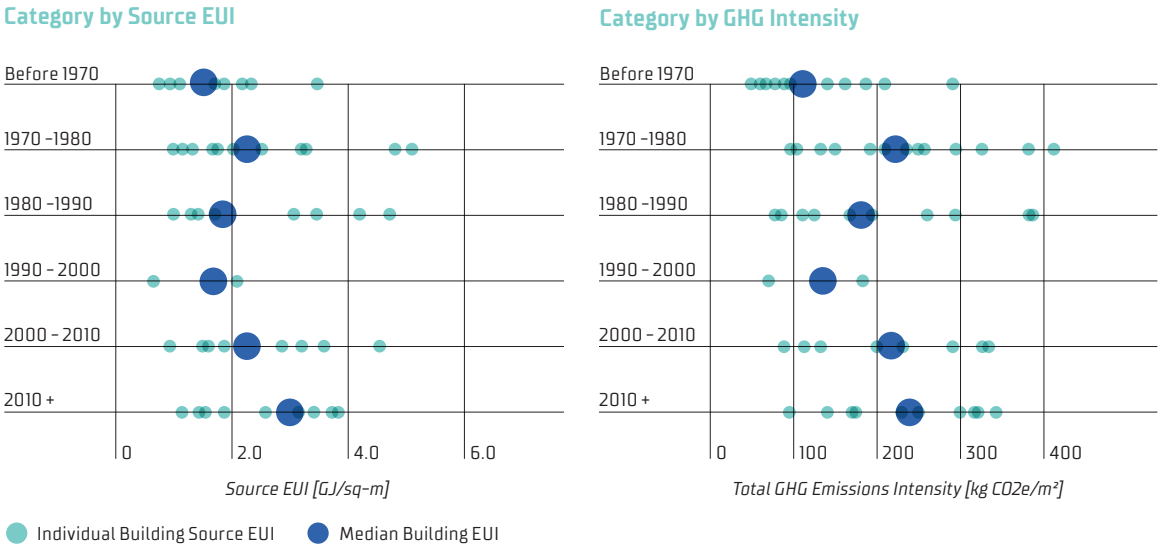
**THE JOHN E. BROWNLEE BUILDING HAS AN ANNUAL SOURCE ENERGY USE INTENSITY OF 1.21 GJ/SQ-M, WHICH IS 37% BELOW THE NATIONAL MEDIAN FOR OFFICES. WITH AN ENERGY STAR SCORE OF 92, IT HAS ALSO BEEN AWARDED THE TOBY BUILDING OF THE YEAR AWARD BY BOMA EDMONTON IN 2017.**

# ENERGY AND EMISSIONS INTENSITY TRENDS BY AGE AND SIZE



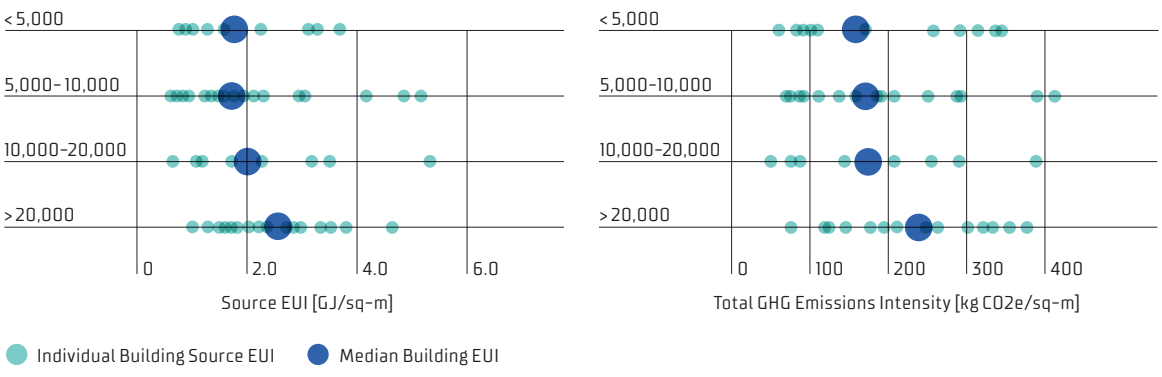
It is often assumed that the EUI of a property would be lower for newer buildings, owing to newer equipment, a better envelope, and improved construction practices. However, the data show very little correlation between the property EUI and building age, as shown below. This could be a result of various factors, including retrofitting of older buildings (e.g. LED lighting retrofits), or more energy-consuming plug loads in newer buildings (e.g. television displays in lobbies, data centres).

### FIGURE 18: ENERGY AND EMISSIONS INTENSITY TRENDS BY AGE AND SIZE[14]




Similarly, the data show very weak correlation between the building size and the EUI of the property, though the larger participant buildings tend to have slightly higher EUIs.

### FIGURE 19: BUILDING EUIS AND GHG INTENSITIES BY SIZE CATEGORY

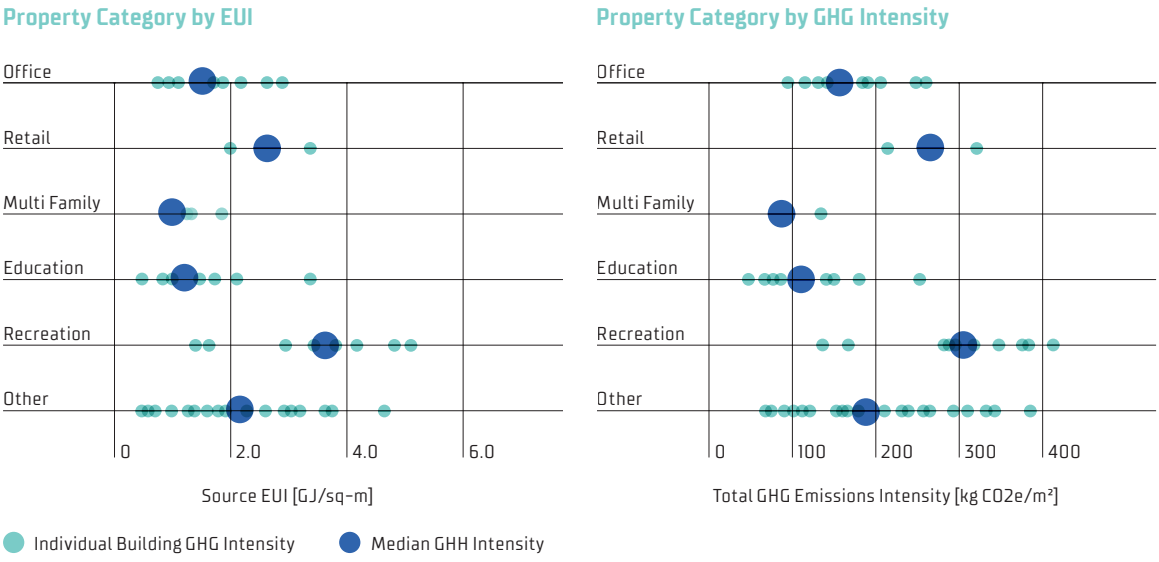



[14] Individual data points and medians shown only for properties that gave consent for building-level disclosure, for data privacy purposes.

# ENERGY AND EMISSIONS INTENSITY TRENDS BY PROPERTY CATEGORY

The plots below show the average EUI and emissions distributions for the six property type categories, for properties consenting to building-level disclosure. The figures below show the average EUI and emissions distributions for the six property type categories. Comparing the medians of each property category, it can be seen that Education, and Offices have the lowest median EUIs, followed by Retail and Recreation categories. The Recreation category has the highest median EUI and GHG intensity at 3.60 GJ/sq-m (317 kBTU/sq-ft) and 310 kg/sq-m (28.8 kg CO2e/sq-ft) respectively, owing largely to the energy-intensive multiplexes, pools, and arenas and multiplexes in this category. Offices and multi-family residential buildings have a comparatively narrow range of EUI and GHG intensities, suggesting that the buildings within these property categories tend to be more similar to their peers.

**FIGURE 20: BUILDING EUIS AND GHG INTENSITIES BY PROPERTY CATEGORY**




## COMMERCE SOUTH OFFICE PARK

**THE COMMERCE SOUTH OFFICE PARK – BUILDINGS A AND B FEATURE ANNUAL SOURCE ENERGY USE INTENSITIES BELOW 1.2 GJ/SQ-M, AND ENERGY STAR SCORE OF 100.**

# OFFICES

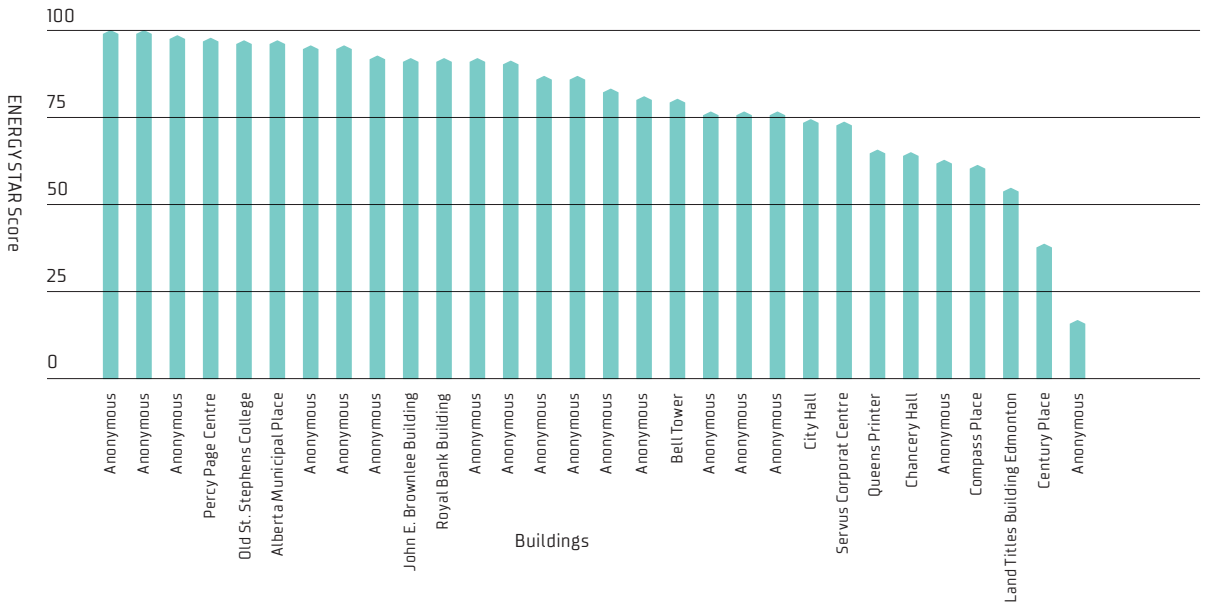


## OFFICES

Over 30 office properties reported to the program, accounting for over 40% of the total gross floor area, and forming the most robust peer comparison group of participants. Offices are eligible for an **ENERGY STAR Score** in Portfolio Manager, a metric for comparing a property to other similar properties, normalized for climate and operational characteristics. Scores are given on a 1-100 scale, with 1 being the lowest performer in a peer comparison group, 50 being the median performer, and a score of 100 being the best-in-class performer. Natural Resources Canada plans to launch an ENERGY STAR Certification program in 2018 for commercial buildings in Canada that receive a score of 75 or higher. ENERGY STAR Certification allows property owners to receive public recognition for their high performance building and leadership in energy efficiency.

The data indicate that the median ENERGY STAR Score of all participating offices is 85, with the subset of buildings consenting to building-level disclosure shown below. While this may suggest that most office buildings in the City of Edmonton are performing well above the national population of office buildings (median score of 50), it is also likely that the voluntary nature of the program attracted high-performing buildings. Regardless, the data indicates there are at least 20 office buildings that may be eligible for ENERGY STAR Certification in the City of Edmonton.

**FIGURE 21: DISTRIBUTION OF ENERGY STAR SCORES – OFFICES**



# OFFICES CONT'D



The complete list of office properties consenting to building-level disclosure is provided below. Full energy and GHG performance data for office buildings consenting to building-level disclosure is provided in an Appendix for further reference.

## FIGURE 22: DETAILED ENERGY AND EMISSIONS PERFORMANCE – OFFICES

| Property Name | Organization | ENERGY STAR Score | Source EUI (GJ/sq-m) | Emissions Intensity |
|---|---|---|---|---|
| Percy Page Centre | Government of Alberta | 98 | 1.06 | 96 |
| Old St. Stephens College | Government of Alberta | 97 | 1.09 | 95 |
| Alberta Municipal Place | Humford Management Inc. | 97 | 1.35 | 114 |
| John E. Brownlee Building | Government of Alberta | 92 | 1.21 | 128 |
| Royal Bank Building | Melcor Developments Inc. | 92 | 1.75 | 142 |
| Bell Tower | Aspen Properties | 80 | 1.75 | 196 |
| City Hall | City of Edmonton | 75 | 1.69 | 143 |
| Servus Corporate Centre | Servus Credit Union Ltd | 74 | 1.91 | 204 |
| Queens Printer | Government of Alberta | 66 | 1.75 | 154 |
| Chancery Hall | City of Edmonton | 65 | 1.98 | 181 |
| Compass Place | Humford Management Inc. | 62 | 2.21 | 190 |
| Land Titles Building Edmonton | Government of Alberta | 55 | 1.74 | 155 |
| Century Place | City of Edmonton | 39 | 2.6 | 259 |

*hp Centre for Information and Communications Technology and the Spartan Centre for Instrumentation Technology*

## NAIT'S W AND Y BUILDINGS

**LOCATED AT NAIT'S MAIN CAMPUS, THE W BUILDING IS HOME TO THE HP CENTRE FOR INFORMATION AND COMMUNICATIONS TECHNOLOGY AND THE Y BUILDING IS HOME TO SPARTAN CENTRE FOR INSTRUMENTATION TECHNOLOGY. THE BUILDINGS HAVE ACHIEVED A COMBINED ENERGY USE INTENSITY OF 1.60 GJ/SQ-M, PARTIALLY DUE TO OPERATIONAL PRACTICES AND AN ACTIVELY MANAGED BUILDING AUTOMATION SYSTEM TO MONITOR AND CONTROL ENVIRONMENTAL SYSTEMS.**

Comparisons were also made against the national median EUI available through Portfolio Manager, the *provincial* average EUI for Offices, the sample of office buildings within the City of Edmonton currently entered in Portfolio Manager, and the BOMA BEST certified office buildings in Edmonton. The results are summarized below, compared to the reporting sample. Some benchmarks are provided on a source energy basis (which includes electricity generation and transmission losses), while others are provided on site energy basis. The median EUI of the reporting properties is lower than the national, provincial, and City (as reflected by existing ENERGY STAR Portfolio Manager entries) sample of offices. The program sample is close to median of the BOMA BEST Certified buildings, which have been certified as meeting BOMA's standard of environmental performance and management.

### FIGURE 23: COMPARISON OF AVAILABLE ENERGY BENCHMARKS FOR OFFICES

| Dataset - Office Buildings | Median Site EUI [GJ/sq-m] | Median Source EUI [GJ/sq-m] |
|---|---|---|
| SCIEU National Median[15] | 1.51 | 2.23 |
| Provincial Average[16] | 1.34 (sector average) | 1.80 (sector average) |
| ENERGY STAR Portfolio Manager Offices | 1.14-1.18[17] (City of Edmonton only) | N/A |
| BOMA BEST Edmonton - Offices[18] | 1.17 | 1.59 |
| **City of Edmonton Building Energy Benchmarking Program** | **1.10** | **1.65** |

[15] Based on the 2009 Survey of Commercial and Institutional Energy Use [16] Based on StatsCan Comprehensive Energy End Use Database for 2014
[17] Based on aggregate data request made to NRCan by COE in January 2017 [18] Based on dataset provided to the City by BOMA Canada

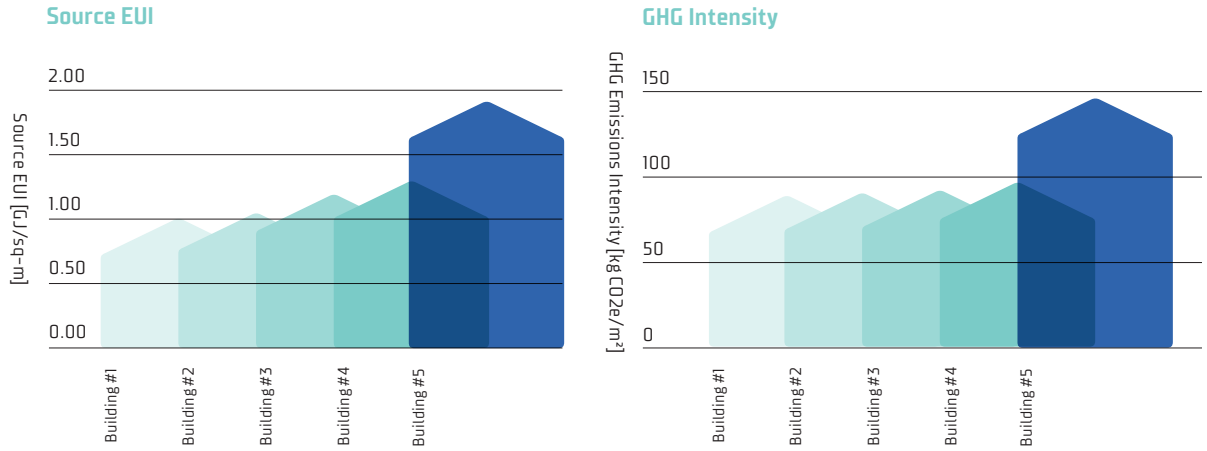
# MULTI-FAMILY BUILDINGS

## MULTI-FAMILY RESIDENTIAL BUILDINGS

The energy and emissions performance of multi-family buildings in Canada are not well described in the available literature. There are no statistically representative databases available to the public for energy benchmarking, nor are there ENERGY STAR Scores for multi-family residential in Canada[19]. Energy benchmarking and disclosure programs like the City's Pilot Program can help establish these benchmarks in order to provide transparency to the multi-family residential market and motivate energy efficiency improvements.

In Year 1 of the Pilot, five multi-family residential properties submitted data for calendar year 2016. The EUI and GHG intensities of these properties are shown below, ranked from lowest to highest. The only available comparison data point comes from Natural Resources Canada, who provided an aggregated data summary of multi-family residential buildings in Edmonton that were already entered in Portfolio Manager as of January 2017. The median Site EUI for these properties (< 50 buildings, per NRCan) was 1.13 GJ/sq-m (100 kBTU/sq-ft). All but one of the reporting properties for the City of Edmonton program fell below the median EUI of the properties summarized by NRCan. Note that the buildings have not been identified to ensure participant privacy.

**FIGURE 24: ENERGY AND EMISSIONS PERFORMANCE FOR PARTICIPATING MULTI-FAMILY BUILDINGS**




[19] The only available data was an aggregate data request to NRCan for multi-family residential properties in Edmonton that were in the ENERGY STAR Portfolio Manager tool as of January 2017.

# CITY OF EDMONTON

Gathering the information needed to benchmark 24 City properties required input from a number of City of Edmonton facilities' staff. After data collection was complete, program staff held in-person workshops with representatives of each City property to discuss initial benchmarking results, next steps, and to give facilities staff opportunity to verify and adjust the data that was entered into ENERGY STAR Portfolio Manager. The result of City staff efforts is 24 high-quality data points, accounting for over 400,000 sq-m (4,300,000 sq-ft) of floor area, or 26% of eligible City of Edmonton property gross floor area[20]. Full energy and emissions data for these buildings are provided in the Appendices.

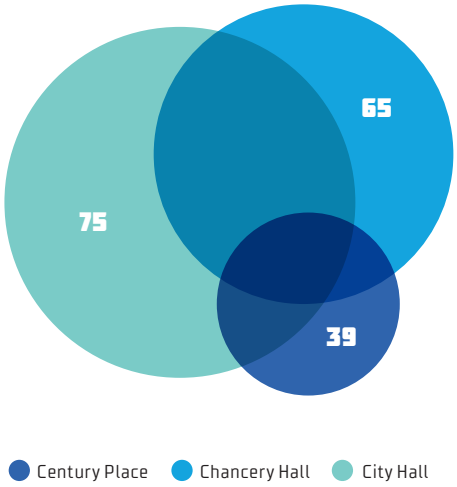
**FIGURE 25: DETAILED ENERGY PERFORMANCE – CITY OF EDMONTON BUILDINGS***


[20] City of Edmonton total floor area = 1,530,565 sq-m (owned and operated).
* Some building names have been shortened due to limited space. Full building names are available in the Appendices.

# CITY OF EDMONTON CONT'D

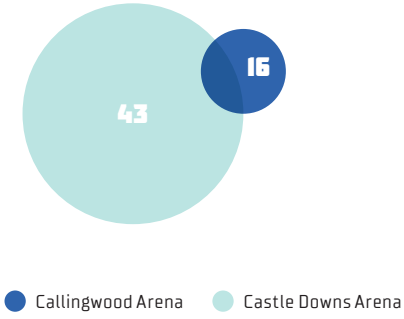
The three City offices scored well on average, comparing well to the national median score of 50 for offices. City Hall achieved a score of 75, placing it in the top quartile of performers, and making it eligible for ENERGY STAR Certification. The City Hall Portfolio Manager entry reveals an impressive track record of successful of energy management, with EUI trending steadily downwards since 2008. See the building showcase on page 39 for more information.

### FIGURE 26: ENERGY STAR SCORES FOR CITY OF EDMONTON OFFICES




Natural Resources Canada recently released an ENERGY STAR Score for ice rinks, which was well-timed with the City of Edmonton program, as it allowed City Facilities staff to collect the property use details necessary to calculate a score. Only facilities that have more than 75% of the building floor area dedicated to an ice rink use are eligible for a score, which excluded a number of city multiplex facilities, leaving only scored two arena buildings: Castle Downs and Callingwood Arenas. Castle Downs has an ENERGY STAR Score of 43 (with an EUI 6.4% higher than the national median arena), while Callingwood Arenas has an ENERGY STAR Score of 16 (with an EUI 42.1% higher than the national median arena).

### FIGURE 27: ENERGY STAR SCORES FOR CITY OF EDMONTON ARENAS




Beyond the available ENERGY STAR Scores, the City buildings were also compared to a number of valuable benchmarks established from the Municipal Climate Change Action Centre (MCCAC) in Alberta, which houses an energy performance database of over 800 municipal buildings, assembled as part of the MCCAC's benchmarking and energy monitoring efforts. Of the 24 City buildings submitted, 14 had a matching property type available for comparison in the MCCAC data. The data indicate that City fitness centres and office buildings have very similar energy and emissions performance as the MCCAC dataset, while the arena and repair service buildings tend to be higher than the average within the MCCAC dataset.

### FIGURE 28: ENERGY AND EMISSIONS PERFORMANCE – CITY OF EDMONTON VS. MCCAC PROPERTIES

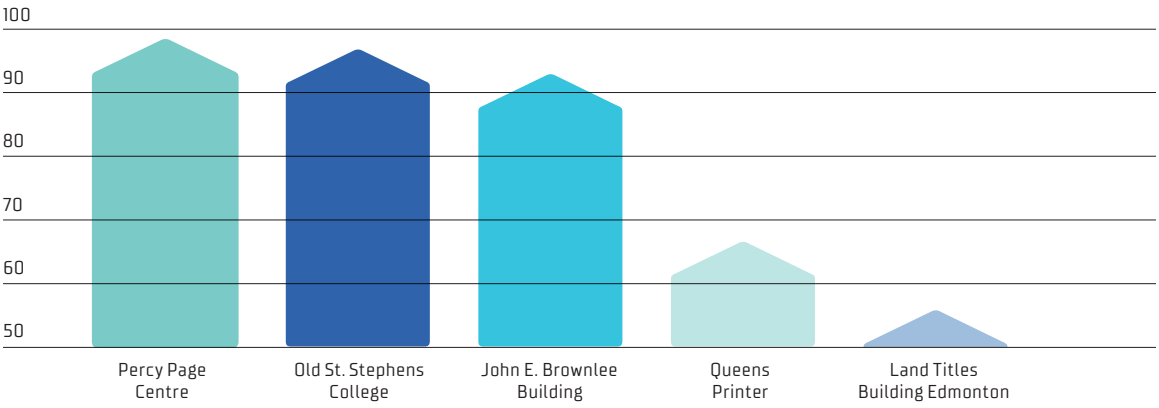
| | | | Average Source EUI [GJ/sq-m] | | Average GHG Intensity [kg/sq-m] | |
|---|---|---|---|---|---|---|
| **Type** | **# Buildings** | **GFA [sq-m]** | **Edmonton** | **MCCAC** | **Edmonton** | **MCCAC** |
| Fitness Center/Health Club/Gym | 6 | 127000 | 3.60 | 3.45 | 332 | 289 |
| Ice/Curling Rink | 2 | 14000 | 3.56 | 2.30 | 340 | 198 |
| Office | 3 | 64000 | 1.98 | 1.88 | 181 | 154 |
| Repair Services | 3 | 53000 | 3.18 | 2.49 | 255 | 182 |

# GOVERNMENT OF ALBERTA

The Government of Alberta submitted 21 buildings in support of Edmonton's program, representing a cross-section of typical provincial building types. The process used to submit data to the City of Edmonton was unique to the program: data was pushed from the province's energy management software (EnergyCAP Canada) directly into ENERGY STAR Portfolio Manager.

The province's office buildings scored well – 3 of the 5 submitted properties have an ENERGY STAR Score above 75. The three highest scoring office building are the John E. Brownlee building, Old St. Stephen's College, and Percy Page Centre – see the building showcases on pages 15, 36 and 43 for more information.

**FIGURE 29: ENERGY STAR SCORES FOR GOVERNMENT OF ALBERTA OFFICES**




Comparing the national benchmarks to the program sample reveals considerable variation for some property types. For example, the laboratory submitted has an EUI of 4.77 GJ/sq-m (420 kBTU/sq-ft), while the national median is 1.23 GJ/sq-m (108 kBTU/sq-ft). Similarly, the submitted Outpatient Rehabilitation building has an EUI of 3.26 GJ/sq-m (287 kBTU/sq-ft), but the national median EUI is only 1.50 GJ/sq-m (132 kBTU/sq-ft). While this variation can motivate building owners to monitor and manage their energy use more closely, it should be noted that establishing benchmarks for uncommon building types is difficult due to limited data availability. Regardless, comparing a property to the closest available benchmark is a valuable exercise, and helps motivate owners to continue tracking energy performance relative to the benchmark on an ongoing basis.

# GOVERNMENT OF ALBERTA CONT'D



## FIGURE 30: DETAILED ENERGY AND EMISSIONS PERFORMANCE – GOVERNMENT OF ALBERTA BUILDINGS

| Property Name | Primary Property Type | ENERGY STAR Score | Source EUI (GJ/sq-m) | Emissions Intensity |
|---|---|---|---|---|
| Alberta Research Council Millwoods | Laboratory | - | 4.77 | 379 |
| Alberta School For The Deaf | Other - Education | - | 1.08 | 75 |
| Bonaventure Workshop | Other - Public Services | - | 1.09 | 85 |
| Central Vehicle Service Garage | Other - Public Services | - | 1.31 | 100 |
| Edmonton Remand Centre | Prison/Incarceration | - | 2.68 | 244 |
| Infrastructure Building (Shops) | Other - Public Services | - | 1.50 | 100 |
| Infrastructure Warehouse No. 3 | Non-Refrigerated Warehouse | - | 0.98 | 66 |
| Intoxication Recovery Centre | Outpatient Rehabilitation | - | 3.26 | 294 |
| John E. Brownlee Building | Office | 92 | 1.21 | 128 |
| Land Titles Building Edmonton | Office | 55 | 1.74 | 155 |
| Law Courts Edmonton | Courthouse | - | 1.68 | 153 |
| Learning Resources Centre | Other - Education | - | 0.66 | 57 |
| Northern Alberta Jubilee Auditorium | Performing Arts | - | 2.16 | 180 |
| Old St. Stephens College | Office | 97 | 1.09 | 95 |
| Percy Page Centre | Office | 98 | 1.06 | 96 |
| Queens Printer | Office | 66 | 1.75 | 154 |
| Single Mens Hostel Edmonton | Residence Hall/Dormitory | - | 1.53 | 111 |
| Solicitor General Staff College | Adult Education | - | 1.12 | 85 |
| Winnifred Stewart School | Adult Education | - | 0.99 | 80 |
| Yellowhead Youth Centre | Adult Education | - | 1.72 | 138 |
| Young Offender Centre Edmonton | 1Prison/Incarceration | - | 1.90 | 159 |

# OTHER BUILDINGS

The remaining 10 participating buildings that submitted to the program cover 403,000 sq-m (4,338,000 sq-ft), across 7 distinct property uses. The properties are summarized below, though two property types have been obfuscated due to these participants not consenting to building-level disclosure. Although rankings within each building category were not carried out given the small sample sizes, comparisons were made to national EUI data from external energy consumption databases where available.

### FIGURE 31: DETAILED ENERGY AND EMISSIONS PERFORMANCE – ALL OTHERS

| Property Name | Primary Property Type | Source EUI [GJ/sq-m] | National Median Source EUI | GHG Intensity [kg CO2e/sq-m] | National median GHG Intensity |
|---|---|---|---|---|---|
| HI-Edmonton | Other - Lodging/Residential | 2.19 | 1.75 | 156 | 125 |
| NAIT's W and Y Buildings | Adult Education | 1.60 | 1.44 | 153 | 138 |
| NAIT Souch Campus | Adult Education | 2.08 | 1.44 | 182 | 126 |
| NAIT Patricia Campus | Adult Education | 3.15 | 1.44 | 252 | 115 |
| Southgate Centre | Enclosed Mall | 2.00 | 3.47 | 211 | 365 |
| Edmonton City Centre East | Mixed Use Property | 2.31 | 1.23 | 240 | 128 |
| Edmonton City Centre West | Enclosed Mall | 3.19 | 3.47 | 326 | 355 |
| Francis Winspear Centre for Music | Performing Arts | 0.82 | 2.47 | 73 | 222 |

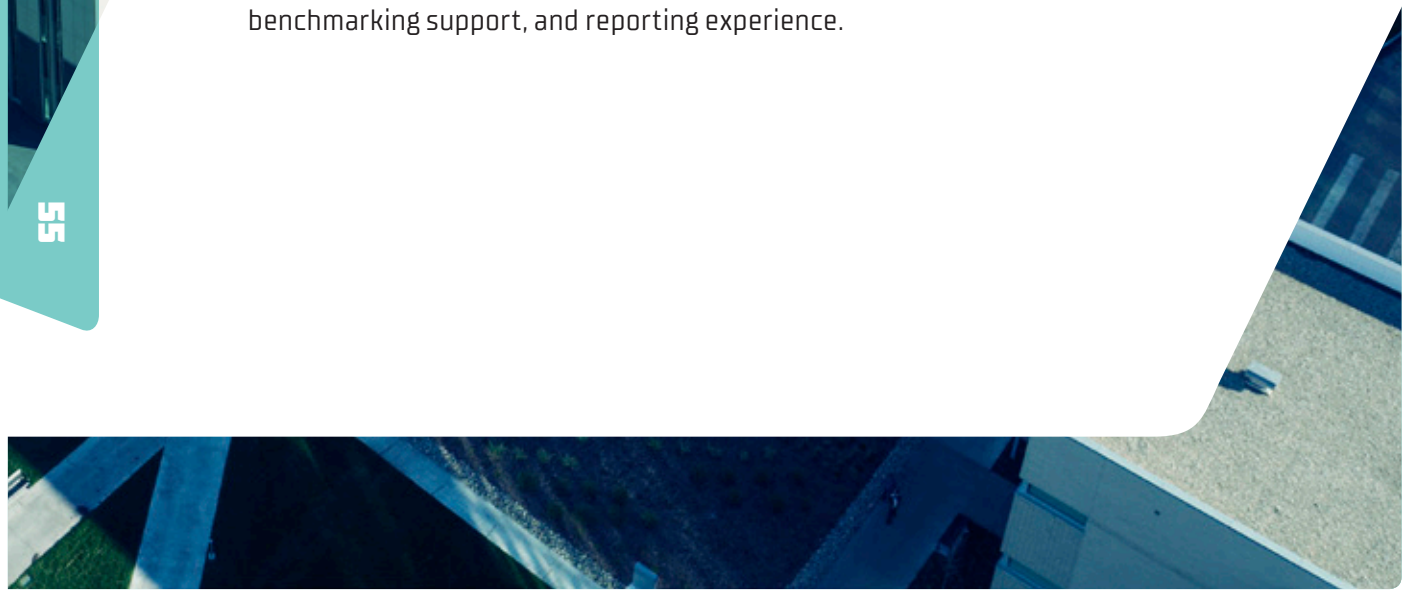
Several of these properties have notably low energy and GHG intensities that fall well below the national medians for their respective property types. For example, the Southgate Centre falls 42% below the national median EUI for enclosed malls. Finally, the Francis Winspear Centre for Music has reported an impressive energy use intensity 67% lower than the national median EUI for Performing Arts buildings. For more information on these high-performance properties, please see the building showcases on pages 32 and 37.

## 44 CAPITAL BLVD

**THE 44 CAPITAL BLVD BUILDING HAS AN ENERGY STAR SCORE OF 95, MEANING THAT IT PERFORMS BETTER THAN 95% OF SIMILAR OFFICE BUILDINGS IN CANADA.**

# WHAT'S NEXT

Year 2 of the Pilot Program will incorporate feedback from year one participants in order to improve the outreach, benchmarking support, and reporting experience.



# RECRUITMENT

The City of Edmonton is looking to engage up to 300 of Edmonton's large buildings in this benchmarking initiative. By signing up to participate in Edmonton's Building Energy Benchmarking pilot program, participants will join a group of industry leaders that are working to understand the energy and greenhouse gas impacts and performance of their buildings and incorporate this into decision making.

Participating buildings must be located within Edmonton's city limits, have a Gross Floor Area greater than 20,000 square feet and must qualify as a commercial, light industrial, institutional, mixed-use, or multi-unit residential building type.

Launching in early 2018, Year 2 efforts will aim to register participants by **September 30, 2018**, with an anticipated data submission deadline of **October 31, 2018**.

**FIGURE 32: PILOT PROGRAM LIFECYCLE YEARS 2 & 3**

# RECRUITMENT CONT'D



Recruitment efforts for Year 2 will focus on expanding program participation in several key sectors. Of particular focus will be the multi-family residential building sector, which does not currently have robust energy and emissions performance benchmarks. Although Year 1 of the Pilot Program succeeded in capturing 5% of the multi-family sector in Edmonton[21], multi-family buildings often represent much larger fractions of participant buildings in other programs[22]. Increasing participation in the multi-family sector will provide Edmonton property owners, managers, and tenants a reliable and directly applicable benchmark against which to compare their own energy and emissions performance.

Year 2 recruitment efforts will include a series of information sessions, similar to those held for Year 1 participants. These events will describe the value of the benchmarking pilot to prospective participants, and will provide them support in collecting and entering data into ENERGY STAR Portfolio Manager. City staff also plan to market the program through various communications channels and events, such as BUILDEX Edmonton in March 2018.

## CALL FOR PARTICIPATION – JOIN US!

If you are interested in participating in Year 2 of the benchmarking Pilot, please learn more at the Building Energy Benchmarking Program website (edmonton.ca/energybenchmarking). Here you will find program updates, details on benchmarking support services, timelines and the registration form. If you have any questions, please email energystar@edmonton.ca

## WHY PARTICIPATE?

Building owners and operators can realize environmental, social and economic benefits by participating in Edmonton's Building Energy Benchmarking program. In the short term, benefits can include:

- A competitive advantage in the market achieved through leadership recognition that boosts reputation
- Receive one-on-one support for energy benchmarking using ENERGY STAR Portfolio Manager and aggregated utility data requests
- Receive data and customized benchmarking reports on your building and other similar buildings' energy use, to understand how you compare
- Eligibility for a building rebate for a commercial energy audit (up to 3 buildings per owner per year)
- Receive regular targeted updates on new energy efficiency programs and incentives
- Recognition as a leader through the City's recognition program
- Access to the City of Edmonton hosted tenant education workshops (resources and toolkits)
- Be ready for upcoming provincial and federal regulation of energy use in buildings and influence the direction of future regulations

[21] Based on the 2016 City of Edmonton's Large Building Stock Analysis
[22] For example, multi-family represents roughly one third of all floor area reported in Chicago in 2016

# RECOGNITION & EVALUATION

The City of Edmonton will host an awards ceremony to recognize Year 1 participants and share the program's results. This annual recognition ceremony will be open to all Pilot participants, and various industry stakeholders, including BOMA Edmonton, City staff, utilities, and building owner's associations. Recognition and performance awards will be handed out for the following categories:

**Participant Recognition:** All participants will be recognized for their voluntary participation in Year 1 of the Pilot. Specific recognition will be given to participants who utilized whole-building aggregation for their historical energy consumption.

**Performance Awards:** Awards will be given to buildings demonstrating exceptional energy and emissions performance. Specifically, awards will be given to participants with high ENERGY STAR Scores, low EUIs, and low GHG emission intensities, where deemed appropriate by program staff.

**Leadership/Ambassador Awards:** Participating organizations that demonstrated exceptional support for the program will also be publicly recognized, including participants on the Building Energy Benchmarking Industry Advisory Group, BOMA Edmonton, and other key pilot supporters. Exceptional individual efforts will be recognized for the owner/manager who submitted the most number of buildings and greatest building area.

If future years, awards will also be given to returning participants showing the largest year-over-year improvements to ENERGY STAR Score, EUI, and GHG intensity, and also to landlord-tenant teams that have demonstrated noteworthy collaboration in completing energy efficiency projects.

Following the three-year pilot, the City will evaluate the impacts of the pilot, will consider ways to maintain and expand benchmarking and disclosure support its market transformation objectives in the commercial building sector. The key performance indicators used to assess the program impacts are:

- Participation rates and diversity
- Participant/nonparticipant awareness and satisfaction
- Impacts on participant behavior and actions
- Data quality and effectiveness of the benchmarking tools
- Energy and GHG impacts
- Market transformation contributions
- Program delivery processes

# ENERGY SAVING OPPORTUNITIES & INCENTIVE PROGRAMS

## CITY OF EDMONTON

**Edmonton's Commercial Energy Audit Rebate Program** is available to all benchmarking program participants, making them eligible for up to $5,000 per building financial rebate towards a commercial energy audit of their building. A maximum of 3 rebates are available per building ownership group per year. Eligibility criteria and application details are available at edmonton.ca/energybenchmarking

## ENERGY EFFICIENCY ALBERTA

The **Business, Non-Profit and Institutional Energy Savings Program** offers rebates for the purchase of energy efficient lighting, space heating and water heating equipment. Each applicant is eligible for a maximum $100,000 rebate and applications are accepted pre- or post- installation.

The **Residential and Commercial Solar Program** offers rebates to homeowners, businesses and non-profits that install rooftop solar photovoltaic (PV) systems to a maximum of $500,000 or 25% of eligible system costs.

In addition, the following programs are available to homes and multi-family buildings:

The **Residential Energy Efficiency Rebate Program** helps make energy-efficient appliances more affordable for Albertans. Purchase any eligible, energy-efficient refrigerator, clothes washer or smart thermostat and receive a rebate.

The **Residential No-Charge Energy Savings Program** offers direct, no-charge installation of energy-efficient products in single and multi-family homes across Alberta. An Energy Efficiency Alberta installer will visit your building and conduct a walkthrough of suites to identify and install energy-efficient products at no charge.

Program details, application forms and lists of eligible measures can be found at efficiencyalberta.ca

## MUNICIPAL CLIMATE CHANGE ACTION CENTRE

The Municipal Climate Change Action Centre offers programs to help municipalities and community-related organizations address climate change through mitigation and resiliency planning.

The **TAME+** and **TAME Express** programs (or equivalent) provide funding for implementing energy efficiency retrofits in buildings.

Non-Profits (including educational facilities) in Alberta can take advantage of the **Non-Profit Energy Efficiency Transition** program to receive funding for an energy audit and an energy management plan.

The **Alberta Municipal Solar Program** provides financial incentives to Alberta municipalities who install grid-connected solar photovoltaics (PV) on municipal facilities or land and complete public engagement for the project.

Program details, application forms and eligibility criteria can be found at mccac.ca

## ENERGY STAR CERTIFICATION

Your building may be eligible to receive ENERGY STAR certification. Certified buildings will be able to display the ENERGY STAR symbol on their building, identifying it as a top performer in terms of energy efficiency. To qualify, your building will need a 1-100 ENERGY STAR score of at least 75, meet certain other eligibility criteria, and have your application verified by a licensed professional.

Details available by searching nrcan.gc.ca/energy/efficiency/buildings

# ENERGY SAVING OPPORTUNITIES & INCENTIVE PROGRAMS CONT'D

### TAKE THE NEXT STEP – BOMA BEST CERTIFICATION

BOMA BEST Sustainable Buildings certification recognizes excellence in energy and environmental management and performance in commercial real estate. The Program is managed by the Building Owners and Managers Association of Canada (BOMA Canada) and delivered by the nearest local association – BOMA Edmonton.

As the largest sustainability certification program in Canada for existing buildings, BOMA BEST is a voluntary program designed to assess and improve building environmental performance, achieved through continuous improvement and alignment with industry best practice. BOMA BEST re-certification has demonstrated significant environmental benefits and greenhouse gas reductions in other jurisdictions.

ENERGY STAR Portfolio Manager is fully integrated into the online BOMA BEST data submission process, and as a result your building has a head start in applying for your certification.

Learn more at [bomacanada.ca/bomabest](bomacanada.ca/bomabest)


## KENNEDALE ECO STATION

ORIGINALLY BUILT ON A BROWNFIELD SITE, KENNEDALE ECO STATION WAS DESIGNED TO ACHIEVE LEED GOLD CERTIFICATION AND WORKED TO INCORPORATE LOW IMPACT DEVELOPMENT (LID) STRATEGIES INTO THE DESIGN OF THE 10.26 ACRES OF LAND. THE BUILDING HAS AN UNDERGROUND GEOTHERMAL SYSTEM THAT HELPS MEET THE FACILITY'S HEATING AND COOLING NEEDS IN A PASSIVE AND SUSTAINABLE WAY.

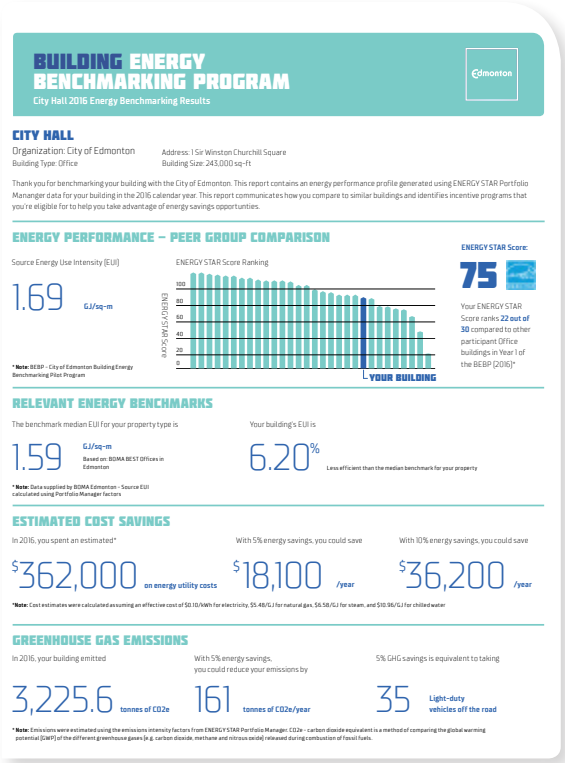
servus credit union

# PARTICIPANT SCORECARD

Edmonton's Building Energy Benchmarking Report

# PARTICPANT SCORECARD

Each participant who submitted complete energy performance data also received a customized scorecard for their building(s). The scorecards compare participant buildings to their peer group (where one is available), as well as energy and emissions intensity metrics. Estimated cost performance (based on assumed per kWh and GJ costs for the various fuel types) quantify the annual financial impact of energy consumption by the building, along with potential financial impact of modest energy performance improvements. Helpful links to efficiency programs and this City of Edmonton public disclosure report are also provided, along with the opportunity for participants to provide feedback to program administrators.



BUILDING ENERGY BENCHMARKING PROGRAM

City Hall 2016 Energy Benchmarking Results

CITY HALL

Organization: City of Edmonton
Building Type: Office
Address: 1 Sir Winston Churchill Square
Building Size: 243,000 sq-ft

Thank you for benchmarking your building with the City of Edmonton. This report contains an energy performance profile generated using ENERGY STAR Portfolio Manager data for your building in the 2016 calendar year. This report communicates how you compare to similar buildings and identifies incentive programs that you're eligible for to help you take advantage of energy savings opportunities.

ENERGY PERFORMANCE – PEER GROUP COMPARISON

Source Energy Use Intensity (EUI)
1.69 GJ/sq-m

* Note: BEBP - City of Edmonton Building Energy Benchmarking Pilot Program

ENERGY STAR Score Ranking
ENERGY STAR SCORE
100
80
60
40
20
0
YOUR BUILDING

ENERGY STAR Score:
75

Your ENERGY STAR Score ranks 22 out of 30 compared to other participant Office buildings in Year 1 of the BEBP (2016)*

RELEVANT ENERGY BENCHMARKS

The benchmark median EUI for your property type is
1.59 GJ/sq-m
Based on: BOMA BEST Offices in Edmonton

Your building's EUI is
6.20% Less efficient than the median benchmark for your property

* Note: Data supplied by BOMA Edmonton - Source EUI calculated using Portfolio Manager factors

ESTIMATED COST SAVINGS

In 2016, you spent an estimated*
$362,000 on energy utility costs

With 5% energy savings, you could save
$18,100 /year

With 10% energy savings, you could save
$36,200 /year

*Note: Cost estimates were calculated assuming an effective cost of $0.10/kWh for electricity, $5.48/GJ for natural gas, $6.58/GJ for steam, and $10.96/GJ for chilled water

GREENHOUSE GAS EMISSIONS

In 2016, your building emitted
3,225.6 tonnes of CO2e

With 5% energy savings, you could reduce your emissions by
161 tonnes of CO2e/year

5% GHG savings is equivalent to taking
35 Light-duty vehicles off the road

* Note: Emissions were estimated using the emissions intensity factors from ENERGY STAR Portfolio Manager. CO2e - carbon dioxide equivalent is a method of comparing the global warming potential (GWP) of the different greenhouse gases (e.g. carbon dioxide, methane and nitrous oxide) released during combustion of fossil fuels.

CHANGE BUILDINGS FOR CLIMATE

RELEVANT INCENTIVES – TAKE ACTION!

Take advantage of Edmonton's Commercial Energy Audit Rebate Program. All benchmarking program participants (Year 2) are eligible for a rebate of up to $5,000 per building (three buildings maximum) towards a commercial energy audit. Head over to edmonton.ca/energybenchmarking for eligibility criteria and to register. This rebate is retroactive, as a result any commercial energy audits delivered after January 1, 2018 are eligible for the rebate. The deadline for applications is November 30, 2018.

Energy Efficiency Alberta's Business, Non-Profit and Institutional Energy Savings Program offers rebates for the purchase of energy efficient lighting, HVAC and water heating equipment. Each site ID is eligible for a maximum of $100,000 rebate. Applications are accepted pre- or post- installation. Visit efficiencyalberta.ca/business for more information and a list of eligible measures.

Consider installing solar power on your building. The Alberta Municipal Solar Program (AMSP) provides financial incentives to Alberta municipalities who install grid-connected solar photovoltaics (PV) on municipal facilities or land and complete public engagement for the project – PV systems must be greater than or equal to 2 kW in installation capacity, and rebates cannot exceed 25% of eligible expenses. Note that provincially owned buildings are not eligible for the program. Visit mccac.ca to learn more.

The Municipal Climate Change Action Centre (MCCAC) offers programs to help municipalities address climate change through mitigation and resiliency planning – the TAME+ and TAME Express programs (or equivalent) provide funding for implementing energy efficiency retrofits. Note that provincially owned buildings are not eligible for the program. Visit mccac.ca to learn more.

Your building may be eligible to receive an ENERGY STAR certification! Starting in early 2018, Natural Resources Canada (NRCan) is launching a new recognition program to award superior building energy performance. Certified buildings will be able to display the ENERGY STAR symbol on their building, identifying it as a top performer in terms of energy efficiency. To qualify, your building will need an ENERGY STAR score of at least 75, meet certain eligibility criteria, and have your application verified by a licensed professional. Visit nrcan.gc.ca/energy/efficiency/buildings/4261 for more information. Will your building be among the first ENERGY STAR-certified buildings in Canada?

TAKE THE NEXT STEP BOMA BEST CERTIFICATION

BOMA BEST is the largest sustainability certification program in Canada for existing buildings. It is a voluntary program designed to assess and improve building environmental performance, achieved through continuous improvement and alignment with industry best practice. BOMA BEST recertification has demonstrated significant environmental benefits and greenhouse gas reductions in buildings.

ENERGY STAR Portfolio Manager is fully integrated into the online BOMA BEST data submission process, and as a result your building has a head start in applying for certification. Learn more at bomacanada.ca/bomabest.

BENCHMARKING REPORT – NOW AVAILABLE

Transparency is a key piece of Edmonton's Building Energy Benchmarking Program in order to make information about building energy performance readily accessible and begin to transform the market to properly value energy efficient buildings.

Edmonton's 2016 Building Energy Benchmarking Report is available now on edmonton.ca/energybenchmarking and includes an in depth summary of Year 1 participants, their benchmarking results, and showcases of some of Edmonton's most energy efficient buildings.

YEAR 2 REGISTRATION – NOW OPEN

In March 2018 the City of Edmonton launched Year 2 of the program, and we hope that you will participate once again. Please visit edmonton.ca/energybenchmarking to learn more about benefits of participating and sign up for an information session. The registration deadline is September 30, 2018 and the data submission deadline is October 31, 2018. We look forward to your participation!

QUESTIONS

energystar@edmonton.ca
edmonton.ca/energybenchmarking

9th Floor, Edmonton Tower
10111 - 104 Avenue NW, Edmonton AB, T5J 0J4

Report prepared on March 01, 2018

The example scorecard above reflects the results for a building type with group of similar buildings in the program. In future years, increased participation will result in peer group rankings being possible for a wider range of building types. Of particular value will be a richer dataset for multi-family residential buildings, given the current lack of high-quality benchmarks for multi-family residential buildings in Canada.

# APPENDICES

# APPENDIX A
# DATA QUALITY + VERIFICATION



A data verification process was carried out to ensure the energy data submitted to the program did not contain any obvious errors or omissions. Records were examined for missing building information, non-Edmonton postal costs, missing electricity and/or natural gas consumption, and year of construction in 2016 or later. Inaccurate data was identified by examining buildings' energy use intensities (EUIs) and comparing to the range of expected values identified in external resources.

The US Department of Energy's Buildings Performance Database (BPD) was used to establish the expected ranges for overall building source EUIs[23]. The BPD was filtered for Climate Zone 7 buildings to match Edmonton's ASHRAE Climate Zone. Due to sample size limitations the BPD data was filtered by property type into Offices and Other buildings, for comparison to the City of Edmonton dataset. The following EUI limits were used to raise potential data quality flags, using the 25th and 75th percentiles for EUI from the BPD's sample as a guide.

| Building Type | Lower Source EUI Limit | Upper Source EUI Limit |
|---|---|---|
| **Offices** | 0.75 GJ/sq-m | 3.42 GJ/sq-m |
| **Others** | 0.51 GJ/sq-m | 4.90 GJ/sq-m |

Buildings with unusually low or high electricity or gas consumption were also flagged as potential indicators of missing meter data, incorrect units for meter data, or under- or over-reporting of building floor area. The expected ranges for electricity and natural gas EUI (on a site basis) were:

| Fuel Type | Lower Site EUI Limit | Upper Site EUI Limit |
|---|---|---|
| **Electricity** | 0.1 GJ/sq-m | 1.5 GJ/sq-m |
| **Gas** | 0.1 GJ/sq-m | 3.0 GJ/sq-m |

Participant buildings were prioritized for verification based on the number and severity of the data flags raised. In the end, 12 of the 85 submitted buildings (or 14% of all data points) were prioritized for data verification follow-up with the participants. Of the 12 flagged buildings, 10 were confirmed as correct, or successfully revised and resubmitted through the Data Request link. Only two buildings were excluded from the analysis after confirming significant errors in the reported floor area and/or energy data that could not be resolved before the analysis and reporting activities concluded.

[23] Source EUIs were adjusted to reflect Canadian Source-Site factors

# APPENDIX B
# GLOSSARY OF TERMS

| Term | Definition |
|---|---|
| **Benchmarking** | The process of comparing a building's energy and emissions performance to similar buildings, and to itself over time. |
| **BOMA BEST Certification** | The BOMA BEST program is intended to complement existing internal operations and maintenance programs, by helping to drive continuous improvement through benchmarking, external validation and recognition. BOMA offers five levels of certification for buildings that have demonstrated commitment and implementation of the best practices identified in the standard. |
| **ENERGY STAR Portfolio Manager** | A free, secure, web-based building energy benchmarking tool that allows users to compare building energy consumption and energy performance metrics and ratings, as well as GHG emissions, for a single building or across a portfolio of buildings. |
| **ENERGY STAR Score** | NRCan's 1 – 100 ENERGY STAR score for is an external benchmark for assessing the performance of commercial buildings in Canada. The ENERGY STAR score, expressed as a number on a simple 1 – 100 scale, rates performance on a percentile basis: buildings with a score of 50 perform better than 50% of their peers; buildings earning a score of 75 or higher are in the top quartile of energy performance |
| **Energy Use Intensity** | The site or source energy use of a building, expressed on a per-square meter basis. |
| **LEED Certification** | LEED is a national certification system developed by the US and Canadian Green Building Councils (USGBC and CaGBC) to encourage the construction of energy and resource-efficient buildings that are healthy to live in. LEED stands for Leadership in Energy and Environmental Design. |
| **Gross Floor Area (Building)** | The Gross Floor Area (GFA) is the total property square footage, including all supporting areas inside the building(s). GFA is not the same as rentable space, but rather includes all area inside the building(s). |
| **GHG intensity** | The direct (i.e. on-site) and/or indirect (i.e. upstream) GHG emissions associated with your building's energy consumption, expressed on a per-square meter basis. |
| **Property** | The Portfolio Manager record representing the partial building (i.e. tenant space), a single building, or a campus of multiple buildings that you are benchmarking. |
| **Property Type** | ENERGY STAR Portfolio Manager calculates a property type based on the property uses entered. This is the property type that accounts for more than 50% of area use. If no individual property type accounts for more than 50%, then it will be designated as Mixed Use. |
| **Property Use** | The property use describes the category of primary activity in a building, or in a portion of the building. Portfolio Manager makes over 80 distinct property uses available |
| **Site Energy** | Site Energy is the annual amount of all the energy a property consumes onsite, as reported on utility bills. Use Site Energy to understand how the energy use for an individual property has changed over time. |
| **Source Energy** | Source Energy Use is the total amount of raw fuel that is required to operate a property. In addition to what the property consumes on-site, source energy includes losses that take place during generation, transmission, and distribution of the energy, thereby enabling a complete assessment of energy consumption resulting from building operations. |

# APPENDIX C
# FULL PARTICIPANT LIST



| Property Name | Organization | Primary Property Type |
|---|---|---|
| 44 Capital Blvd | Morguard | Office |
| 9925 Building | Triovest Realty Advisors Inc. | Office |
| Alberta Municipal Place | Humford Management Inc. | Office |
| Alberta Research Council Millwoods | Government of Alberta | Laboratory |
| Alberta School For The Deaf | Government of Alberta | Other - Education |
| Ambleside Eco Station | City of Edmonton | Other - Public Services |
| Animal Care and Control Centre | City of Edmonton | Other - Public Services |
| ATB Place | Triovest Realty Advisors Inc. | Office |
| ATCO Centre | Triovest Realty Advisors Inc. | Office |
| Bell Tower | Aspen Properties | Office |
| Bonaventure Workshop | Government of Alberta | Other - Public Services |
| Callingwood Arenas | City of Edmonton | Ice/Curling Rink |
| Canadian Western Bank Place | Bentall Kennedy | Office |
| Castle Downs Arena | City of Edmonton | Ice/Curling Rink |
| Centennial Transit Vehicle Repair/Storage Garage | City of Edmonton | Repair Services |
| Central Vehicle Service Garage | Government of Alberta | Other - Public Services |
| Century Park LRT Station | City of Edmonton | Transportation Terminal/Station |
| Century Place | City of Edmonton | Office |
| Chancery Hall | City of Edmonton | Office |
| City Hall | City of Edmonton | Office |
| Clareview Community Recreation Centre | City of Edmonton | Fitness Center/Health Club/Gym |
| Commerce Place | QuadReal Property Group | Office |
| Commerce South Office Park - Bldg A | Bentall Kennedy | Office |
| Commerce South Office Park - Bldg B | Bentall Kennedy | Office |
| Commerce South Office Park - Bldg D | Bentall Kennedy | Office |
| Commerce South Office Park - Bldg E | Bentall Kennedy | Office |
| Commonwealth Recreation Centre + Commonwealth Stadium + Clarke Stadium | City of Edmonton | Stadium (Open) |
| Compass Place | Humford Management Inc. | Office |
| David Thompson | Midwest Property Management | Multifamily Housing |
| Edmonton City Centre East | Oxford Properties | Mixed Use Property |
| Edmonton City Centre West | Oxford Properties | Enclosed Mall |
| Edmonton House | Midwest Property Management | Multifamily Housing |
| Edmonton Remand Centre | Government of Alberta | Prison/Incarceration |
| Engineering Services Building Materials Test Lab | City of Edmonton | Laboratory |
| EPCOR Tower | Station Lands LTD | Office |
| Essex | Callaghan Ravines | Multifamily Housing |
| Francis Winspear Centre for Music | Francis Winspear Centre for Music | Performing Arts |
| Gallery | Callaghan Ravines | Multifamily Housing |
| HI-Edmonton | Hostelling International - Canada - Pacific Mountain | Other - Lodging/Residential |
| Infrastructure Building (Shops) | Government of Alberta | Other - Public Services |
| Infrastructure Warehouse No. 3 | Government of Alberta | Non-Refrigerated Warehouse |
| Intoxication Recovery Centre | Government of Alberta | Outpatient Rehabilitation/Physical Therapy |

# APPENDIX C
# FULL PARTICIPANT LIST CONT.

| Property Name | Organization | Primary Property Type |
|---|---|---|
| John E. Brownlee Building | Government of Alberta | Office |
| Kennedale Eco Station | City of Edmonton | Non-Refrigerated Warehouse |
| Kennedale Integrated Services Site | City of Edmonton | Mixed Use Property |
| Kinsmen Sports Centre | City of Edmonton | Fitness Center/Health Club/Gym |
| Land Titles Building Edmonton | Government of Alberta | Office |
| Law Courts Edmonton | Government of Alberta | Courthouse |
| Learning Resources Centre | Government of Alberta | Other - Education |
| Limelight | Humford Management Inc. | Office |
| Mammoet Edmonton | Mammoet Canada | Repair Services (Vehicle, Shoe, Locksmith, etc.) |
| Mill Woods Recreation Centre | City of Edmonton | Fitness Center/Health Club/Gym |
| MNP Tower | Aspen Properties | Office |
| Muttart Conservatory | City of Edmonton | Other - Recreation |
| NAIT Patricia Campus | NAIT | Adult Education |
| NAIT Souch Campus | NAIT | Adult Education |
| NAIT's W and Y Buildings | NAIT | Adult Education |
| Northern Alberta Jubilee Auditorium | Government of Alberta | Performing Arts |
| Old St. Stephens College | Government of Alberta | Office |
| Percy Page Centre | Government of Alberta | Office |
| Petroleum Plaza | Morguard | Office |
| Plaza 124 | Humford Management Inc. | Office |
| Queens Printer | Government of Alberta | Office |
| Riverwind | Riverwind Strata Title Housing Cooperative Ltd. | Multifamily Housing |
| Robbins Health Learning Centre | MacEwan University | Office |
| Royal Bank Building | Melcor Developments Ltd. | Office |
| Saint Francis Xavier Sports Centre | City of Edmonton | Fitness Center/Health Club/Gym |
| Scotia Place Co-Ownership | Morguard | Office |
| Servus Corporate Centre | Servus Credit Union Ltd | Financial Office |
| Single Mens Hostel Edmonton | Government of Alberta | Residence Hall/Dormitory |
| Solicitor General Staff College | Government of Alberta | Adult Education |
| Southgate Centre | Ivanhoe Cambridge | Enclosed Mall |
| Southwest Transportation Yard Equipment Storage Garage | City of Edmonton | Non-Refrigerated Warehouse |
| Stanley A. Milner Library | City of Edmonton | Parking |
| Sun Life Place | Bentall Kennedy | Office |
| Terwillegar Community Recreation Centre | City of Edmonton | Fitness Center/Health Club/Gym |
| The Meadows Community Recreation Centre | City of Edmonton | Fitness Center/Health Club/Gym |
| University Service Centre | MacEwan University | Parking |
| Waste Services Equipment Storage & Maintenance Facility | City of Edmonton | Repair Services |
| Waste Services Integrated Processing & Transfer Facility | City of Edmonton | Other - Public Services |
| Winnifred Stewart School | Government of Alberta | Adult Education |
| Yellowhead Youth Centre | Government of Alberta | Adult Education |
| Young Offender Centre Edmonton | Government of Alberta | Prison/Incarceration |

# APPENDIX D
# BUILDING-SPECIFIC PERFORMANCE DATA

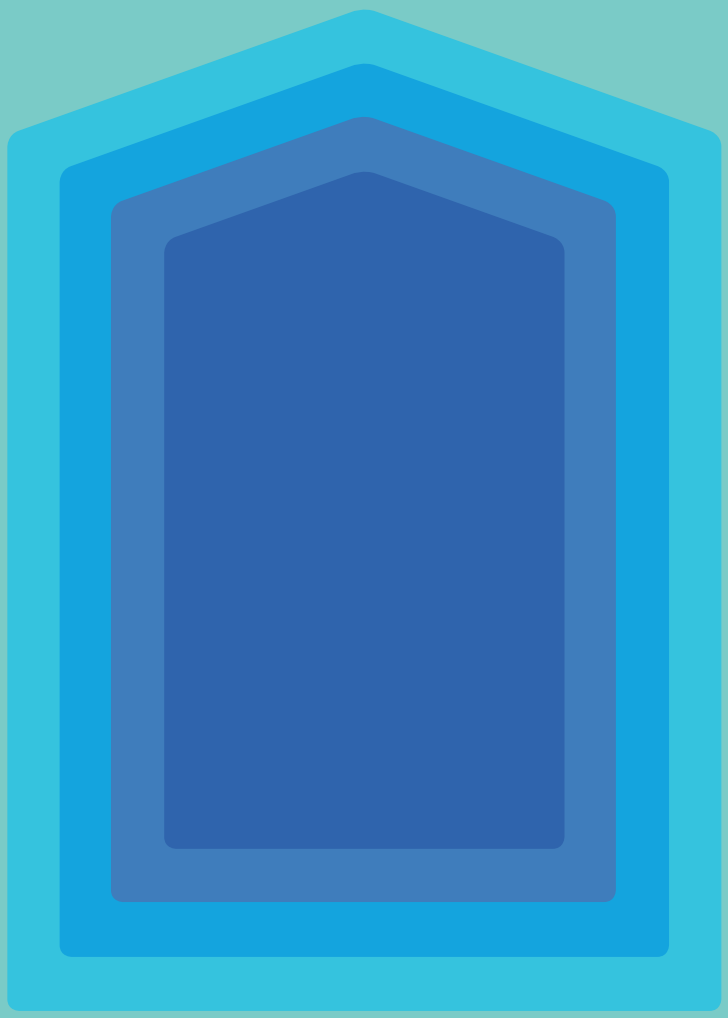
This appendix lists the energy and emissions performance data for all buildings consenting to building-level disclosure. No directly applicable benchmarks were identifiable for certain buildings listed below.

| Property Name | Organization | Property Category | GFA [sq-m] | Source EUI [GJ/sq-m] | National Median Source EUI [GJ/sq-m]** | GHG Emissions Intensity [kg CO2e/m²] | National Median GHG Intensity [kg CO2e/m²]** |
|---|---|---|---|---|---|---|---|
| Alberta Municipal Place | Humford Management Inc. | Office | 6215 | 1.35 | 2.37 | 114 | 201 |
| Alberta Research Council Millwoods | Government of Alberta | Other | 43617 | 4.77 | - | 379 | - |
| Alberta School For The Deaf | Government of Alberta | Education | 20712 | 1.08 | 1.27 | 75 | 89 |
| Ambleside Eco Station | City of Edmonton | Other | 2323 | 4.79 | - | 335 | - |
| Animal Care and Control Centre | City of Edmonton | Other | 2454 | 1.54 | - | 172 | - |
| Bell Tower | Aspen Properties | Office | 51160 | 1.75 | 2.21 | 196 | 246 |
| Bonaventure Workshop | Government of Alberta | Other | 3151 | 1.09 | - | 85 | - |
| Callingwood Arenas | City of Edmonton | Recreation | 6815 | 4.09 | 2.88 | 384 | 270 |
| Castle Downs Arena | City of Edmonton | Recreation | 7067 | 3.03 | 2.85 | 296 | 278 |
| Centennial Transit Vehicle Repair/Storage Garage | City of Edmonton | Other | 29090 | 3.18 | 1.37 | 238 | 102 |
| Central Vehicle Service Garage | Government of Alberta | Other | 2727 | 1.31 | - | 100 | - |
| Century Park LRT Station | City of Edmonton | Other | 2135 | 3.63 | 1.42 | 343 | 134 |
| Century Place | City of Edmonton | Office | 27854 | 2.6 | 2.42 | 259 | 242 |
| Chancery Hall | City of Edmonton | Office | 13708 | 1.98 | 2.23 | 181 | 203 |
| City Hall | City of Edmonton | Office | 22596 | 1.69 | 2.03 | 143 | 171 |
| Clareview Community Recreation Centre | City of Edmonton | Recreation | 32040 | 3.42 | 1.93 | 301 | 170 |
| Commonwealth Recreation Centre + Commonwealth Stadium + Clarke Stadium | City of Edmonton | Recreation | 81277 | 1.51 | 1.93 | 136 | 174 |
| Compass Place | Humford Management Inc. | Office | 8848 | 2.21 | 2.41 | 190 | 208 |
| Edmonton City Centre East | Oxford Properties | Other | 135603 | 2.31 | - | 240 | - |
| Edmonton City Centre West | Oxford Properties | Retail | 57249 | 3.19 | 3.47 | 326 | 355 |
| Edmonton Remand Centre | Government of Alberta | Other | 56020 | 2.68 | 1.74 | 244 | 159 |
| Engineering Services Building Materials Test Lab | City of Edmonton | Other | 3761 | 3.65 | - | 315 | - |
| Essex* | Callaghan Ravines | Multi-family | 4688 | n/a | - | n/a | - |
| Francis Winspear Centre for Music | Francis Winspear | Other Centre for Music | 27881 | 0.82 | 2.47 | 73 | 222 |
| Gallery* | Callaghan Ravines | Multi-family | 3333 | n/a | - | n/a | - |
| HI-Edmonton | Hostelling International - Canada - Pacific Mountain | Other | 1859 | 2.19 | 1.75 | 156 | 125 |
| Infrastructure Building (Shops) | Government of Alberta | Other | 8370 | 1.5 | - | 100 | - |
| Infrastructure Warehouse No. 3 | Government of Alberta | Other | 2232 | 0.98 | 0.93 | 66 | 62 |

# APPENDIX D
# BUILDING-SPECIFIC PERFORMANCE DATA CONT.

| Property Name | Organization | Property Category | GFA [sq-m] | Source EUI [GJ/sq-m] | National Median Source [GJ/sq-m]** | GHG Emissions Intensity [kg CO2e/m²] | National Median GHG Intensity [kg CO2e/m²] ** |
|---|---|---|---|---|---|---|---|
| Intoxication Recovery Centre | Government of Alberta | Other | 1970 | 3.26 | 1.5 | 294 | 135 |
| John E. Brownlee Building | Government of Alberta | Office | 71408 | 1.21 | 1.91 | 128 | 203 |
| Kennedale Eco Station | City of Edmonton | Other | 2093 | 1.84 | - | 147 | - |
| Kennedale Integrated Services Site | City of Edmonton | Other | 17287 | 3.49 | - | 258 | - |
| Kinsmen Sports Centre | City of Edmonton | Recreation | 20107 | 5.05 | 1.93 | 381 | 146 |
| Land Titles Building Edmonton | Government of Alberta | Office | 5716 | 1.74 | 1.82 | 155 | 162 |
| Law Courts Edmonton | Government of Alberta | Other | 72974 | 1.68 | 1.74 | 153 | 158 |
| Learning Resources Centre | Government of Alberta | Education | 18818 | 0.66 | 1.27 | 57 | 111 |
| Mill Woods Recreation Centre | City of Edmonton | Recreation | 13005 | 5.03 | 1.93 | 414 | 159 |
| Muttart Conservatory | City of Edmonton | Recreation | 8505 | 4.75 | - | 292 | - |
| NAIT Patricia Campus | NAIT | Education | 11440 | 3.15 | 1.44 | 252 | 115 |
| NAIT Souch Campus | NAIT | Education | 13411 | 2.08 | 1.44 | 182 | 126 |
| NAIT's W and Y Buildings | NAIT | Education | 35235 | 1.6 | 1.44 | 153 | 138 |
| Northern Alberta Jubilee Auditorium | Government of Alberta | Other | 23355 | 2.16 | 2.47 | 180 | 206 |
| Old St. Stephens College | Government of Alberta | Office | 5564 | 1.09 | 2.02 | 95 | 175 |
| Percy Page Centre | Government of Alberta | Office | 8771 | 1.06 | 2.02 | 96 | 182 |
| Queens Printer | Government of Alberta | Office | 4346 | 1.75 | 1.98 | 154 | 175 |
| Riverwind* | Riverwind Strata Title Housing Cooperative Ltd. | Multi-family | 15700 | n/a | - | n/a | - |
| Saint Francis Xavier Sports Centre | City of Edmonton | Recreation | 4789 | 1.63 | 1.93 | 170 | 202 |
| Servus Corporate Centre | Servus Credit Union Ltd | Office | 11734 | 1.91 | 2.28 | 204 | 244 |
| Single Mens Hostel Edmonton | Government of Alberta | Other | 4607 | 1.53 | 2.05 | 111 | 149 |
| Solicitor General Staff College | Government of Alberta | Education | 7098 | 1.12 | 1.44 | 85 | 110 |
| Southgate Centre | Ivanhoe Cambridge | Retail | 106756 | 2 | 3.47 | 211 | 365 |
| Southwest Transportation Yard Equipment Storage Garage | City of Edmonton | Other | 4162 | 1.69 | 0.93 | 119 | 65 |
| Stanley A. Milner Library | City of Edmonton | Other | 21607 | 2.31 | - | 209 | - |
| Terwillegar Community Recreation Centre | City of Edmonton | Recreation | 33622 | 3.43 | 1.93 | 318 | 180 |
| The Meadows Community Recreation Centre | City of Edmonton | Recreation | 23329 | 3.78 | 1.93 | 345 | 177 |
| Waste Services Equipment Storage & Maintenance Facility | City of Edmonton | Other | 2215 | 3.08 | 1.37 | 255 | 113 |
| Waste Services Integrated Processing & Transfer Facility | City of Edmonton | Other | 21410 | 3.19 | - | 293 | - |
| Winnifred Stewart School | Government of Alberta | Education | 8650 | 0.99 | 1.44 | 80 | 116 |
| Yellowhead Youth Centre | Government of Alberta | Education | 9817 | 1.72 | 1.44 | 138 | 115 |
| Young Offender Centre Edmonton | Government of Alberta | Other | 12888 | 1.9 | 1.74 | 159 | 146 |

*Though building-level consent was provided for this building, the results have been obscured to preserve the data privacy of other participants.,
** Comparison to National medians does not normalize for climate, property uses and characteristics.



Building Energy Benchmarking Program
is a City of Edmonton pilot initiative to support building owners and operators to reduce energy consumption.
For more information about this program,
please visit: edmonton.ca/**energybenchmarking**

For more information, contact 311
or email **energystar@edmonton.ca**

CHANGE BUILDINGS FOR CLIMATE

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