



→ Building on Sustainability

2020 National Green Building Report – Technical Report

> Building Photo: 980 Howe – 980 Howe Street, Vancouver, BC. Managed by Manulife Real Estate. BOMA BEST Platinum

Another Strong Year

Welcome to the 2020 BOMA BEST National Green Building Report!

This report explores the results of all 549 buildings certified between April 1, 2018 and March 31, 2019 ("2018 Certifications") across BOMA's nine regions: British Columbia; Alberta; Saskatchewan; Manitoba; Ontario; Quebec; Nova Scotia, New Brunswick & P.E.I.; Newfoundland & Labrador; and The Territories.



↑ Park Place Shopping Centre, 501-1 Avenue S., Lethbridge, AB, Managed by Primaris Management Inc., BOMA BEST Platinum

← Canada Square, 2200 Yonge Street, Toronto, ON Managed by Oxford Properties Group BOMA BEST Gold

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This report was prepared with assistance from Purpose Building Inc.



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Active Certifications

BOMA BEST Sustainable Buildings is North America's most widely used environmental assessment and certification program.

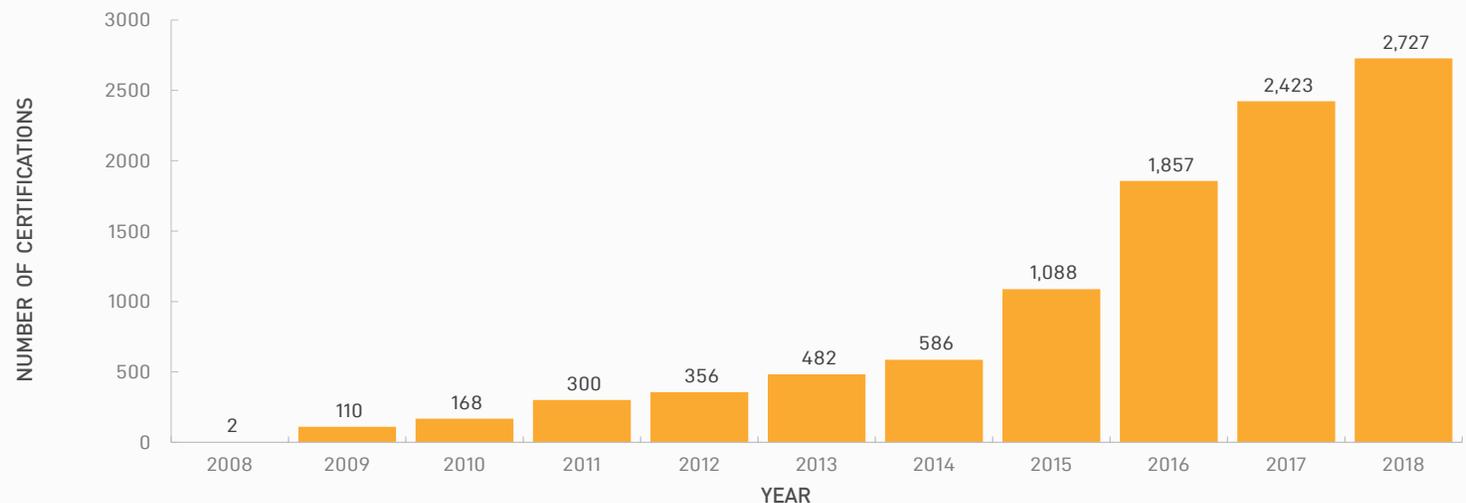
Did you know?

BOMA BEST has two administrative streams. In the Single Stream, a certification remains valid, or active, for three (3) years from the day it was achieved. In the Portfolio Stream, a certification is continuously valid (does not expire), provided the buildings in the Portfolio are successfully verified each year.

Unless otherwise stated, the values reported in this section encompass all five levels of certification: *Platinum, Gold, Silver, Bronze, and Certified*.

Figure 1

Number of Active Certifications – All Levels



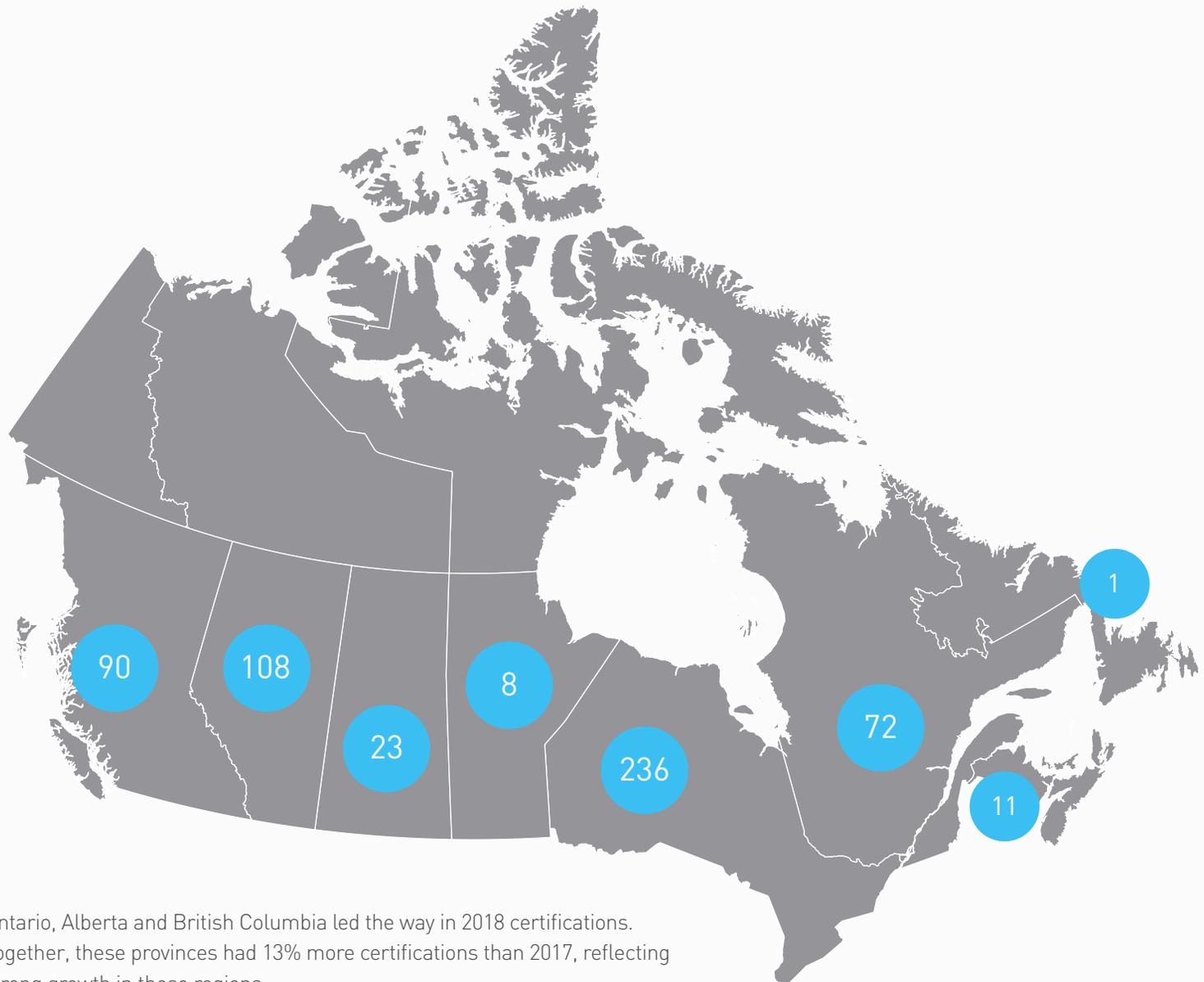


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Figure 2

Number of 2018 Certifications by Region – All Levels



Ontario, Alberta and British Columbia led the way in 2018 certifications. Together, these provinces had 13% more certifications than 2017, reflecting strong growth in these regions.





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Table 1 shows the number of certifications obtained through each administrative stream in 2018: *Direct Verification and Inherited from Portfolio*.

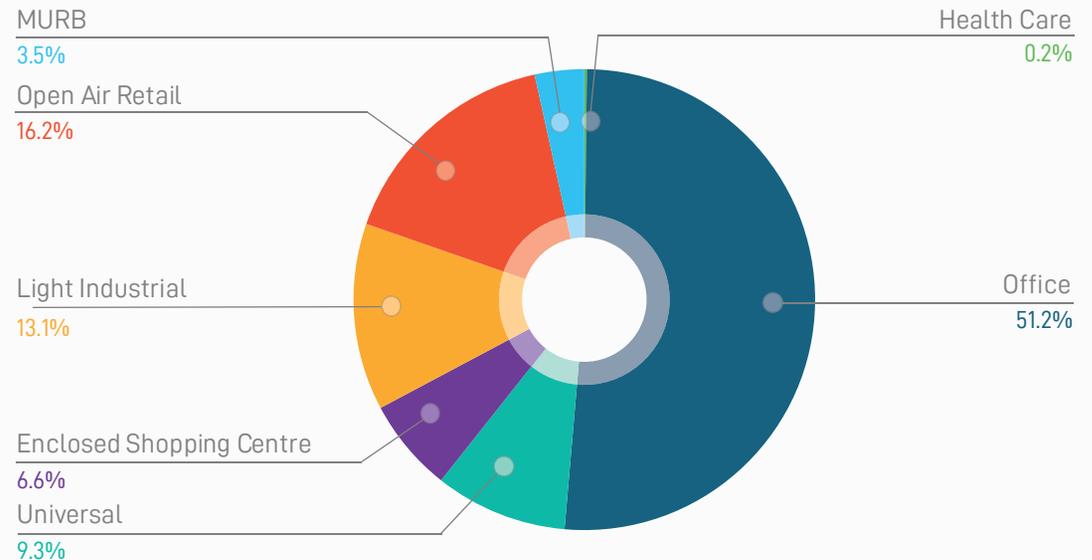
- Direct Verification represents all buildings certified that received verification in 2018, either through the Single Stream or because they were part of the 20% of all portfolio stream buildings verified in a given year.
- Inherited from Portfolio represents all buildings that were not directly verified in 2018 but received certification as part of the wider portfolio, as per Portfolio Stream policy.

Table 1
Number of 2018 Certifications by Stream – All Levels

CERTIFICATION STREAM	NUMBER OF CERTIFICATIONS
Direct Verification	365
Inherited from Portfolio	184
TOTAL 2018 CERTIFICATIONS	549

Figure 3
Distribution of 2018 Certifications by Property Type

This figure shows the distribution of 2018 certifications across seven property types: Office, Universal, Enclosed Shopping Centre, Light Industrial, Open Air Retail, Multi-Unit Residential Building (MURB), and Health Care. The Universal property type covers a wide range of space usage that is not included in the other types.





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The number of 2018 certifications by property type and certification level are shown in **Table 2**.

Table 2

Number of 2018 Certifications by Property Type and Level

	PLATINUM	GOLD	SILVER	BRONZE	CERTIFIED	TOTAL
Office	16	45	123	22	75	281
Universal	1	6	20	15	9	51
Enclosed Shopping Centre	5	12	10	3	6	36
Light Industrial		8	17	5	42	72
Open Air Retail	1	4	21	5	58	89
Multi-Unit Residential Building		3	2	1	13	19
Health Care			1			1
GRAND TOTAL	23	78	194	51	203	549



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Scores & Performance

DATA SET

The analysis that follows is based on a dataset filtered to exclude certain buildings, such as *Certified* level buildings; see the Methodology section for more detail on inclusion criteria.

Table 3 outlines the number of buildings in each region and property type that were included in the performance analysis.

Table 3

Number of Buildings Included in the Performance Analysis, by Region and Property Type

PROVINCE	OFFICE	UNIVERSAL	ENCLOSED SHOPPING CENTER	LIGHT INDUSTRY & OPEN AIR RETAIL	GRAND TOTAL
British Columbia	20	6	3	17	46
Alberta	27	1	2	14	44
Saskatchewan	9	8			17
Manitoba	5	1			6
Ontario	87	4	13	11	115
Quebec	25	2	10	8	45
Nova Scotia, New Brunswick & P.E.I.	2	2			4
Newfoundland & Labrador	1				1
The Territories					
GRAND TOTAL	176	24	28	50	278





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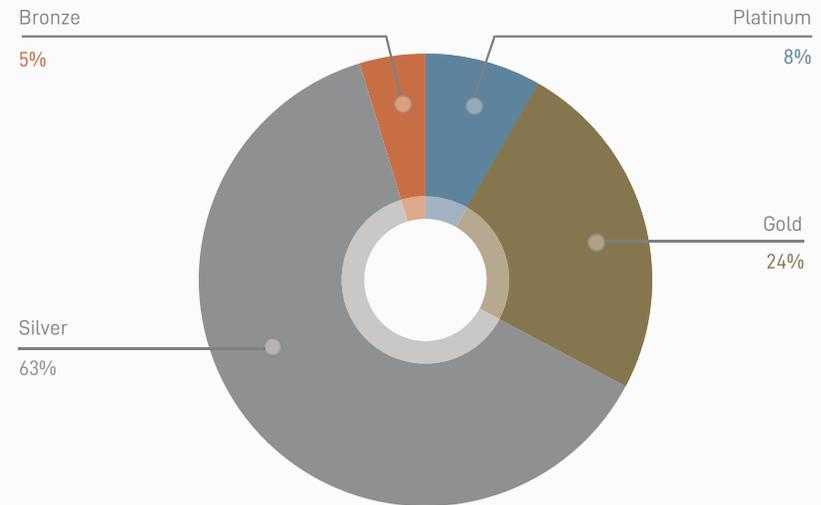


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The distribution of certification levels achieved for buildings that were included in the performance analysis is shown in Figure 4.

Figure 4

Distribution of Certification Level Achieved for Buildings Included in Performance Analysis



RECERTIFICATION

When a building's performance changes during recertification, the certification level can also change.

Figure 5

Percentage Change in Level of Certification Achieved at Recertification

This figure shows the distribution of buildings that saw a change (or lack thereof) in certification level at recertification. The percentages presented are the portions of each respective level after recertification. For example, 66.7% of 2018 *Platinum* buildings were increases from previously lower certification levels; 33.3% did not change the certification level (they were previously *Platinum* certified).





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Table 4 specifically shows the improvement of *Certified* level buildings. Upon recertification, 84.6% of buildings that had previously achieved a *Certified* level were now obtaining a *Silver* level of certification.

Table 4

Improvement at Recertification of Previously Certified Level Buildings

LEVEL AT RECERTIFICATION	NUMBER OF BUILDINGS	PERCENTAGE
Platinum	1	2.6%
Gold	3	7.7%
Silver	33	84.6%
Bronze	2	5.1%

WATER USE INTENSITY

Table 5 compares the implementation rate of common water-efficient technologies in 2018 between properties at the *Platinum* level and other certification levels.

Table 5

Water-Efficient Technology Implementation Rate between Platinum and Other Certification Levels

	DRIP OR ROOT-FED IRRIGATION	IRRIGATION MOISTURE SENSORS	HIGH-EFFICIENCY TOILETS	HIGH-EFFICIENCY URINALS	HIGH-EFFICIENCY LAVATORY OR KITCHEN FAUCETS
			4.8 Litres per flush or less	1.9 Litres per flush or less	5.7 Litres per minute or less
Platinum	68%	55%	61%	91%	96%
Other Levels	24%	21%	22%	29%	47%



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Table 6 compares the implementation rate of common water-efficient fixtures in 2018.

Table 6

Water-Efficient Fixtures Implementation Rate

	HIGH-EFFICIENCY TOILETS	HIGH-EFFICIENCY URINALS	HIGH-EFFICIENCY LAVATORY OR KITCHEN FAUCETS	AVERAGE PERCENTAGE OF IMPLEMENTATION
	4.8 Litres per flush or less	1.9 Litres per flush or less	5.7 Litres per minute or less	
Implemented (Number of Buildings)	69	95	142	37%
Not Implemented (Number of Buildings)	209	183	136	63%

WASTE PERFORMANCE

Several diversion programs are implemented to reduce the amount of waste generated and to divert waste from landfill and incineration disposal streams.

Table 7 outlines the implementation rate of popular diversion programs. Diversion programs adopted by over 80% are indicated in green; diversion programs adopted by under 35% are indicated in orange.

Table 7

Popularity of Diversion Programs – All Asset Types

DIVERSION PROGRAMS	NUMBER OF BUILDINGS	PERCENTAGE OF BUILDINGS
Ballasts and fluorescent tubes	237	85%
Electronics	230	83%
Batteries	228	82%
Food waste diversion	175	63%

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Table 7 (Continued)

Popularity of Diversion Programs – All Asset Types

DIVERSION PROGRAMS	NUMBER OF BUILDINGS	PERCENTAGE OF BUILDINGS
Toner cartridges	167	60%
Scrap metal	165	59%
Removable carpet tiles	158	57%
Organic food material for composting	158	57%
Wood	144	52%
Furniture	130	47%
Low-grade paper	126	45%
Grease/cooking oil	119	43%
Take back programs	104	37%
Reusable china and utensils	97	35%
Coffee cups	96	35%
Paper accountability system	95	34%
Bulk dispensers	94	34%
Packaging reduction	86	31%
Merchandise bulk packaging (shrink wrap, Styrofoam)	61	22%
Coffee pods	53	19%



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Waste Diversion Rate measures the proportion of the waste generated that was diverted from disposal streams (such as landfill).

Table 8 summarizes the waste diversion rate for each property type and certification level. Of the responses received, 22% (60) buildings of all property types achieved 70% or better diversion rate, 56% (99) Office buildings achieved 50% or better, and 26% (6) of *Platinum* level buildings achieved 80% or better. The building which reported the highest diversion rate, at 90%, implemented 17 diversion programs.

Table 8

Waste Diversion Rate by Property Type and Certification Level

	NUMBER OF BUILDINGS			TOTAL NUMBER
	Waste Diversion Rate Above 50%	Waste Diversion Rate Above 70%	Waste Diversion Rate Above 80%	
Office Buildings	99	36	16	176
All Asset Types	148	60	30	278
Platinum – All Asset Types	21	10	6	23

Table 9 shows the number of diversion practices implemented by buildings. Out of 278 buildings, 88% (244) buildings implemented 6 or more diversion practices.

Table 9

Number of Buildings Implementing Diversion Practices – All Property Types

	NUMBER OF BUILDINGS	PERCENTAGE OF BUILDINGS
< 6 diversion practices	34	12%
6+ diversion practices	244	88%



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Table 10 shows the proportion of buildings with known final disposition/destination information for waste at each certification level. 70% of BOMA BEST *Gold* and *Platinum* buildings demonstrate accountability by tracking materials to their final destination. The majority of *Silver* certified properties in 2018 had diversion rates of less than 50%.

Table 10

Percentage of Buildings with Known Final Disposition for Waste – All Property Types

	NUMBER OF BUILDINGS WITH KNOWN FINAL DISPOSITION FOR WASTE	TOTAL NUMBER OF BUILDINGS	RESPONSE RATE (%)
Platinum	18	23	78%
Gold	49	68	72%
Silver	61	174	35%



RESILIENCE

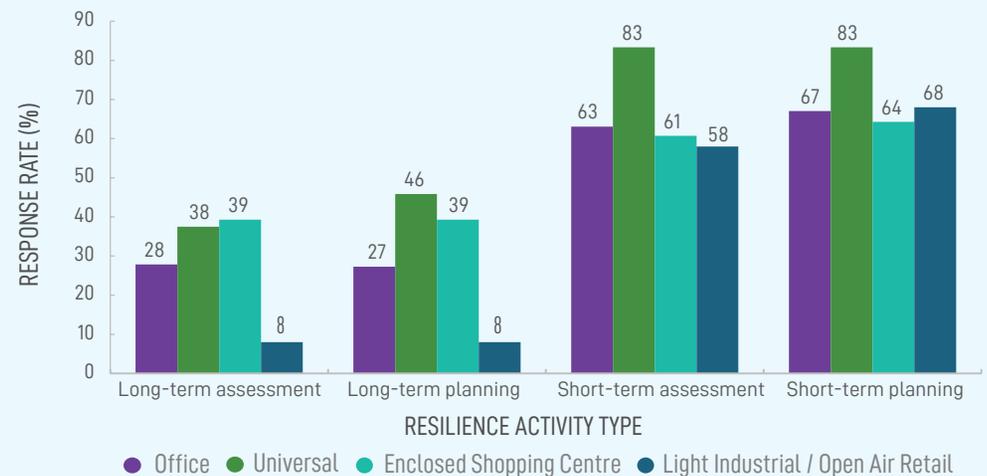


Resilience performance is measured by the resilience activities in place at a property: a long-term climate change risk assessment, an adaptation plan based on assessed long-term climate risks, a short-term hazard assessment, and a plan to safeguard against potential short-term hazards.

Figure 6

Resilience Performance by Property Type and Activity Type

This figure shows the proportion of building owners and managers, sorted by property type, who reported completing each resilience activity.





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Compared to 2017, when the resilience performance measurements were first introduced, more properties completed resilience assessments and planning in 2018.

Figure 7

Resilience Performance Comparison with 2017

This figure compares 2017 versus 2018 response rate to the completion of long-term and short-term assessments and planning.



Peak load shedding and *stormwater management* are two strategies available to improve resilience against long-term climate risks.

Table 11 shows the number and percentage of buildings within each property type at which these strategies were implemented in 2018.

Table 11

Implementation of Resilience Improvement Strategies by Property Type

	PEAK LOAD SHEDDING		STORMWATER MANAGEMENT	
	NUMBER OF BUILDINGS	PERCENTAGE	NUMBER OF BUILDINGS	PERCENTAGE
Office	56	32%	25	14%
Universal	5	21%	4	17%
Shopping Centre	18	64%	10	35%
Light Industrial & Open Air Retail	0	0%	14	28%



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Figure 8

Resilience Performance by Certification Level and Activity Type – Office

This figure shows the proportion of Office building owners and managers, by level of certification, who reported completing each resilience activity.

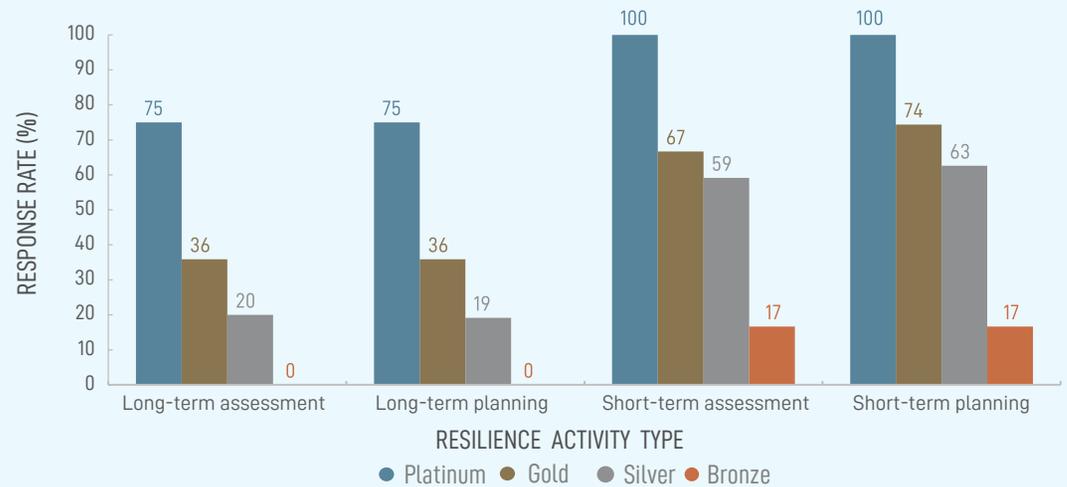
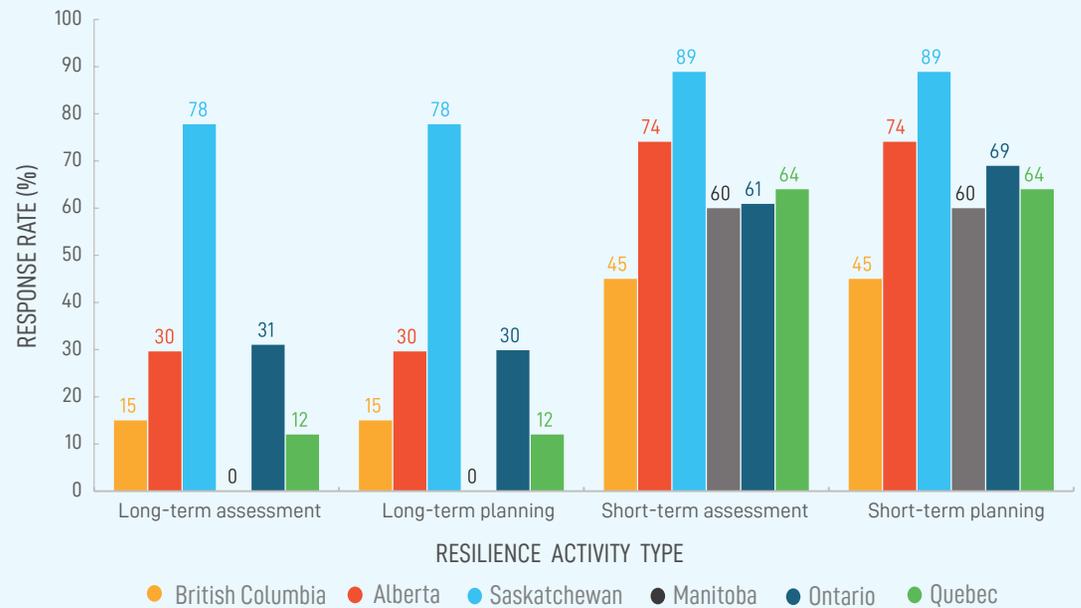


Figure 9

Resilience Performance by Region and Activity Type – Office

This figure shows the proportion of Office building owners and managers, by region, who reported completing each resilience activity.





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HEALTHY BUILDINGS

Healthy buildings are measured by property comfort level and overall human experience.

Table 12 shows the number of buildings, by property type, in which four healthy building features were implemented: *biophilic features*, *exceedance of ASHRAE ventilation rates*, *secure bicycle racks*, and *completion of background sound level assessment*.

Table 12

Implementation of Healthy Building Features by Property Type

	BIOPHILIC FEATURES	EXCEEDANCE ASHRAE VENTILATION RATES	SECURE BICYCLE RACKS	BACKGROUND SOUND LEVEL ASSESSMENT
Number of Buildings Implementing Features	48	46	100	27
Total Number of Buildings	278	278	278	278
	17%	17%	36%	10%





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Performance by property type

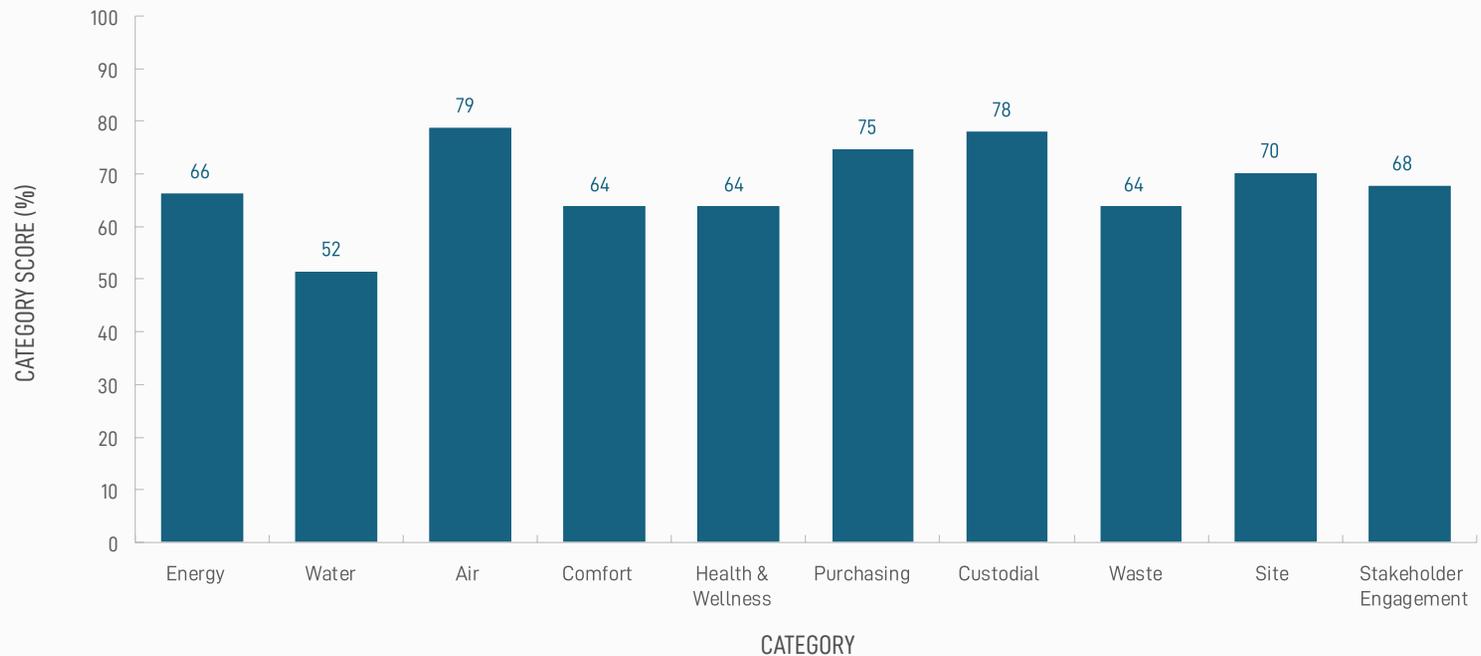
OFFICE BUILDINGS

Category Performance

A score out of 100% is assigned for each of BOMA BEST's ten (10) categories: *Energy, Water, Air, Comfort, Health & Wellness, Purchasing, Custodial, Waste, Site, and Stakeholder Engagement*. The 2018 average category scores for office buildings are summarized in **Figure 10**.

Figure 10

Average Category Scores – Office





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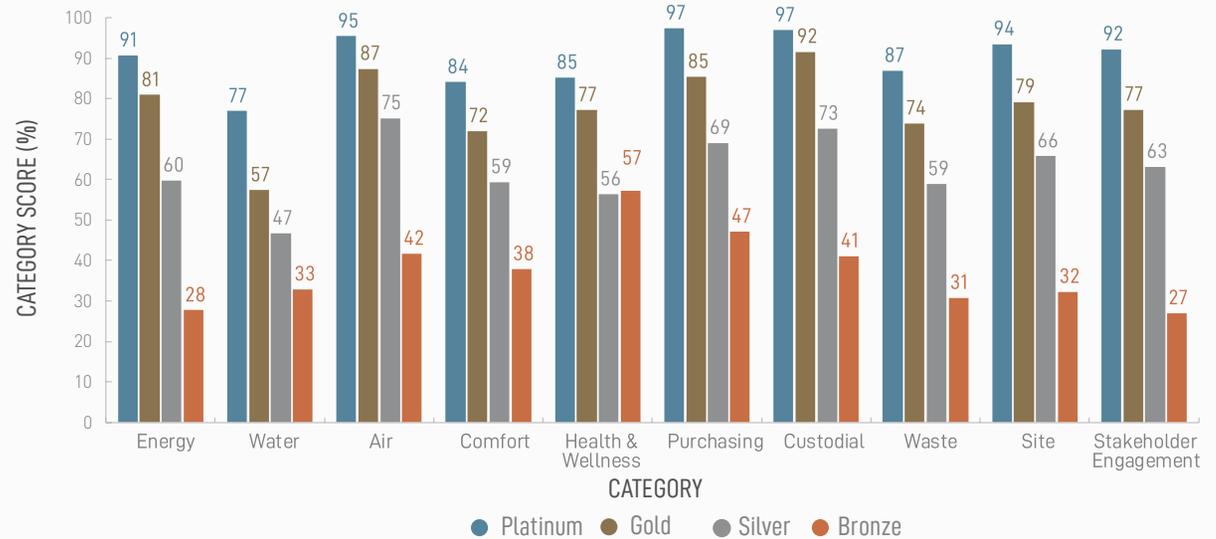


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The average category scores of Office buildings at each certification level are shown in **Figure 11**.

Figure 11

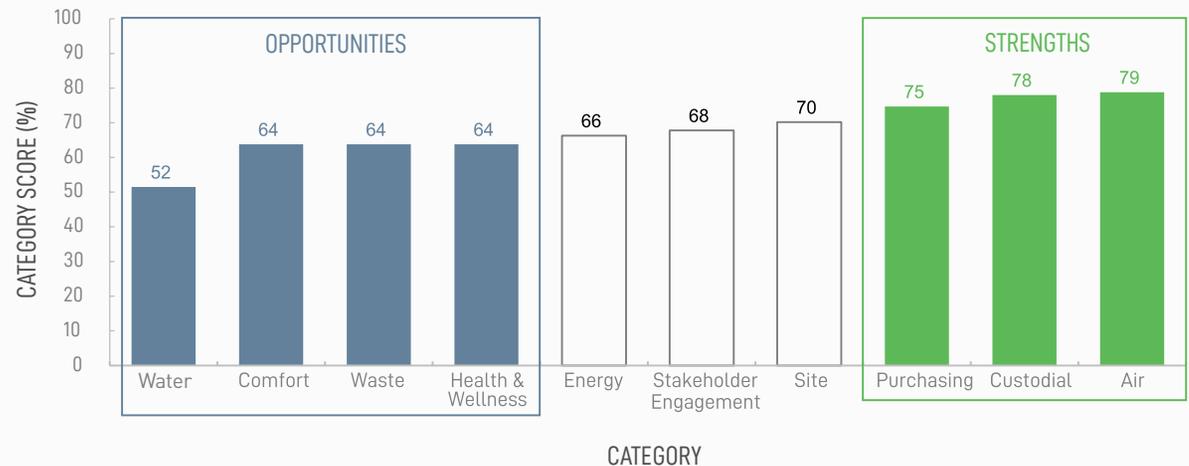
Average Category Scores by Certification Level – Office



Strengths and opportunities identified for the Office property type are summarized in **Figure 12**. Strengths are defined as categories where scores exceed 75%. Opportunities are defined as categories where scores fall short of 65%.

Figure 12

Strength and Opportunities – Office





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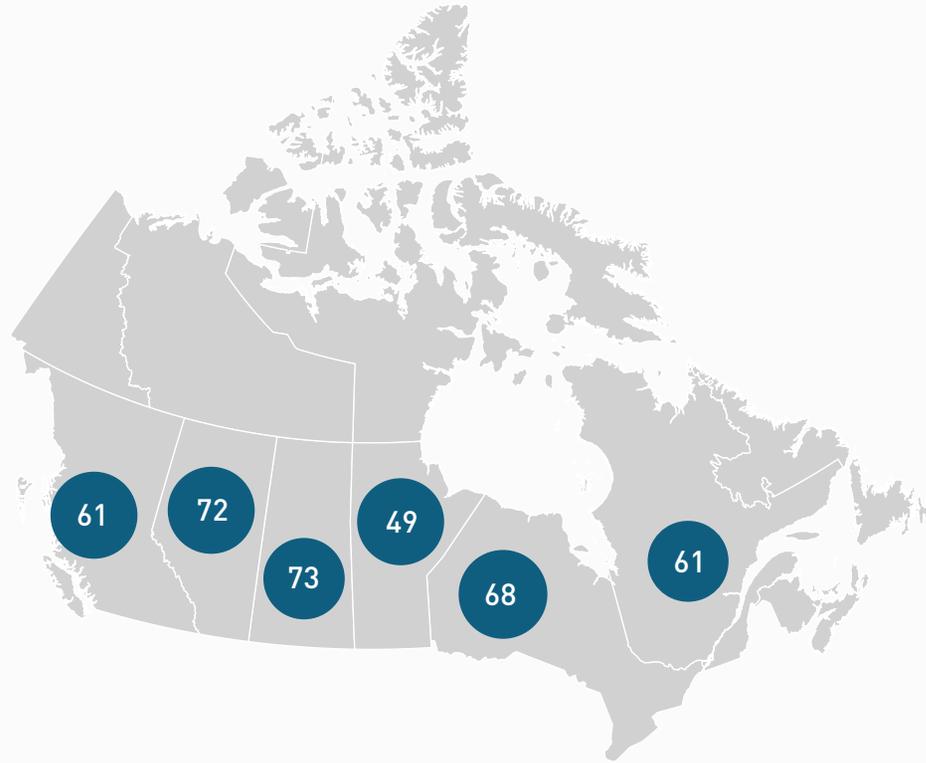


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Figure 13

Energy Category Scores (%) by Region – Office

This figure shows the 2018 Energy category scores of Office buildings in each region.

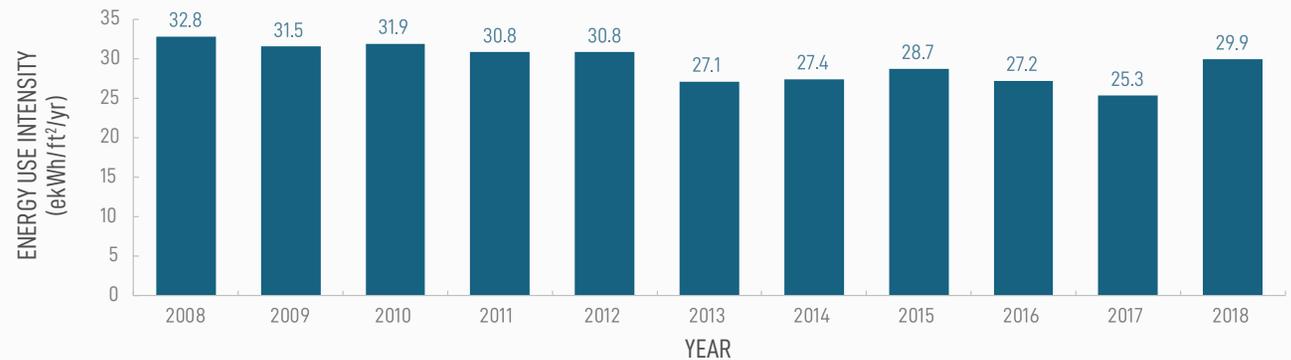


Energy Use Intensity

The annual average energy use intensity (ekWh/ft²/yr) of Office buildings is shown in Figure 14.

Figure 14

Annual Energy Use Intensity – Office





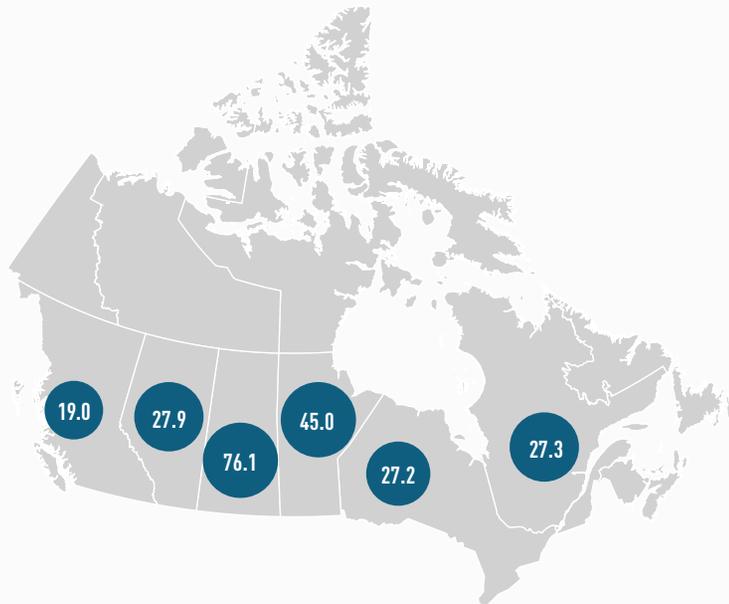
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The average energy use intensity (EUI, kWh/ft²/yr) of Office buildings in each region in 2018 is shown in **Figure 15**. Saskatchewan and Manitoba have a greater EUI than other regions because of a few buildings that have very high energy consumption.

Figure 15

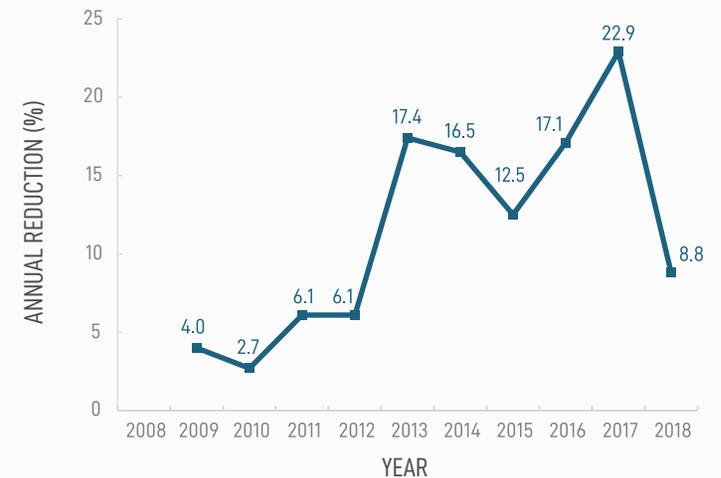
Annual Energy Use Intensity (kWh/ft²/yr) by Region – Office



Compared to the baseline energy use intensity from 2008, the annual percentage reduction in energy use intensity of Office buildings is shown in **Figure 16**.

Figure 16

Annual Percentage Reduction in Energy Use Intensity Compared to 2008 – Office





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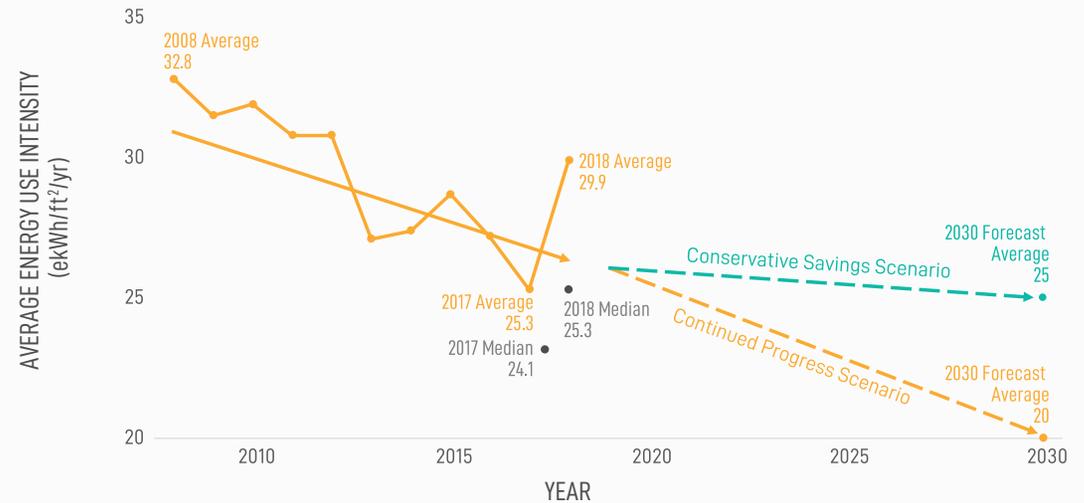


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Figure 17 shows the average energy use intensity and forecast up to 2030. It showcases two potential future scenarios, one in which current progress continues at the same pace as recent progress, and one in which future progress is more conservative.

Figure 17

Average Energy Use Intensity and Forecast – Office



Energy use and cost reduction from the 2018 data and 2030 forecast were compared to 2008 and 2018 baselines, summarized in Table 13 alongside reduction equivalencies.

Table 13

Energy Use and Cost Reduction – Office

*The equivalent barrels of oil and energy saving for homes were calculated using the [Greenhouse Gas Equivalencies Calculator](#) published by Natural Resources Canada

	COMPARED TO 2008				COMPARED TO 2018		
	ENERGY USE INTENSITY (ekWh/ft²/yr)	ENERGY USE INTENSITY REDUCTION (ekWh/ft²/yr)	PERCENTAGE REDUCTION	REDUCTION EQUIVALENCY	ENERGY COST REDUCTION (\$/ft²/yr)	ENERGY USE INTENSITY PERCENTAGE REDUCTION	ENERGY COST REDUCTION (\$/ft²/yr)
2008	32.8	–	–	–	–	–	–
2018	29.9	2.9	9%	Enough to save 70,000 barrels of oil;	–	–	–
2030	20.0	12.8	39%	Equivalent to an average of 1.7% EUI reduction every year	1.0	33%	0.8



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The 2018 average energy use intensity (ekWh/ft²/yr) and corresponding energy score of Office buildings at each certification level are shown in **Figure 18**.

Figure 18

Energy Use Intensity and Energy Score by Certification Level – Office

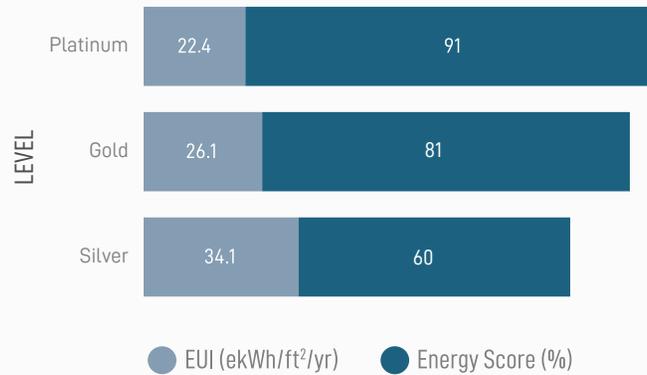
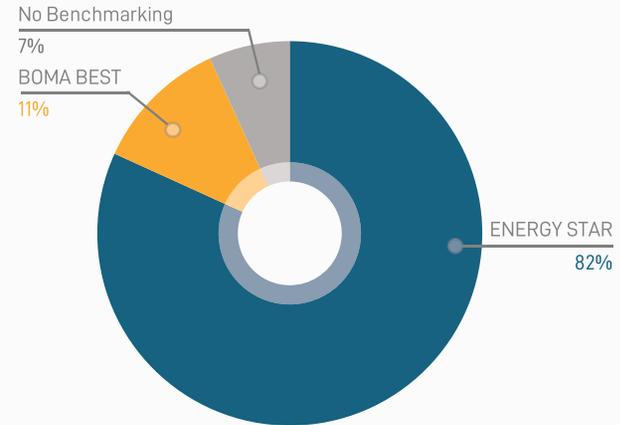


Figure 19 shows the portion of Office buildings that benchmark energy using: BOMA BEST, ENERGY STAR, or has No Benchmarking at all.

Figure 19

Energy Benchmarking Tools Used – Office



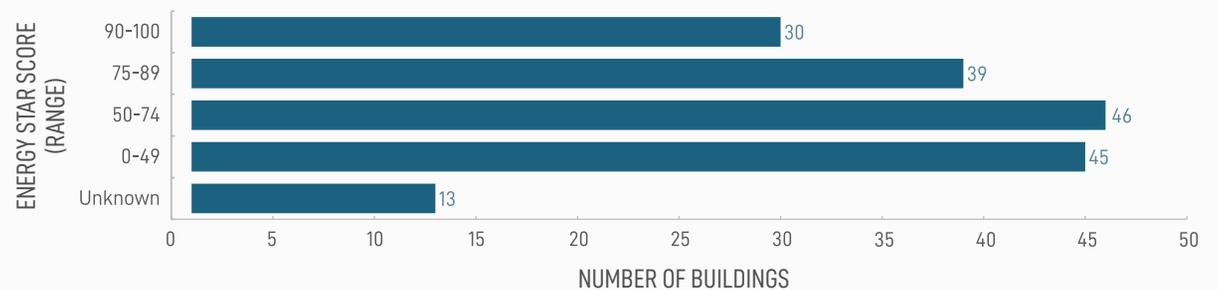
ENERGY STAR Scores

ENERGY STAR has a scoring system that compares the energy consumption of a building to similar buildings across the country. Out of a score of 100, 50 represents median performance, while 75 or more indicates top performance.

The number of Office buildings within each performance range is shown in **Figure 20**.

Figure 20

Distribution of ENERGY STAR Score by Number of Buildings – Office





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Figure 21 shows the 2018 average ENERGY STAR score of office buildings in each region.

Figure 21

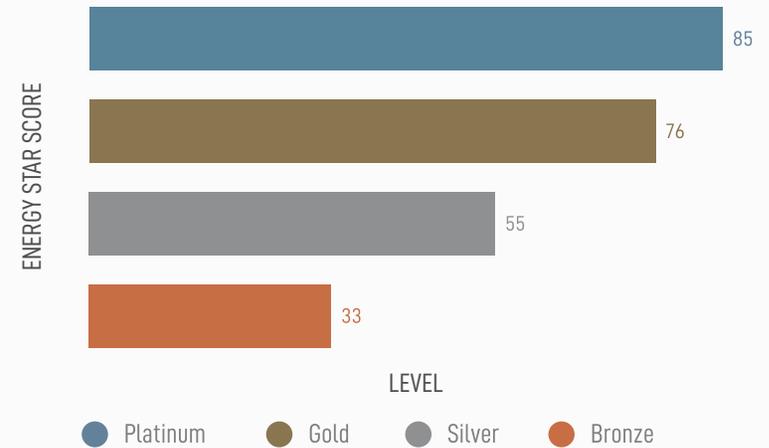
Average ENERGY STAR Score by Region – Office



The 2018 average ENERGY STAR score of Office buildings at each certification level is shown in **Figure 22**.

Figure 22

Average ENERGY STAR Score by Certification Level – Office



Energy Efficiency Features and EUI for Office

The installation of efficient building systems, such as *lighting controls*, *heat recovery*, *high-efficiency boilers*, *ENERGY STAR lighting*, and *VSD pumps and fans*, can yield significant energy savings. The number of buildings and the average energy use intensity where efficient systems are installed (indicated by a “Yes” response) were compared to buildings where these systems are not installed (indicated by a “No” response). The results are shown in **Table 14**. The percentage of energy savings from the installation of these systems are also presented. Refer to the methodology for the description of buildings included in this analysis.



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Table 14

Energy Savings from Efficient Systems

		LIGHTING CONTROLS	HEAT RECOVERY	HIGH-EFFICIENCY BOILERS	ENERGY STAR LIGHTING	VSD PUMPS & FANS
Yes	Number of buildings	71	26	61	67	118
	Average EUI (ekWh/ft ² /yr)	24.9	24.1	25.7	28.6	29.8
No	Number of buildings	70	115	80	74	23
	Average EUI (ekWh/ft ² /yr)	39.9	31.2	32.5	31.1	32.0
PERCENTAGE OF ENERGY SAVINGS		38%	23%	21%	8%	7%

The implementation of certain operation and maintenance strategies, such as *accessible operation manuals*, *equipment scheduling*, and *sharing energy data with tenants*, can yield significant energy savings. The number of buildings and the average energy use intensity where these strategies are implemented (indicated by “Yes”) were compared to buildings where these strategies are not implemented (indicated by “No”). The results are shown in **Table 15**. Energy savings from the implementation of these operations and maintenance strategies are also presented.

Table 15

Energy Savings from Operation and Maintenance Strategies

		ACCESSIBLE OPERATION MANUALS	EQUIPMENT SCHEDULING	ENERGY DATA SHARED WITH TENANTS
Yes	Number of buildings	133	132	14
	Average EUI (ekWh/ft ² /yr)	29.6	29.8	27.2
No	Number of buildings	8	9	127
	Average EUI (ekWh/ft ² /yr)	40.7	33.5	30.5
PERCENTAGE OF ENERGY SAVINGS		27%	11%	11%



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Table 16 shows the combined results of the installation of efficient systems and the implementation of operation and maintenance strategies.

Table 16

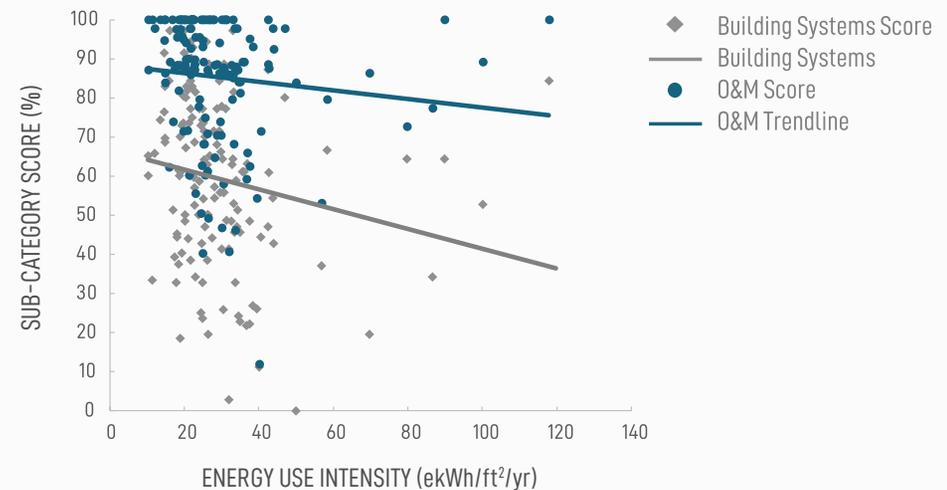
Energy Savings from Efficient Systems and Operation and Maintenance Strategies

	ENERGY USE INTENSITY (ekWh/ft ² /yr)	ENERGY COST (\$/ft ² /yr)	EQUIVALENCY
Properties implementing 6+ strategies	23.1		
Properties implementing < 3 strategies	28.5		
Savings	19%	0.6	\$150,000/yr in utility costs for a 250,000 ft² office building

Figure 23 shows the correlation between energy use intensity (ekWh/ft²/yr) of Office buildings and sub-category scores in Building Systems and Operations & Maintenance. The average sub-category scores in *Building Systems and Operations & Maintenance* achieved by Office buildings at each certification level are shown in Figure 24: a higher sub-category score is correlated with a lower energy use intensity (i.e., a more energy efficient building). However, there are significant variations in energy use intensity (EUI) at the same sub-category score. This means that though improved Building Systems and Operation & Maintenance strategies contribute to improved EUI, there are other factors that also impact energy efficiency (e.g., climate and weather, building operating hours, occupant density, data centres and high intensity space types).

Figure 23

Correlation between Energy Use Intensity and Scores in the Sub-Categories of Building Systems and Operations & Maintenance – Office





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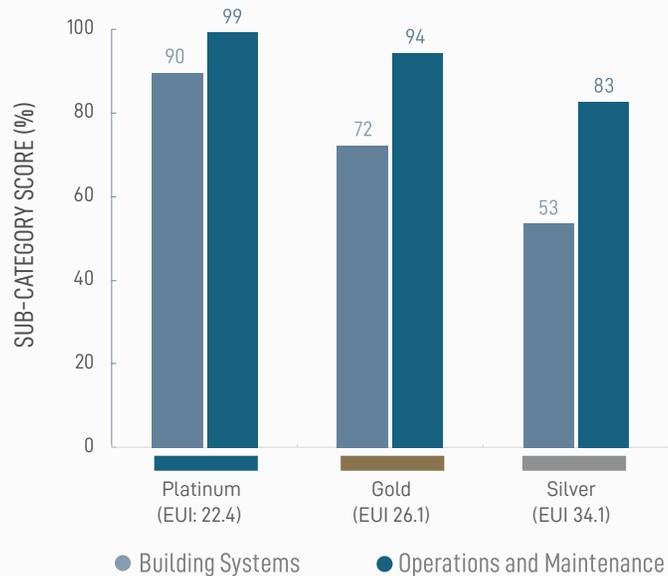
- 1 ACTIVE CERTIFICATIONS
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Figure 24

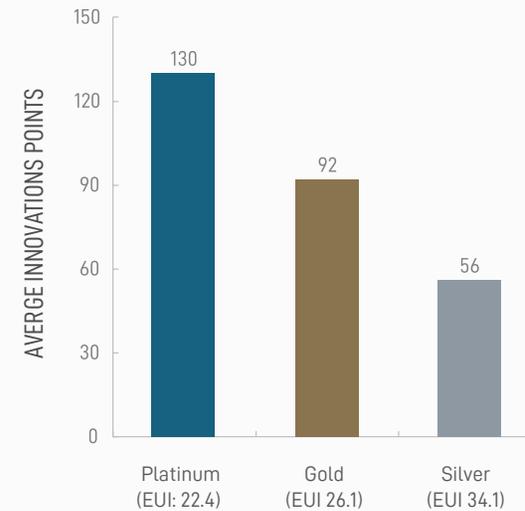
Average Building Systems Score and Operations & Maintenance Score by Level – Office



The average energy innovation points achieved by Office buildings within each certification level is shown in **Figure 25**. The average energy use intensity (ekWh/ft²/yr) of each are included again for reference.

Figure 25

Average of Energy Innovation Points Achieved by Level – Office





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Greenhouse Gas Intensity

The 2018 average greenhouse gas intensity (GHGI, kgCO₂e/ft²) of each certification level is shown in **Figure 26**. GHGI is defined as the equivalent mass of CO₂ emission per floor area, and the averages were calculated for Office buildings in all regions.

Figure 26

Average Greenhouse Gas Intensity by Certification Level for All Regions – Office



Figure 27 shows the average GHGI (kgCO₂e/ft²) and forecast up to 2030. The percentage reductions shown are compared to the 2008 baseline.

Figure 27

Average Greenhouse Gas Intensity and Forecast – Office

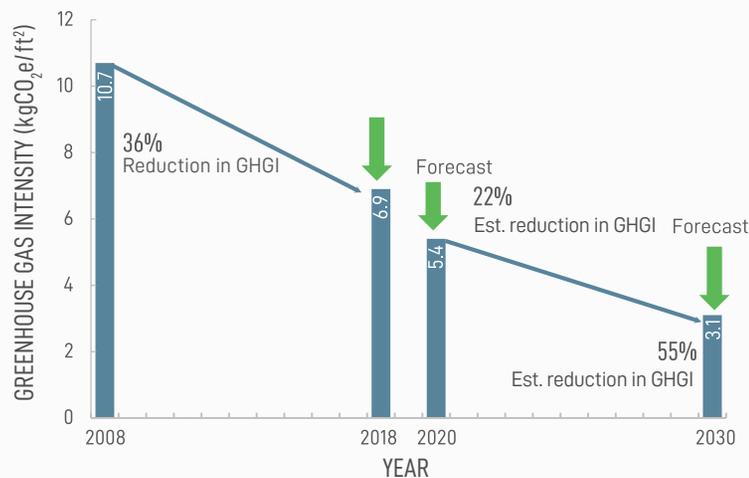
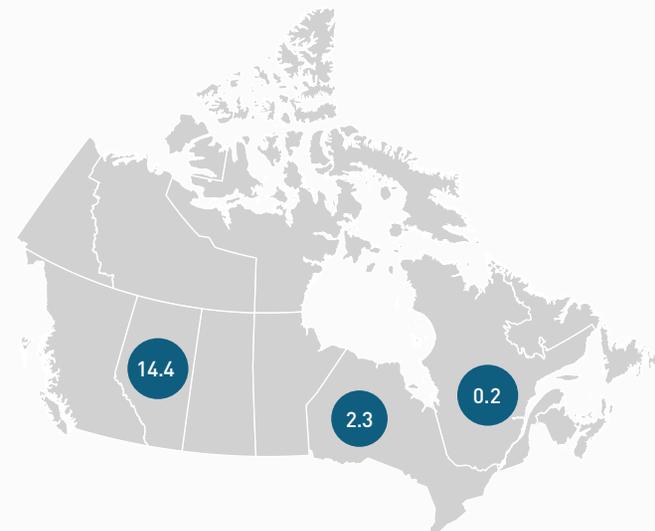


Figure 28 shows the 2018 average GHGI (kgCO₂e/ft²) in each region. Only regions with more than 5 properties that have available GHGI are reported.

Figure 28

Greenhouse Gas Intensity by Region (kgCO₂e/ft²) – Office





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Greenhouse gas intensity reduction from the 2018 data and 2030 forecast were compared to 2008 and 2018, summarized in **Table 17**. Reduction equivalencies are included to provide a reference.

Table 17

Greenhouse Gas Emissions Reduction

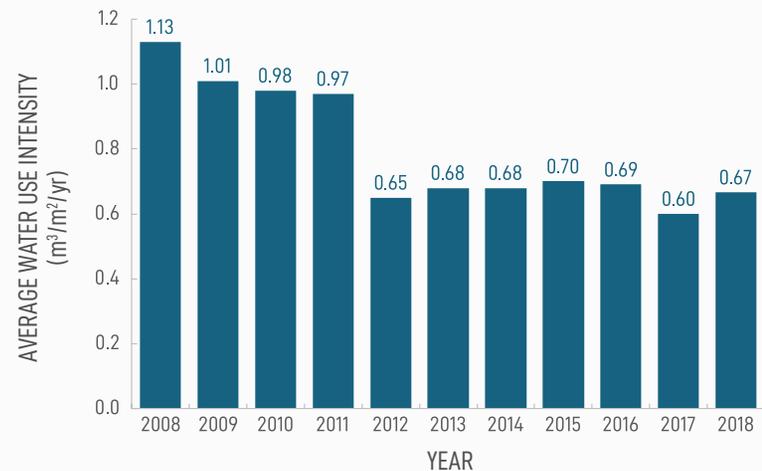
	COMPARED TO 2008			COMPARED TO 2018		
	GREENHOUSE GAS INTENSITY (kgCO ₂ e/ft ² /yr)	GREENHOUSE GAS EMISSION REDUCTION (tonne CO ₂ e/yr)	PERCENTAGE REDUCTION	REDUCTION EQUIVALENCY	PERCENTAGE REDUCTION	REDUCTION EQUIVALENCY
2008	10.7	–	–	–	–	–
2018	6.9	54,000	36%	Taking 16,700 cars off the road; OR planting 900,000 trees	–	–
2030	3.1	–	71%	Taking 33,000 passenger vehicles off the road for one year	55%	Planting 880,000 trees

Water Use Intensity

The annual average water use intensity (m³/m²/yr) of Office buildings is shown in **Figure 29**.

Figure 29

Annual Water Use Intensity – Office





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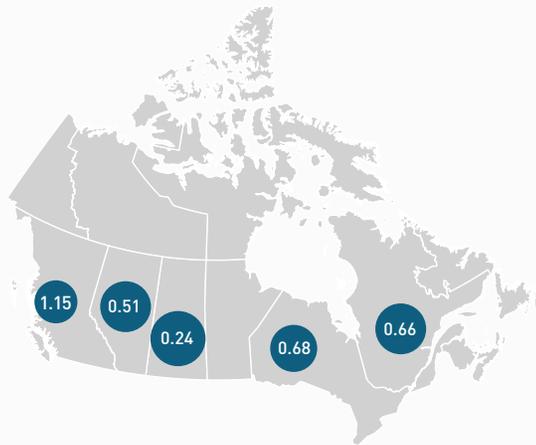


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The average water use intensity (WUI, m³/m²/yr) of Office buildings in each region in 2018 is shown in **Figure 30**. British Columbia has a greater WUI than other regions because of a few buildings that have very high water consumption.

Figure 30

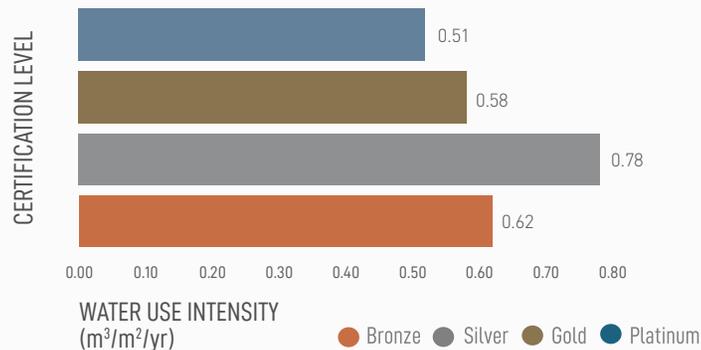
Average Water Use Intensity (m³/m²/yr) by Region – Office



The 2018 average water use intensity (m³/m²/yr) of Office buildings at each certification level are shown in **Figure 32**.

Figure 32

Water Use Intensity by Certification Level – Office



Compared to the baseline water use intensity from 2008, the annual percentage reduction of Office building water use intensity is shown in **Figure 31**.

Figure 31

Annual Percentage Reduction in Water Use Intensity Since 2008 – Office

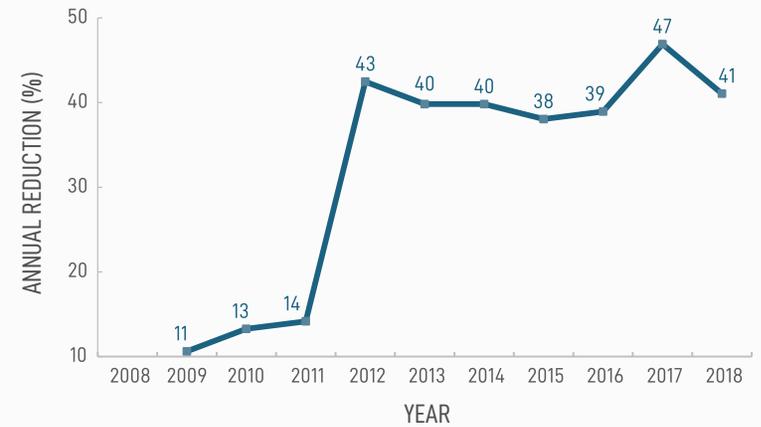
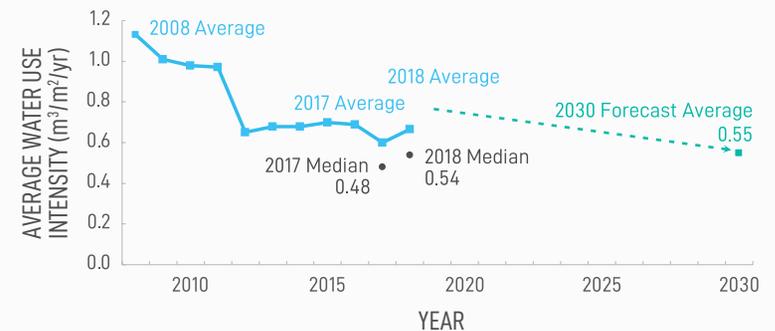


Figure 33 shows the average water use intensity and forecast up to 2030.

Figure 33

Average Water Use Intensity and Forecast – Office





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Water use and cost reduction from the 2018 data and 2030 forecast were compared to 2008 and 2018 baselines, summarized in **Table 18**, alongside reduction equivalencies.

Table 18

Water Use Intensity and Comparison to 2008 and 2018 Baselines

	COMPARED TO 2008				COMPARED TO 2018		
	WATER USE INTENSITY (m ³ /m ² /yr)	WATER USE INTENSITY REDUCTION (m ³ /m ² /yr)	PERCENTAGE REDUCTION	REDUCTION EQUIVALENCY	WATER COST REDUCTION (\$/ft ² /yr)	WATER USE INTENSITY PERCENTAGE REDUCTION	WATER COST REDUCTION (\$/ft ² /yr)
2008	1.13	–	–	–	–	–	–
2018	0.67	0.46	41%	Enough to fill almost 3 billion bottles of water; OR 33% lower than the REALPAC National Average	0.10	–	–
2030	0.55	0.58	51%	Equivalent to 5% reduction each year; OR 730 Olympic sized swimming pools	0.13	18%	0.03

Table 19 compares the water use in 2018 between buildings at the *Platinum* level and other certification levels.

Table 19

Water Use Intensity and Comparison between Platinum and Average

	WATER USE INTENSITY (m ³ /m ² /yr)	WATER USE SAVING	REDUCTION EQUIVALENT
Platinum	0.51	24%	\$8,500 cost saving for a 250,000 ft ² office building
Average	0.67	–	–



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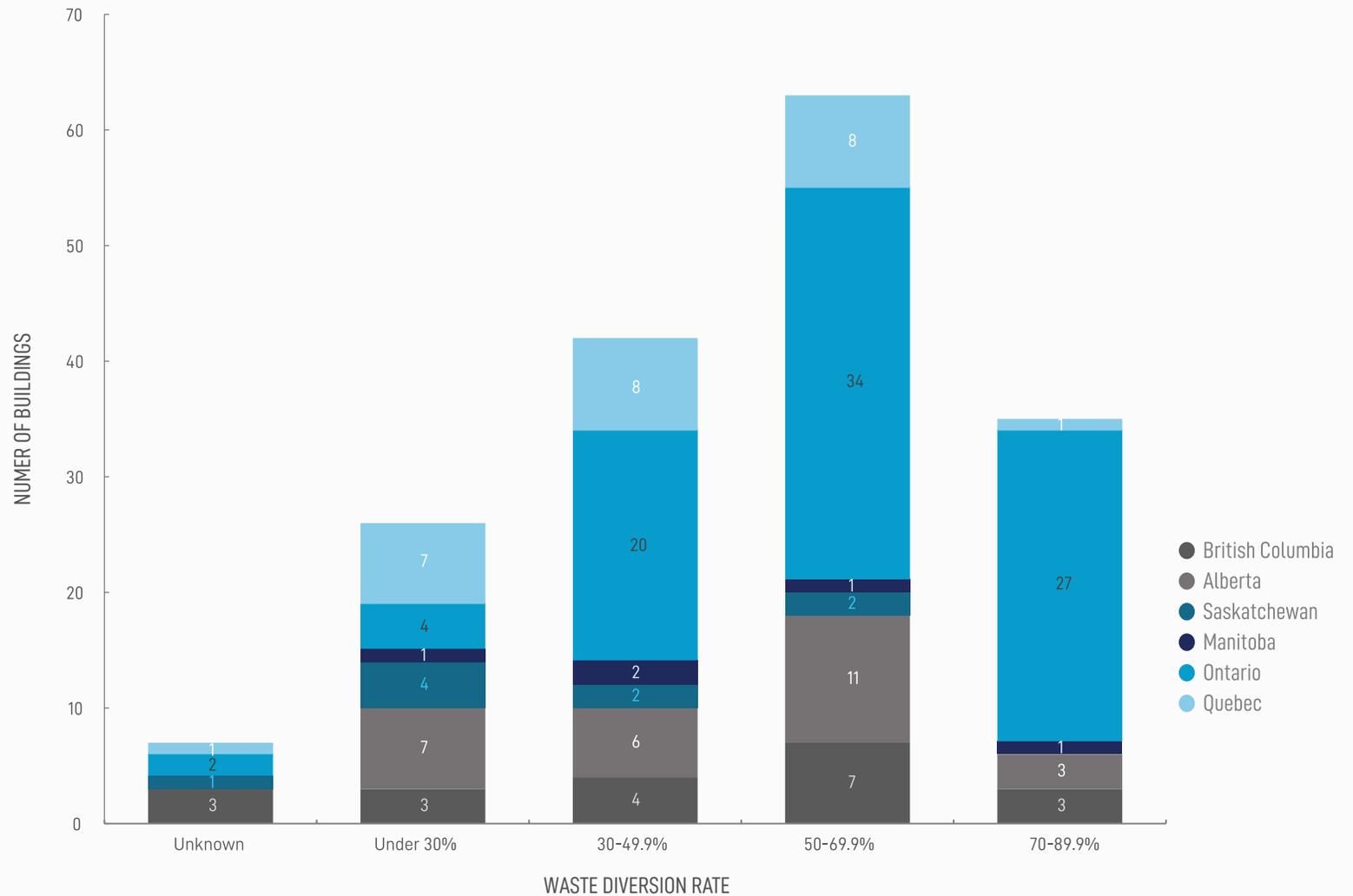
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Waste Performance

The number of Office buildings that achieved each range of diversion rates is shown in **Figure 34**, including the breakdown of number of buildings in each region.

Figure 34

Waste Diversion Rates by Number of Buildings per Region – Office





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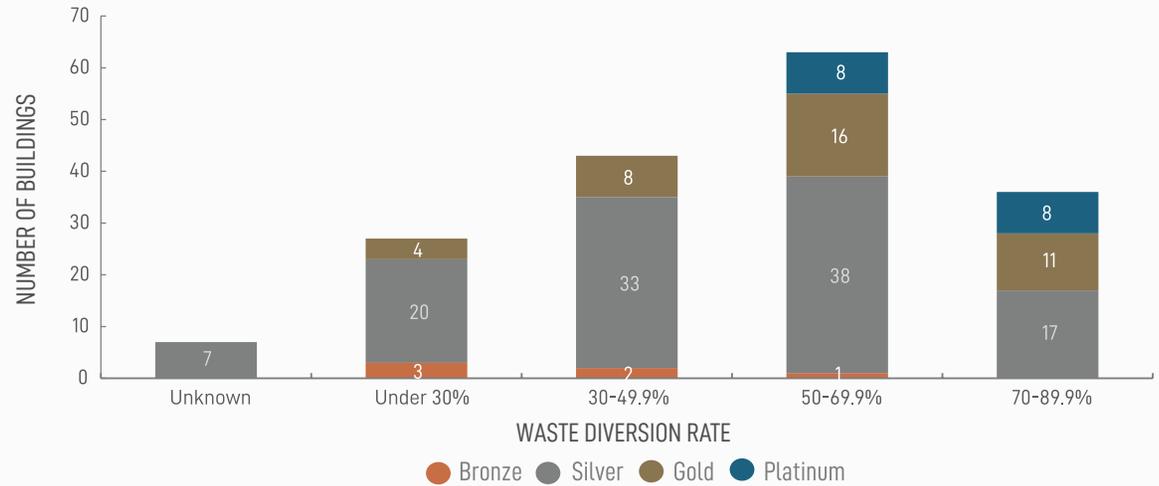


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Figure 35 shows the number of buildings that achieved each range of waste diversion rates, including a breakdown by corresponding certification level.

Figure 35

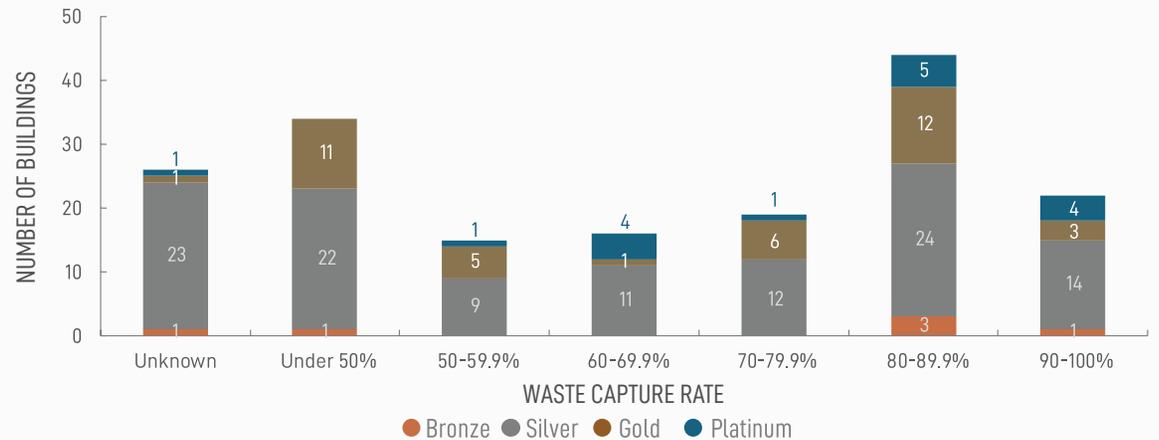
Waste Diversion Rates by Number of Buildings per Certification Level – Office



Waste capture rate measures the effectiveness of diversion programs, in terms of the proportion of waste that was successfully diverted out of all the waste that could be diverted. **Figure 36** shows the number of buildings that achieved each range of waste capture rates, including a breakdown by corresponding certification level.

Figure 36

Waste Capture Rates by Number of Buildings per Certification Level – Office





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Waste diversion programs can include a combination of initiatives to achieve a high diversion rate. **Figure 37** shows the proportion of buildings that adopted waste diversion initiatives, broken down by certification level.

Figure 37

Percentage of Implemented Waste Diversion Initiatives, by Certification Level – Office

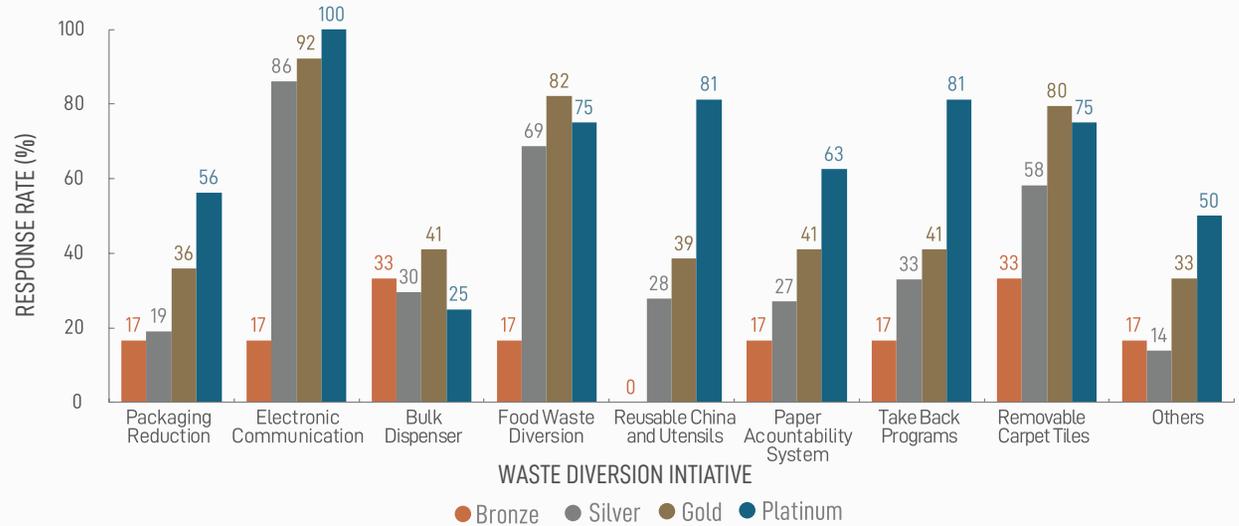
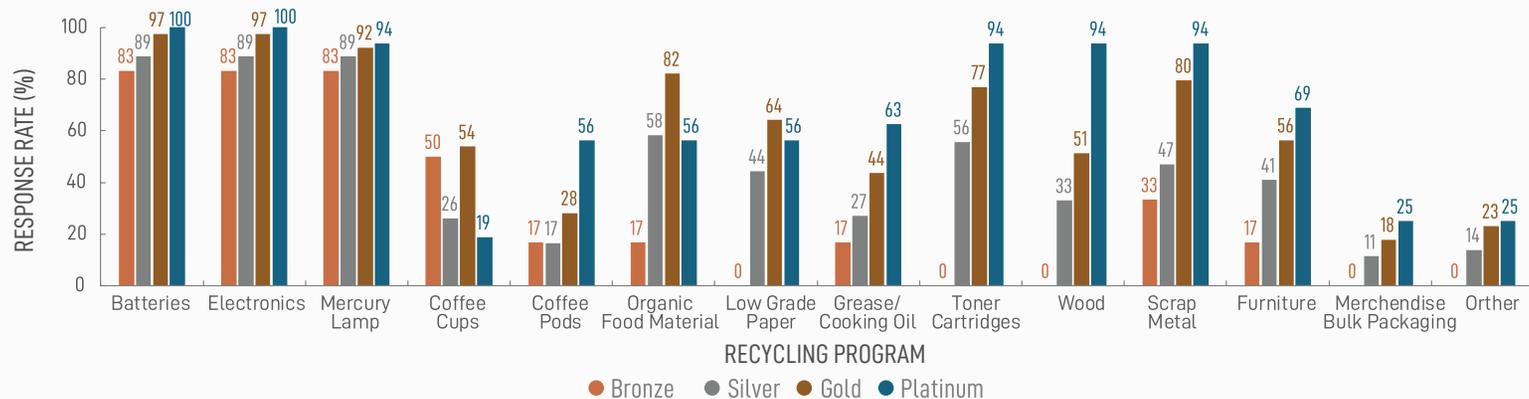


Figure 38 shows the proportion of buildings that implement recycling programs, broken down by certification level.

Figure 38

Percentage of Implemented Recycling Programs by Certification Level – Office





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Table 20 shows the waste diversion rate of Office buildings by region. 16 Office buildings reported a waste diversion rate above 80%. These buildings are located in Ontario (13 properties), Alberta (2 properties), and Manitoba (1 property).

Table 20

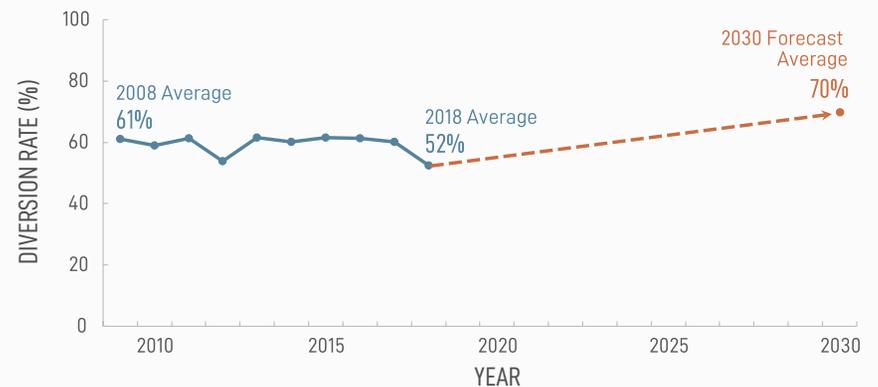
Waste Diversion Rate by Region – Office

REGION	UNKNOWN	UNDER 30%	30-39.9%	40-49.9%	50-59.9%	60-69.9%	70-79.9%	80-89.9%	TOTAL
British Columbia	3	3		4	4	3	3		20
Alberta		7	4	2	6	5	1	2	27
Saskatchewan	1	4	2			2			9
Manitoba		1	1	1	1			1	5
Ontario	2	4	4	16	15	19	14	13	87
Quebec	1	7	3	5	7	1	1		25
Nova Scotia, New Brunswick & P.E.I.				Insufficient Data					
Newfoundland & Labrador				Insufficient Data					
Total	7	26	14	28	33	30	19	16	173

Figure 39 shows the average waste diversion rate and forecast up to 2030. 2018 saw a 9% increase in diversion rates compared to 2008, which means an additional 1.8 million kilograms of waste was diverted. By 2030, 70% of total waste may be diverted, which is equivalent to diverting 1,500 garbage trucks from landfill.

Figure 39

Average Waste Diversion Rate and Forecast – Office





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UNIVERSAL

Category Performance

A score out of 100% is assigned for each of the ten BOMA BEST categories. The 2018 average category scores of Universal buildings are summarized in **Figure 40**.

Figure 40
Average Category Score – Universal



The average category scores of Universal buildings at each certification level are shown in **Figure 41**.

Figure 41
Average Category Score by Certification Level – Universal





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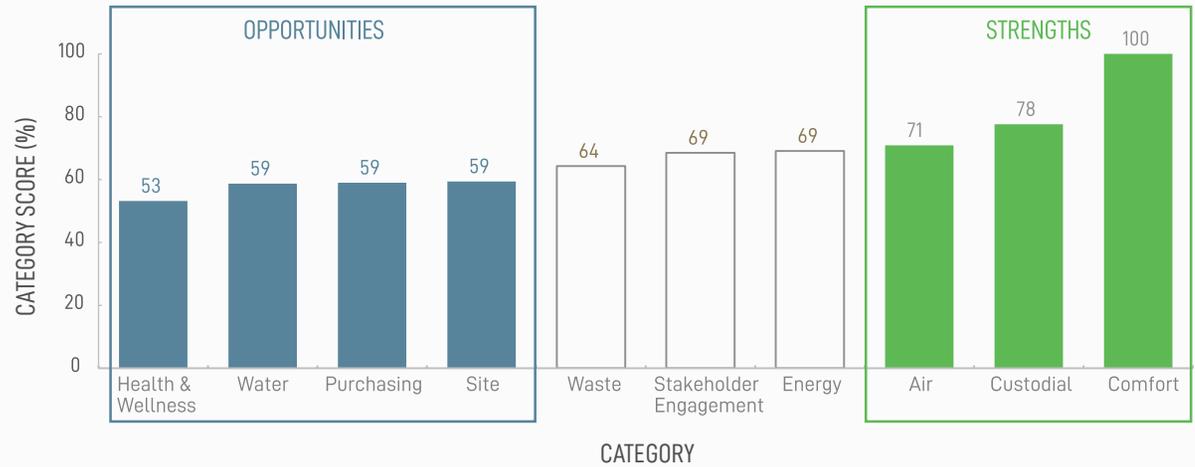
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Strengths and opportunities identified for the Universal property type are summarized in **Figure 42**. Strengths are defined as categories where scores exceed 70%. Opportunities are defined as categories where scores fall short of 60%.

Figure 42
Strengths and Opportunities – Universal



Property Types

The Universal property type covers a wide range of space usage that is not included in the other property types. **Table 21** shows the most prevalent facility functions within Universal buildings certified in 2018.

Table 21

Facility function for Universal Building Type Certified in 2018

PROPERTY TYPE	PERCENTAGE
Mixed-Use Property	25.0%
Courthouse	20.8%
College or University	20.8%
Office	12.5%
Convention Center	12.5%
Library	4.2%
Other	4.2%



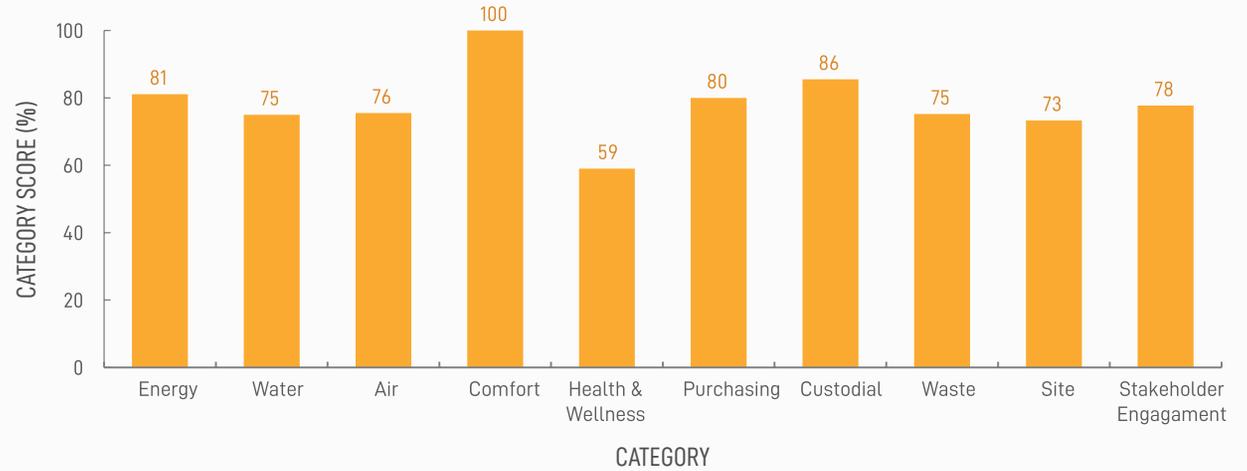
ENCLOSED SHOPPING CENTRE

Category Performance

The 2018 average scores in each of 10 categories for Enclosed Shopping Centres are summarized in **Figure 43**.

Figure 43

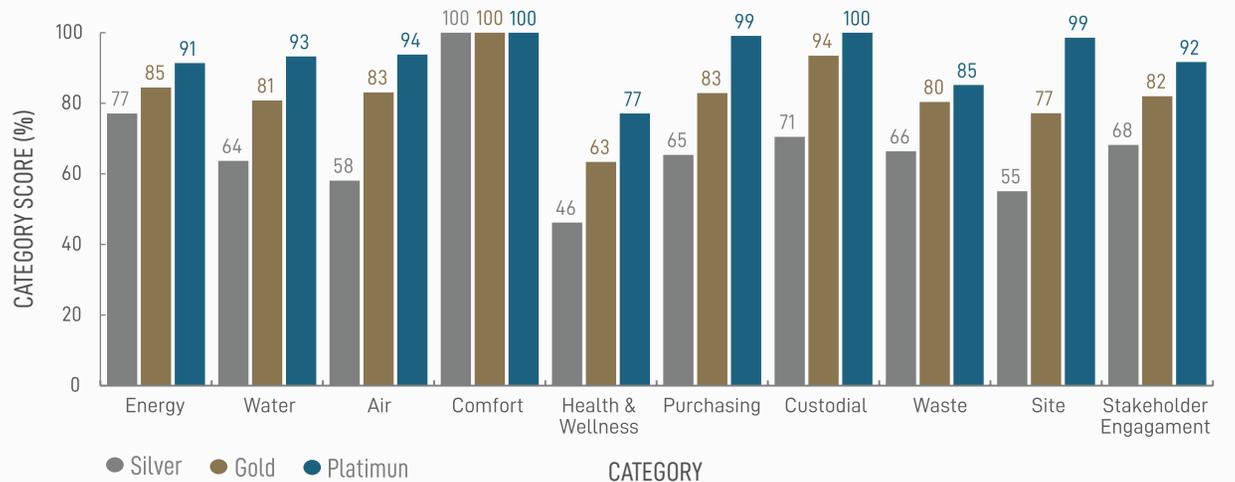
Average Category Score – Enclosed Shopping Centre



The average category scores of Enclosed Shopping Centres at each certification level are shown in **Figure 44**.

Figure 44

Average Category Score by Certification Level – Enclosed Shopping Centre



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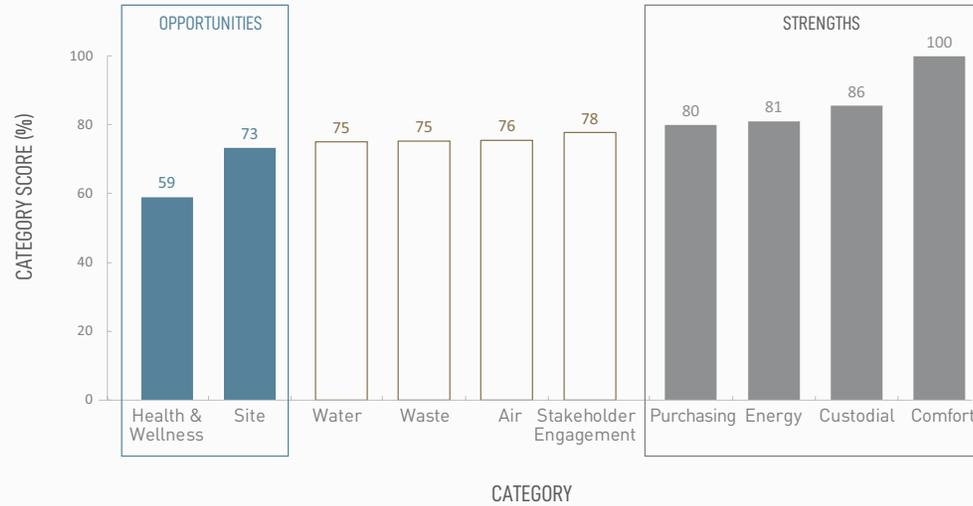


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Strengths and opportunities identified for the Enclosed Shopping Centre property type are summarized in **Figure 45**. Strengths are defined as categories where scores exceed 80%. Opportunities are defined as categories where scores fall short of 75%.

Figure 45

Strengths and Opportunities – Enclosed Shopping Centre

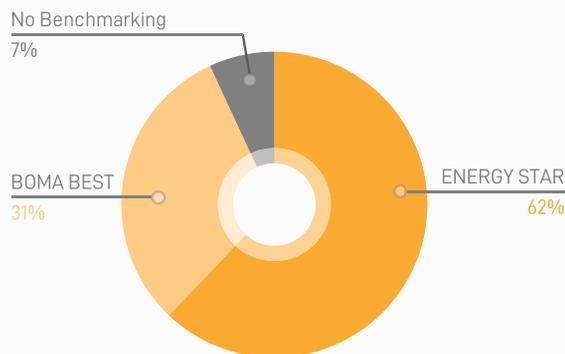


Energy Benchmarking

Figure 46 shows the proportion of Enclosed Shopping Centres which uses either of the two energy benchmarking tools: BOMA BEST, ENERGY STAR, or has No Benchmarking at all.

Figure 46

Energy Benchmarking Tools Used – Enclosed Shopping Centre

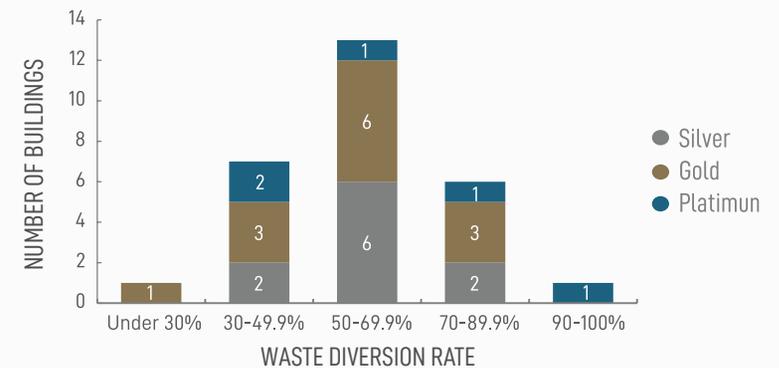


Waste Performance

Figure 47 shows the number of Enclosed Shopping Centres that achieved each range of waste diversion rates, including a breakdown by corresponding certification level.

Figure 47

Waste Diversion Rate by Number of Buildings per Certification Level – Enclosed Shopping Centre





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LIGHT INDUSTRIAL / OPEN AIR RETAIL

Category Performance

The 2018 average scores in each of 10 categories for Light Industrial / Open Air Retail buildings are summarized in **Figure 48**. There are no questions in the Purchasing category for Light Industrial / Open Air Retail asset types.

Figure 48

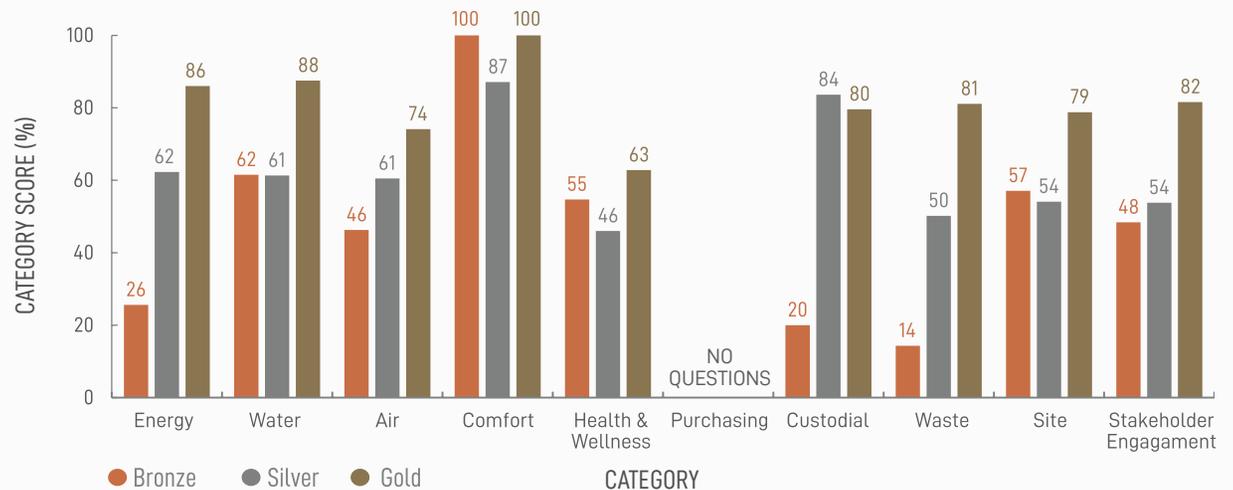
Average Category Score – Light Industrial / Open Air Retail



The average category scores of Light Industrial / Open Air Retail buildings at each certification level are shown in **Figure 49**.

Figure 49

Average Category Score by Certification Level – Light Industrial / Open Air Retail





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Strengths and opportunities identified for the Light Industrial and Open Air Retail property types are summarized in **Figure 50**. Strengths are defined as categories where scores exceed 80%. Opportunities are defined as categories where scores fall short of 65%.

Figure 50

Strengths and Opportunities – Light Industrial / Open Air Retail

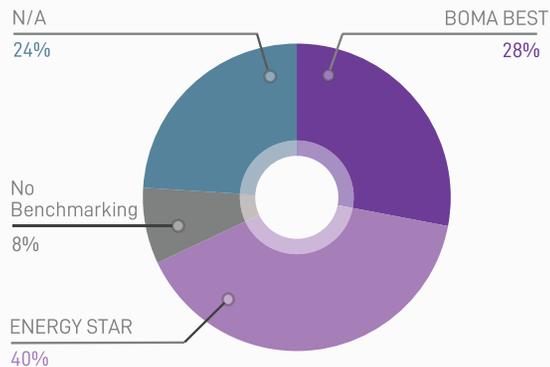


Energy Benchmarking

Figure 51 shows the proportion of Light Industrial / Open Air Retail buildings that use either of the two energy benchmarking tools: BOMA BEST, ENERGY STAR, or has No Benchmarking at all. The answer "N/A" is unique to Light Industrial / Open Air Retail asset type, and can be selected if all energy meters are managed solely by tenants.

Figure 51

Energy Benchmarking Tools Used – Light Industrial / Open Air Retail

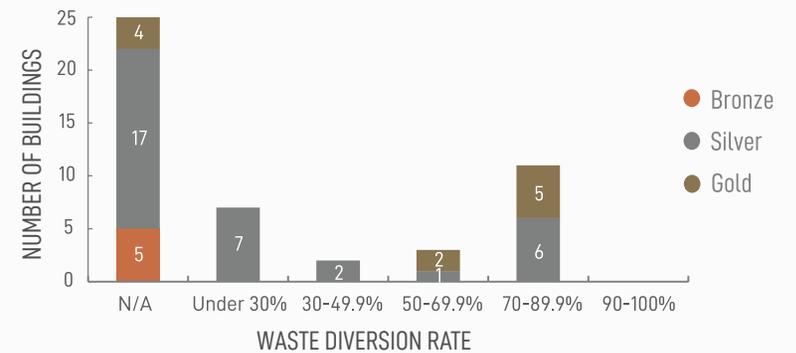


Waste Performance

Figure 52 shows the number of Light Industrial / Open Air Retail buildings that achieved each range of waste diversion rates, including a breakdown by corresponding certification level.

Figure 52

Waste Diversion Rate by Number of Building per Certification Level – Open Air Retail / Light Industrial





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Methodology

ANALYSIS PERIOD AND GENERAL NOTES

The 2020 National Green Building Report (NGBR) includes certifications awarded between April 1, 2018 and March 31, 2019. For ease of reference, buildings analyzed in this report are simply referred to as the “2018” data set.

All buildings included in this report completed the BOMA BEST 3.0 assessment.

Light Industrial and Open Air Retail property types are reported as a combined property type; therefore, their reported performance is an average of all Light Industrial and Open Air Retail buildings. The combined property type is noted as Light Industrial / Open Air Retail throughout the report.

In this report, the term “*Certified*” (with capital “C” and italicized) refers to the BOMA BEST certification level of the same name – *Certified*, i.e., a score of 0 – 19%. In this report the term “certified” (not capitalized) refers to all buildings that achieved BOMA BEST certification (irrespective of the certification level achieved).

Unless specifically stated, changes to percentage scores discussed in this report are absolute, and not relative. For example, a change in score of 78% to 80% would be calculated as “80% minus 78%” and reported as +2%. This is consistent with reporting in previous years.

The percentages in some charts may not add up to 100% due to rounding.

ANALYSIS INCLUSION REQUIREMENTS

The “Active Certifications” section includes all 549 buildings certified within the period of April 1, 2018, to March 31, 2019.

The detailed performance analysis “Scores & Performance” and “Performance by Property Type” sections include only the 278 buildings that met all of the following criteria:

1. Certified between April 1, 2018 and March 31, 2019
2. Achieved a score of 20% or higher (*Bronze, Silver, Gold, Platinum*, but not *Certified*)
3. Were verified in the current year (only 20% of buildings in the Portfolio Stream are verified each year)
4. Included more than 15 buildings in the property type. Multi-Unit Residential Buildings and Health Care buildings were excluded from the 2020 NGBR analysis because there are fewer than 15 buildings of each property type nationally that have achieved *Bronze* or higher certification level, and so data is not considered representative.

At a regional level for a given property type, if fewer than 5 buildings achieved *Bronze* or higher level of certification, performance results were not reported and “insufficient data” is indicated when possible. For this reason, **Figure 34** and **Table 20** have a sample size of 173 buildings and **Figure 52** has 49 buildings.

Table 22 outlines the number of buildings at each certification level and property type that were included in the performance analysis.



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Table 22

Number of Buildings Included in the Performance Analysis, by Level and Property Type

	PLATINUM	GOLD	SILVER	BRONZE	TOTAL
Office	16	39	115	6	176
Universal	1	6	16	1	24
Enclosed Shopping Centre	5	12	10	1	28
Light Industrial & Open Air Retail	1	11	33	5	50
GRAND TOTAL	23	68	174	13	278

Performance Analysis

Total Category Score: Each BOMA BEST Property Type has a different maximum number of points available for each category. For reporting purposes, the maximum number of points achievable for each of the ten BOMA BEST categories was taken as the maximum points available from each property type questionnaire. Where questions were answered with “N/A”, the points associated with that question are not counted in the maximum category points achievable. This way, properties are not penalized for questions not applicable to them. Overall percentage scores reported do not account for innovation questions. Percentage category scores are calculated as follows:

$$\text{Total Category Score (\%)} = \frac{(\text{total category points achieved} - \text{category innovation points achieved})}{(\text{maximum category points achievable, adjusted for "N/A" responses} - \text{category innovation points achieved})}$$

Energy use intensity (EUI) results consider 141 of the 176 office buildings that achieved *Bronze* and higher (*Certified* level buildings are excluded), filtered to meet the following criteria:

1. Exclude entries with no EUI data, or no entered value

2. Exclude statistical outliers: EUI values greater than 200 kWh/ft²/yr or lower than 10 kWh/ft²/yr

Water use intensity (WUI) results consider 105 of the 176 office buildings that achieved *Bronze* and higher (*Certified* level buildings are



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excluded), filtered to meet the following criteria:

1. Exclude entries with no WUI data, or no entered value
2. Exclude statistical outliers: WUI values greater than $5 \text{ m}^3/\text{m}^2/\text{yr}$ or lower than $0.1 \text{ m}^3/\text{m}^2/\text{yr}$
3. Exclude entries with inconsistent WUI value and WUI range

Greenhouse Gas intensity (GHGI) results consider 60 of the 176 office buildings that achieved *Bronze* and higher (*Certified* level buildings are excluded), filtered to meet the following criteria:

1. Buildings with reasonable EUI ($10 - 200 \text{ ekWh}/\text{ft}^2/\text{yr}$)
2. The difference between BOMA EUI and ENERGY STAR EUI is within +/- 15%
3. Weather Normalized Site Natural Gas Intensity (ekWh/ft^2) and Electricity Intensity (kWh/ft^2) are available

Greenhouse gas intensity data was calculated using electricity and natural gas use intensity reported on ENERGY STAR, converted with emission factors.

Average ENERGY STAR Score was estimated by assigning buildings reporting a 0–49 score range with a score of 24.5 (the specific score is unknown). Where ENERGY STAR Score is missing it is excluded from the analysis.



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List of Acronyms

BOMA:	Building Owners and Managers Association
BOMA BEST:	BOMA Building Environmental Standard
EUI:	Energy Use Intensity
ekWh/ft²/yr:	Equivalent kilowatt-hour per square foot per year
WUI:	Water Use Intensity
m³/m²/yr:	Cubic meter per square metre per year
GHGI:	Greenhouse Gas Intensity
kgCO₂e/ft²/yr:	Equivalent kilogram CO ₂ per square foot per year
NGBR:	National Green Building Report
P.E.I.:	Prince Edward Island



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