

# Annual Energy Report

July 2019-June 2020



Draft Version September 12, 2020



MacEwan University  
Facilities Department

# TABLE OF CONTENTS

- Energy Management System (EnMS) ..... 2
  - General..... 2
  - Need for an EnMS ..... 2
  - Energy Management Review Committee ..... 2
  - ISO 50001 Certification ..... 3
- Objectives and Targets..... 3
- Fiscal 2020 Variance Report: Cost vs Budget..... 4
- Fiscal 2020 Variance Report: Cost vs 2019 ..... 4
- Fiscal 2020 Variance Report: Consumption vs 2019..... 5
- Variance Considerations ..... 5
- Benchmarking Program ..... 6
- Energy Performance Indicators ..... 6
- University Earns STARS Silver Rating ..... 7
- Emission Report ..... 7

## Annual Energy Report – Fiscal Year 2020 (July 2019- June 2020)

### Energy Management System (EnMS)

#### General

The Energy Management System (EnMS) provides the Facilities Department with the ability to monitor, control, and optimize the energy performance at MacEwan University. By measuring, monitoring, and analyzing data, the Facilities Department can set energy objectives and targets to meet energy goals. The EnMS is comprised of inspections, internal audits, measurement and analysis of data, risk analysis, and regularly scheduled management review meetings. Additionally, the Facilities Department creates action plans to implement energy improvement. The purpose of EnMS is to achieve energy measures that are reasonable and align with MacEwan University's strategic plan. The EnMS includes electricity, natural gas, water, waste management, and alternative energy sources.

#### Need for an EnMS

The Facilities Department has experienced higher energy demands due to:

- Addition of multiple buildings in the last 20 years (e.g. Robbins Health Center, University Service Center, Allard Hall).
- Increase in full load equivalents (FLE).
- Increase in the number of programs offered by the University.
- Increase in the operational hours of the University.
- Changes in technology (e.g. more computer labs).
- Increased energy consumption and loss of energy efficiency with aging facilities systems.

#### Energy Management Review Committee

The purpose of the Energy Management Review Committee is to guide and steer the Facilities Department on energy matters relating to direction and principals. The purpose of the Committee is to provide an advisory and review service on matters such as:

- Energy Statement
- Energy plans, objectives and targets,
- Energy projects and major equipment selection,
- Energy consumption, reduction and performance measurement,
- Communication and reporting,
- Regulatory and other requirements, as applicable
- Overall improvement in energy processes.

The Management Review Committee will be comprised of the following positions:

Associate Vice President, Facilities; Director of Operations and Maintenance; Quality Manager; Senior Manager of Maintenance and Infrastructure; Manager of Facilities Finance and Planning;

Energy Manager; Electrical Coordinator; Mechanical Coordinator, the Director of the Office of Sustainability; and the contracted energy consultant (Energy Profiles Ltd). The Associate Vice President will act as the chairperson and the Energy Manager will act as Co-chair.

### ISO 50001 Certification

In 2019, the groundwork was laid for this impressive achievement as the department established measures to improve energy efficiency on campus. ISO 50001:2018 is a globally recognized standard to improve environmental impacts through best standards, practices and principles for managing energy systems.

MacEwan has a long history of energy conservation and prudent use of resources, and with ISO certification, MacEwan University Facilities department is the first organization in Alberta to achieve registration to 50001:2018. ISO provides the EnMS with an improved planning and implementation structure to operate and upgrade energy systems based on energy use, efficacy of equipment, viability of new systems and setting objectives.

### Objectives and Targets

- **Lighting Retrofits at City Center Campus**

The Facilities Department has changed all the existing valence lighting with LED lighting in the City Center Campus (Buildings 5-8). The target, which was to reduce the annual baseline power consumption by 8.5%, was successfully achieved.

- **Lighting Retrofits at Robbins Health and Learning Center**

The Facilities Department has changed the existing fluorescent and metal halide lamps to LED lighting in the Robbins Health and Learning Centre building. With this implementation, the University was able to achieve its goal of reducing power consumption by 4.6% in the Robbins Health Learning Centre and extending the life cycle of the lighting infrastructure.

- **SAMU LEED Certification**

The construction of the new SAMU building incorporated an eco-friendly design into the campus and as a result, this building will be able to receive silver LEED certification. This achievement will add another LEED certified building onto the campus (USC and Robbins Health Learning Centre already have this status).

- **Green Space Program**

In coordination with the Office of Sustainability, Facilities helps influence energy savings through a communications and engagement campaign that promotes active participation in energy reduction, awareness and education opportunities, and opportunities for involvement with other sustainable initiatives. The goal is to make the University a greener space through daily eco-friendly actions.

## Fiscal 2020 Variance Report: Cost vs Budget

Cost Relative to 2020 Budget (absolute, not normalized)			
Building	2020 Cost	Actual vs Budget	Variance (+/-)
Alberta College	\$303,653	-12.70%	(\$43,985)
City Centre Campus	\$1,858,819	-8.80%	(\$179,660)
Robbins Building	\$391,176	-6.90%	(\$28,936)
Student Residence	\$243,924	-0.40%	(\$1,023)
USC	\$196,891	-1.30%	(\$2,654)
SAMU*	\$50,158	-72.10%	(\$129,816)
Allard Hall	\$460,121	-0.90%	(\$4,301)
Totals	\$3,504,742	-10.00%	(\$390,375)

## Fiscal 2020 Variance Report: Cost vs 2019

Cost Relative to FY2019 Actuals (absolute, not normalized)			
Building	2020 Cost	2020 vs 2019	Variance (+/-)
Alberta College	\$303,653	-10.50%	(\$35,778)
City Centre Campus	\$1,858,819	-5.30%	(\$103,317)
Robbins Building	\$391,176	-6.20%	(\$25,697)
Student Residence	\$243,924	1.70%	\$4,161
USC	\$196,891	-1.60%	(\$3,224)
Allard Hall	\$460,121	-1.60%	(\$7,342)
Totals	\$3,454,584	-3.92%	(\$171,197)

## Fiscal 2020 Variance Report: Consumption vs 2019

ekWh Consumption Relative to FY2019 Actuals (absolute, not normalized)			
Building	2020 Consumption	2020 vs 2019 Consumption	Variance (+/-)
Alberta College	5,721,271	-9.20%	-578,878
City Centre Campus	34,328,986	-10.60%	-4,074,943
Robbins Building	6,984,585	-9.50%	-729,445
Student Residence	5,351,037	-4.00%	-221,743
USC	2,842,045	-4.30%	-128,752
SAMU*	1,880,127	N/A	N/A
Allard Hall	6,922,268	-5.20%	-376,675
<b>Total</b>	<b>\$64,030,319</b>	<b>-9.00%</b>	<b>(\$6,110,436)</b>
	(ekWh)		(ekWh)

### Variance Considerations

#### Weather

There was extremely cold weather in FY2020 relative to historical averages. This resulted in higher a natural gas consumption than budgeted by EPL.

Compared to the most recent four winters, FY2020 saw approximately 9% higher heating degree hours. The worst cold snap took place in February 2020, which saw 39% more heating degree hours than average. As a result, buildings were required to operate on longer schedules to maintain comfort, and gas and electricity consumption was higher than budgeted.

#### Natural Gas Prices

Through FY2020, natural gas prices remained depressed and slightly lower than the historical average, resulting in gas rates 12.8% less than budgeted (total variance of **\$49,161**).

#### Carbon Tax

Following Alberta's provincial elections in May 2019, the UCP government repealed Alberta's Carbon Levy. As a result, MacEwan University is no longer paying \$1.51/GJ/ (\$30.tonne CO2) for natural gas consumption.

### Energy Reduction Achievements

Energy efficiency projects have been identified and implemented by the Maintenance and Facilities teams since 2016. Through FY2019, savings from a number of these projects have been realized, which in turn have helped avoid electricity and natural gas consumption and costs. Some of these initiatives include:

- LED retrofits of interior and exterior fixtures
- Building Automated System optimization projects with CopperTree
- Boiler control retrofits to optimize equipment runtimes
- Tenant engagement to incorporate energy considerations into departmental purchases

As a result of these variables, CCC incurred a FY2019 utility variance of **\$146, 716** below budget

### Benchmarking Program

MacEwan University has been participating in the City of Edmonton's Building Energy Benchmarking Program since 2017. This program was developed to encourage energy and Greenhouse gas reductions in buildings throughout Edmonton. In the first year of this Benchmarking Program, the Robbins Health and Learning Centre achieved first place for the energy reduction in a mixed-use property (3.8% reduction in year-over-year energy use). In the second year of the program (2019) the Student Residence Building in the City Centre Campus achieved the Best Overall Energy Performance award, which is given to the participant with the lowest energy use intensity for that year.

### Corporate Climate Leaders Program

MacEwan is a founding member of the City of Edmonton's Corporate Climate Leadership program which helps large organizations in Edmonton take action on climate change through active greenhouse gas management across their operations. MacEwan actively engaged with the program sharing best practices and learning from other energy efficiency leaders. As a participant of the program, MacEwan publicly shares our corporate GHG inventory as well as progress towards reducing emissions on campus.

### Energy Performance Indicators

Normalized Energy Use Intensity: Whole Campus – Electricity and Gas Separated			
Fiscal Year (July 1 to June 30)	Electricity NEUI (ekWh/sqm/year)	Natural Gas NEUI (ekWh/sqm/year)	Boundary Notes
2016	155.1	220.4	CFAC included in boundary;
2017	140.4	227.7	Allard Hall not yet built.
2018	130.2	215.3	Allard Hall included in
2019	134.9	225.0	boundary; CFAC sold and not included.
<b>2020</b>	*	*	

## University Earns STARS Silver Rating

The Sustainability Tracking Assessment and Rating System (STARS) is a transparent, self-reporting framework for universities to measure their sustainability performance, which is administered by the Association for the Advancement of Sustainability in Higher Education. MacEwan University has once again received a Silver Rating for STARS. This system has rigorous standards and is recognized globally, making this a great achievement for the University.

## Emission Report

This report presents energy and greenhouse gas (GHG) emissions for MacEwan University for Fiscal Year 2020 (July 1, 2019 through June 30, 2020) vs. previous years as per the GHG Protocol<sup>1</sup>.

Additionally, results are reported on a weather-normalized intensity-basis to better reflect the performance of the buildings considering changing weather and new building developments.

Absolute GHG emissions were 4.3% lower in FY 2020 than FY 2014.

Scope / Source	Emissions (tCO <sub>2e</sub> )			2020 vs. 2014 Increase (+) / Decrease (-)	
	FY 2014	FY 2019	FY 2020	Absolute	%
Scope 1 - Natural Gas, Fleet Fuel, Diesel Fuel	8,041	8,411	8,053	12	0.2%
Scope 2 - Electricity	15,618	16,201	14,596	-1,023	-6.5%
<b>Total</b>	<b>23,659</b>	<b>24,612</b>	<b>22,649</b>	<b>-1,010</b>	<b>-4.3%</b>

## Weather-normalized GHG Intensity from Energy Use

After accounting for differences in weather and the growth of campus with the development of SAMU and Allard Hall, normalized emissions intensity from energy use was 22.4% lower in 2020 vs. 2014.

Year	GFA (m <sup>2</sup> )	Energy Intensity (ekWh/m <sup>2</sup> )	Emissions Intensity (tCO <sub>2e</sub> /m <sup>2</sup> )
FY 2014 actual	153,743	438.32	0.1535
Changes in weather	-	-15.30	-0.0041
FY 2014 normalized	153,743	423.01	0.1494
FY 2020	194,899	337.72	0.1159
FY 2020 vs. FY 2014 norm:	41,155	-85.29	-0.0335
<b>Percent Change:</b>	<b>26.8%</b>	<b>-20.2%</b>	<b>-22.4%</b>



The following buildings are included in the organizational boundaries of this report:

Building Name	Address	GFA (ft <sup>2</sup> )	GFA (m <sup>2</sup> )	Type
Alberta College Campus	Alberta College (10050 MacDonald Drive)	150,569	13,988	multi-use
Allard Hall	Allard Hall (11110 104 Avenue)	387,021	35,955	multi-use
Christenson Family Centre	Christenson Bldg (10700 104 Avenue)	107,904	10,025	multi-use
City Centre Campus - 105 Street	105 Street Bldg (10700 104 Avenue)	160,388	14,900	multi-use
City Centre Campus - 106 Street	106 Street Bldg (10700 104 Avenue)	252,325	23,442	multi-use
City Centre Campus - 107 Street	107 Street Bldg (10700 104 Avenue)	289,510	26,896	multi-use
Robbins Health Learning Centre	Robbins Bldg (10910 104 Avenue)	267,024	24,807	multi-use
SAMU	SAMU (10850 104 AVE NW)	55,973	5,200	multi-use
Student Residence Building	Student Residence (11050 104 Avenue)	354,156	32,902	multi-use
University Service Centre	USC (10930 104 Avenue)	73,019	6,784	multi-use

The reduction in emissions was the result of decreased electricity use throughout the year, with additional large reductions due to four months of pandemic operations.