Operations and Maintenance Benchmarks:

International Facility Management Association (IFMA)

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ABOUT IFMA

IFMA™

IFMA is the world's largest and most widely recognized international association for facility management professionals, supporting 24,000 members in 100 countries. This diverse membership participates in focused component groups equipped to address their unique situations by region (134 chapters), industry (16 councils) and areas of interest (six communities). Together they manage more than 78 billion square feet of property and annually purchase more than US$526 billion in products and services. Formed in 1980, IFMA certifies professionals in facility management, conducts research, provides educational programs, content and resources, and produces World Workplace, the world's largest series of facility management conferences and expositions. In addition, IFMA's collaboration with the Royal Institution of Chartered Surveyors is transforming the global FM profession by unifying standards, offering comprehensive career advancement resources and magnifying the status of practitioners. For more information, visit www.ifma.org/ricscollaboration. To join and follow IFMA's social media outlets online, visit the association's LinkedIn, Twitter, Facebook, YouTube and Flickr pages. For more information, visit the IFMA press room or www.ifma.org.

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Report Overview

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Acronyms & Terminology

Average: Average is also referred to as the mean – the sum or total of all responses divided by the number of respondents.

BAS: Building Automation System

Building Exterior Gross Area (Gross Area): The sum of the floor areas on all levels of a building that are totally enclosed within the building. Measure exterior building gross area to the outside face of exterior walls, disregarding canopies, cornices, pilasters, balconies and buttresses that extend beyond the wall face and courtyards that are enclosed by walls but have no roof. The building exterior gross area of basement space includes the area measured to the outside face of basement or foundation walls. Exterior bridges and tunnels that are totally enclosed, constructed areas connecting two or more buildings are included in building exterior gross area.

CAD: Computer Aided Design

CAFM: Computer Aided Facility Management

CAM Charges: Common Area Maintenance charges

CMMS: Computerized Maintenance Management System

Central Mechanical Plant: A plant that is owned by, and on the grounds of, a multi-building facility that provides district heating, district cooling, or electricity to one or more buildings on the same facility. The central physical plant may be by itself in a separate building or may be located in a building where other activities occur.

Climate Zones: The eight climate zone regions in the United States are based on the climate designations used by the International Energy Conservation Code (IECC) and the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE). Designation of a climate zone serves as an indicator of heating and air condition use. The climate region definitions are based on heating degree days, average temperatures and precipitation. More information can be found in the "Volume 7.3: Guide to Determining Climate Regions by County" issued by the U.S. Department of Energy in August 2015.
Natural Resources Canada's Office of Energy Efficiency (OEE) regionalizes Canada into three climate zones. These zones are based upon an average number of heating degree-days over a 30-year period.

Cost of Operations: The annual cost of operation includes the total costs associated with the day-to-day operation of a facility. It includes all maintenance and repair costs (both fixed and variable), administrative costs (clerical, timekeeping, general supervision), labor costs, janitorial, housekeeping and other cleaning costs, utility costs and indirect costs — i.e. all costs associated with roadways and grounds.

Current Replacement Value (CRV): Current replacement value is defined as the total amount of expenditure in current dollars required to replace the organization's facilities to its optimal condition (excluding auxiliary facilities). It should include the full replacement cost for all buildings, grounds, utility systems and generating plants. Furthermore, it should meet the current acceptable standards of construction and comply with regulatory requirements. Insurance replacement values or book values should not be used. Current replacement value does not include cost of contents.

Deferred Maintenance: Deferred maintenance is defined as the total dollar amount of existing major maintenance repairs and replacements identified by a comprehensive facilities condition audit of buildings, grounds, fixed equipment and infrastructure needs. This estimate should not include projected maintenance, replacement or other types of work, such as program improvements or new construction, for these items are considered capital projects.

Facility: An environment which is built, installed or established to serve a work-related purpose.

Facility Operating Current Replacement Value (CRV) Index: This indicator represents the level of funding provided for the stewardship responsibility of an organization's capital assets. The indicator is expressed as a ratio of annual facility maintenance operating expenditure to Current Replacement Value (CRV). (Asset Lifecycle Model for Total Cost of Ownership Management, 2005)

Facility Management: Organizational function which integrates people, place and process within the built environment with purpose of improving the quality of life of people and the productivity of the core business [Source ISO 41011:2017(en), Facility management – Vocabulary.

Facility Rentable Area (Rentable Area): As defined in ASTM 1836-01, building exterior gross area minus exterior walls, major vertical penetrations, interior parking space and void areas is facility rentable area.

Fuel Oil: A liquid petroleum product used as an energy source that is less volatile than gasoline. Fuel oil includes distillate fuel oil.

Full-time Equivalent (FTE): The operational and supervisory "person year" headcount that delivers a facility service on an annual, full-time basis, calculated on a 40-hour work week (2080 hours/year).

Gross Square Foot (GSF): Basis used for utility calculations.

Interior Parking Space: The space used for vehicular parking space that is totally enclosed within the (occupied) building envelope.

Kilowatt hour (kWh): A unit of work or energy, measured as one kilowatt (1,000 watts) of power expended for one hour. One kWh is equivalent to 3,412 Btus.

Major Vertical Penetrations: Major vertical penetrations include stairs, elevator shafts, utility tunnels, flues, pipe shafts, vertical ducts and their enclosing walls.

Mean: See definition for average. Mean and average are used interchangeably and the interpretation is the same.

Median: The middle value in a range of responses is the median. One-half of all respondents will be below this value, while one-half will have a higher value. The median is also known as the 50th percentile. The advantage in using the median is that it is not affected as much by extreme highs or lows in the range of values as is the case with the mean.

Multi-Use: Used in this report to describe facilities with two or more primary uses, such as a single site that encompasses headquarter offices, as well as production or research facilities.

N: N is the number of cases supplying the data being described. It is important to note the size of the sample for the value you are comparing.

Percentile: Percentile indicates dispersion of data. A specific percentile identifies where a value lies in relation to other values in a range of responses. The 25th percentile is the lower one-fourth point in the range of values in the group. The 50th percentile, also referred to as the median, represents a value of which one-half of the group falls below and one-half falls above. The median is not affected by extreme high or low values, whereas the mean could be distorted.

Preventive Maintenance: Planned actions undertaken to retain an item at a specified level of performance by providing repetitive scheduled tasks which prolong system operation and a useful life; i.e. inspection, cleaning, lubrication and part replacement. (Cotts, Lee, 1992)

Rentable Square Foot (RSF): Basis for most benchmark calculations. To measure rentable area, subtract major vertical penetrations, interior parking space, exterior walls and void areas from the gross area.

Repair Maintenance: Work that is performed to put equipment back in service after a failure, to extend the life of the equipment or to make its operation more efficient. (Armstrong, 1996)

Site Population: The number of full- and part-time employees, contract workers and/or tenants located at the facility(ies).

Stationary Engineers: Stationary engineers (also called licensed engineers) are licensed personnel assigned to operate a power plant including the steam and hot water boilers or a chilled water plant. Some states and municipalities require licensed engineers watch 24 hours, seven days per week. Further, these individuals are not allowed to leave the power plant to perform maintenance outside the power plant.

Void Areas: Rooms that are more than one story in height. Void areas exist on upper floors, such as atriums, light wells or lobbies.

Xeriscape: A landscaping practice that conserves water and protects the environment by using appropriate design, soil preparation, irrigation, plant selection, mulching and maintenance.

Using this Report

The terms that are often used in today's business environment but are often misunderstood. Benchmarking is a continuous and systematic management process that measures work processes, protocols and services for the purpose of organizational comparison and improvement. When properly applied, benchmarking can identify costly or inefficient practices and quantify your department's overall contribution to the bottom line.

There are several types of benchmarking that an organization can undertake. They include internal, competitive and generic. When conducting an internal benchmarking exercise, a facility manager compares similar functions within his or her own organization. This is typically done when an organization operates multiple sites or units and comparisons can be made. With competitive benchmarking, a facility manager compares costs, processes and practices to other organizations' sites within the same industry. To undertake a generic or process benchmarking exercise, a facility manager analyzes data and best practices regardless of the industry, and concentrates on studying the function or process. This report allows you to make any of these benchmarking comparisons because information is broken down by industry sector, facility use, region and a variety of other factors.

Using this benchmarking data calls for some words of caution. The information contained in the report represents a "self-report" from IFMA members and others. All information was voluntarily provided but was not checked with site visits. When interpreting the data, it is important to remember that every facility is different, and every organization operates using different accounting and measuring practices. The data listed in this report will not provide a perfect comparison of your organization to that of another company, but it should give you a good idea of how your facility fits into a range of performance.

The percentile charts in this report allow you to see how your operation ranks against other organizations. The arrows beside some charts show the "best-in-class" direction. Using your facility's numbers for the performance indicator, determine whether your building is above or below the median (50th percentile). If your facility falls way above or below the median, you may want to examine your cost or procedures on that area. However, your facility may differ from the median due to your type of facility, climate or labor market. The data should help you identify areas where you can improve your facility operation.

Readers will see arrows pointing in an upward or downward direction next to many of the percentile charts in this report. In many cases the arrow points toward the lowest cost; however, the organization with the lowest cost may not profess to have the best practice. There may be an underlying reason why a cost is so low. For example, a building scheduled for decommissioning may not have the same level of maintenance cost outlay compared to those that will continue to be in operation.

Using this report is the first step in benchmarking. After you have identified areas where your facility operations could be improved, you should conduct additional research before reengineering the process. One should not immediately rush to find out which company is "best-in-class" and copy their practice. Instead you should look for a more homogeneous group in which to compare.

Participating in a local IFMA chapter or council benchmarking study is a good way to explore how to improve your facility operations. IFMA's research department can assist companies in forming benchmarking groups and conducting more detailed, smaller-scaled benchmarking studies.

BENCHMARKING

When properly applied, benchmarking can identify costly or inefficient practices and quantify your department's overall contribution to the bottom line.

Acknowledgements

IFMA relies on the willingness and generosity of its members to compile the data and complete this lengthy benchmarking survey. Without their data, there would be no report. We thank these dedicated participants for their contribution. Many participants have responded year after year for which IFMA is extremely thankful for their continued support to this endeavor and the profession.

A committee of subject matter experts worked with IFMA's research department to craft questions and pilot test the survey. The committee members are acknowledged on the inside cover of the report. Nickalos Rocha, IFMA's director of research, and staff from the Simplar Institute, conducted the survey, validated and analyzed the data, created the tables and graphs, and wrote the report.

About this Report

To create this report, a committee of IFMA volunteers with expertise in housekeeping, maintenance, energy management and sustainability reviewed questions posed in previous IFMA surveys and developed new questions to better match today's practices. Once tested, the survey was sent electronically in March 2017 to more than 20,000 IFMA professional members.

Although the survey was issued to IFMA members, membership was not a requirement to participate. Survey recipients were encouraged to circulate the survey to the person responsible for the activity.

Findings are discussed in the sections that follow. When applicable, comparisons are made to previous IFMA benchmarking reports. Additional copies of this report may be ordered through IFMA's bookstore.

Methodology

The *Operations and Maintenance Benchmarks Survey* was originally developed in spring 2008, and was updated in the fall 2016. Committee members examined each question to make sure questions were clear, unambiguous, concise and relevant. Questions were asked in an objective fashion in order to obtain responses that are truly representative of industry practices. The committee designed and added new questions pertaining to security operations and organizational profiles. The survey was only made available electronically through an online survey platform titled Qualtrics.

Respondents were asked to provide information on the facilities they manage for a 12-month time period. Approximately 2,193 surveys were returned during a four-month time period representing more than 98,000 buildings.

To ensure high quality data, highly structured coding and data verification procedures were used. In addition, all variables and values were checked to verify that they were within appropriate ranges and inappropriate outliers were corrected or removed.

Standardized data analysis procedures included reviewing descriptive frequency counts and cross tabulations of responses for variables of interest. To maintain real world usability of these research findings, statistics are most often provided in terms of absolute number of responses, percentages and mean averages. Percentages may not add to 100 percent due to rounding or the acceptance of multiple responses. In many cases, some respondents did not answer all questions, so the base numbers differ among the various quantitative findings. A few tables have lines in lieu of a number because there were not enough responses to generate a valid statistic.

Additional calculations were made to determine cost and utility consumption per square foot, and square footage per occupant. Utility consumption data was changed to match the unit specified. Canadian cost data was converted to U.S. currency by multiplying costs by a factor of .7449, the currency exchange rate on December 31, 2016. Unless otherwise specified, all currency is listed in U.S. Dollars ($ USD). Metric numbers were converted to standard. If data appeared out of range, the respondent was contacted to determine how the information was derived. New information was subsequently entered.
This report contains the results of those analyses deemed to be of most interest to facility managers. Operations and Maintenance Benchmarks is a self-report survey. All data, including respondent identification, was voluntary. As with any research, readers should exercise caution when generalizing results and take individual circumstances and experiences into consideration when making decisions based on these data. While IFMA is confident in its research, it is important to understand that the results presented in this report represent the sample of organizations that chose to supply the requested facility information.

A confidence level and margin of error provide readers some measure of how much they can rely on survey responses to represent all IFMA member organizations. Given the level of response to this survey, IFMA is 95 percent confident that responses given by all responding organizations can be generalized to all IFMA member organizations, in general with a margin of error of approximately +/- 4.0 percent. It is important to note that as the sample size decreases, which occurs in many of the tables, the margin of error increases.

Facility Description

Industries Represented
Facility Used
Facility Description
Facilities by Region
Location of Facility
Climate Zones for the U.S. and Canada
Facility Age
Facility Setting
Overall Ownership
Days and Hours of Facility Heating and Cooling
Central Plant
Developed Acres
Number of Occupants

Industries Represented

Comparing a facility's performance to others in the same industry, i.e., competitive benchmarking, is frequently done as part of an organization's quality assessment program. The following chart shows the industry categories represented in this report.

Respondents were asked to select among the 33 broad industry categories provided. These are further grouped into the services, manufacturing and institutional sectors. Please note that several similar categories are classified together but are listed as one industry category name throughout the report. The U.S. General Services Administration (GSA) contributed data on more than 800 facilities. This large response is reflected in the federal government category.

The number of cases presented is the total number of unique respondents that provided partial or complete surveys. As such, the totals vary in each section depending on the number of responses for the given question.

INDUSTRY TYPE	NUMBER OF CASES (N)
SERVICES	**593**
Banking (Consumer, Commercial, Savings, Credit Unions)	69
Health Care	152
Hospitality (Hotel, Restaurants, Hospitality-Related)	37
Information Services (Data Processing, Information Services, E-Commerce)	42
Insurance (Health, Life, Auto, Mutual, Casualty, Flood)	46
Investment Services (Securities and Investment Services)	10
Media (Broadcasting, Entertainment, Gaming, Media, Publishing)	17
Professional Services (Legal, Accounting, Consulting, Engineering)	101
Research	24
Telecommunications (Telecommunication, Internet Services)	8
Trade (Wholesale, Retail)	24
Transportation (Transportation, Freight)	28
Utilities (Water, Gas, Electric, Energy Management)	17
Other Services (Private security, Other Financial Services, Real Estate, etc.)	18
MANUFACTURING	**210**
Aircraft/Industrial (Industrial Equipment, Aerospace)	23
Building/Construction (Building, Construction Materials)	16
Chemical/Pharmaceutical (Chemical, Pharmaceutical, Biotech)	27
Computer (Computer Hardware or Software)	8
Consumer Products (Food, Paper or Related)	31
Electronics (Electronics, Telecommunications Equipment)	31
Energy (Energy-Related, Mining or Distribution)	35
Medical Equipment	12
Motor Vehicles	10
Other Manufacturing (Ammunition, Furniture, Corrugated Packaging, etc.)	17
INSTITUTIONAL	**1,390**
Association (Association, Federation, Non-Profit, Society)	35
Charitable Foundation	17
City/County Government (Law Enforcement, Library)	130
Corrections (Private, State, Federal, City, County)	11
Cultural (Cultural Institutions)	20
Educational	224
Federal Government	854
Military	6
Religious	21
Special Districts/Quasi-Government (School Boards)	31
State/Provincial Government	19
Other Institutions (Industry Representatives, Charitable Foundation, Casino, etc.)	22
TOTAL	**2,193**

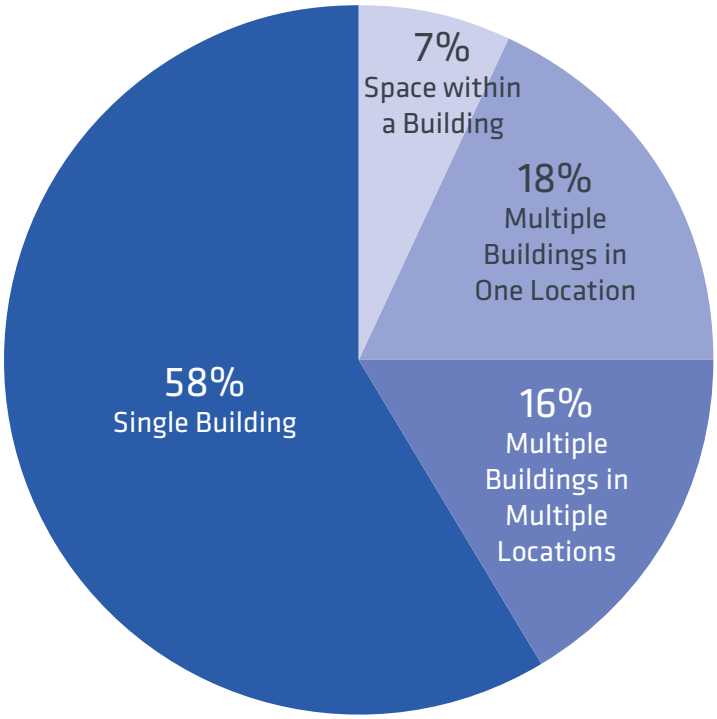
Facility Use

Property type and sub-type categories used within the Appraisal Institute Commercial Data Standards were applied to allow for a more meaningful comparison. There were 29 facility use categories to choose from, but not all were selected. Note the expansion of the office category. This study breaks office space into four categories: headquarter, branch, medical and mixed use where office space is dominant. As in previous studies, office space is the most prevalent; however, other types of space make up 58 percent of the sample.

FACILITY USE	NUMBER OF CASES (N)
OFFICE	**1,268**
Branch/Regional Office	160
Headquarter	382
Medical Office	99
Mixed Use Office	627
INDUSTRIAL	**144**
Manufacturing	102
Warehouse	42
ASSEMBLY	**54**
Community/Recreation Center	24
Convention Center/Exhibit Hall	9
Religious	9
Stadium/Arena/Auditorium	12
RETAIL	**16**
Bank Branch	7
Big Box/Department Store	9
OTHER	**697**
Biosciences	17
Correctional	11
Courthouse	282
Data Center (Data/Computer/Switch Facility)	8
Education (Education/Training/Classrooms)	110
Hospital	13
Library	16
Lodging & Hospitality	18
Military	5
Multi-family (Condominium/Student Housing)	22
Multi-use (No single type of space dominant more than 50%.)	43
Museum (Gallery/Zoo/Arboretum)	25
Research & Development	68
Sports & Entertainment (Aquatic/Gaming/Golf Course)	11
Transportation (Airport/Rail/Bus Station)	45
TOTAL	**2,179**

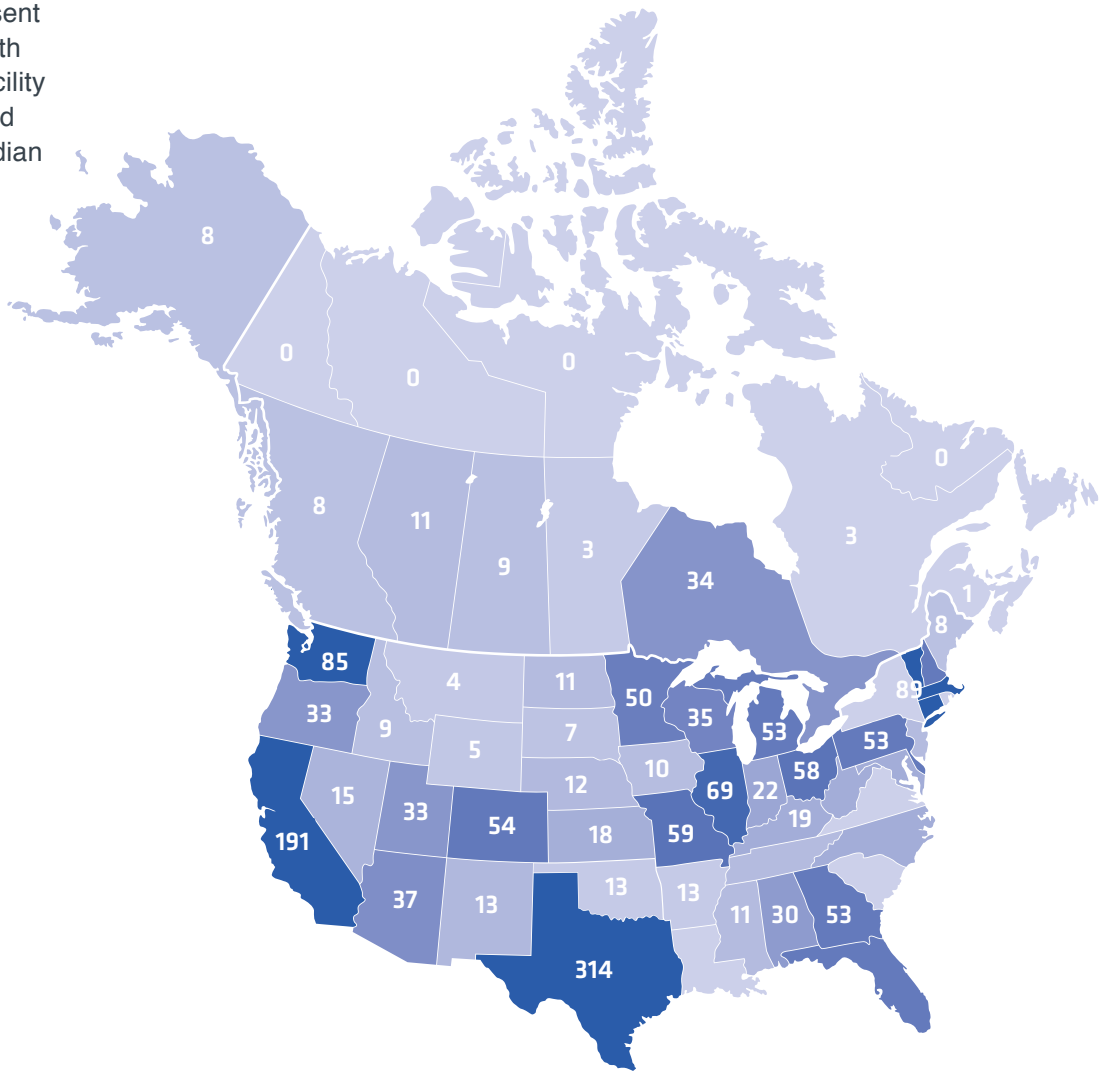
Facility Description

To provide a more accurate comparison of cost and practices, respondents were asked to provide data on a single-use facility, preferably the largest or most active facility of their portfolio. Many of the respondents supplied separate building data, and as a result 58 percent of the facilities represented in this study are single buildings. About 18 percent of the sample was classified as campus sites with a median of five buildings situated in one location. Sixteen percent of the sample represented a portfolio of buildings spread among multiple locations.



Location of Facility

This benchmarking survey was sent to IFMA members located in North America. This report contains facility data for all 50 states in the United States and eight of the 13 Canadian provinces and territories.



Facilities by Region

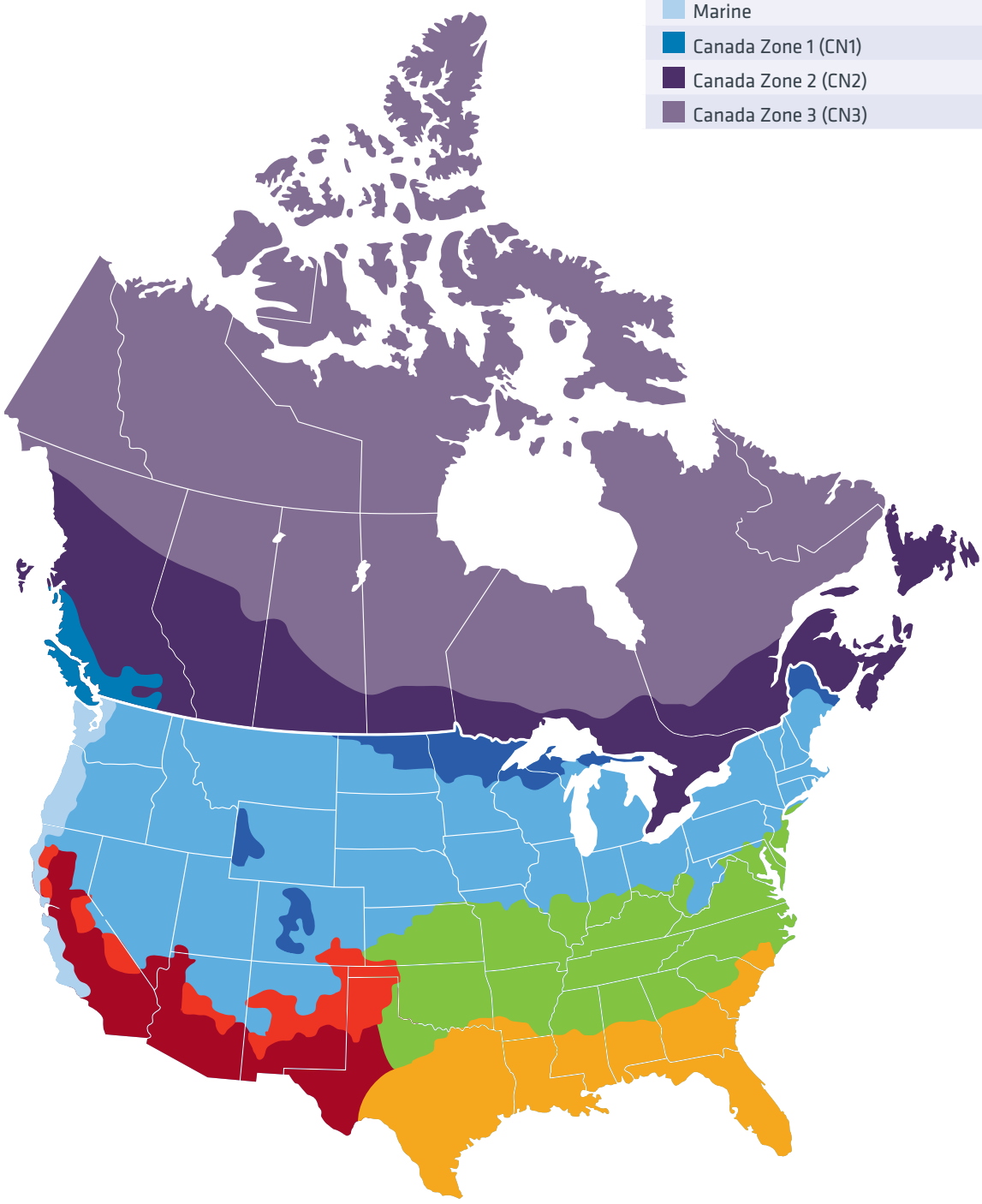
This report breaks out North America into 11 regions. The ten U.S. categories are based upon postal zip codes. For example, the region labeled Heartland is composed of the four states in which the zip code begins with the number six. Note that while Canada is grouped into a single category (due to a lower number of responses), readers should be aware that benchmarks can vary widely across Canada.

REGION	N	PERCENTAGE OF SAMPLE
Canada (AB, BC, MB, NB, NS, ON, QC, SK)	73	3%
New England (CT, MA, ME, NH, NJ, VT, RI)	121	6%
Northeast (DE, NY, PA)	146	7%
Mid-Atlantic (DC, MD, NC, SC, VA, WV)	356	16%
Southeast (AL, FL, GA, MS, TN)	196	9%
Midwest (IN, KY, MI, OH)	151	7%
North Central (IA, MN, MT, ND, SD, WI)	115	5%
Heartland (IL, KS, MO, NE)	158	7%
South Central (AR, LA, OK, TX)	362	17%
Mountain (AZ, CO, ID, NM, NV, UT, WY)	166	8%
Pacific (AK, CA, HI, OR, WA)	322	15%

Climate Zone for the U.S. and Canada

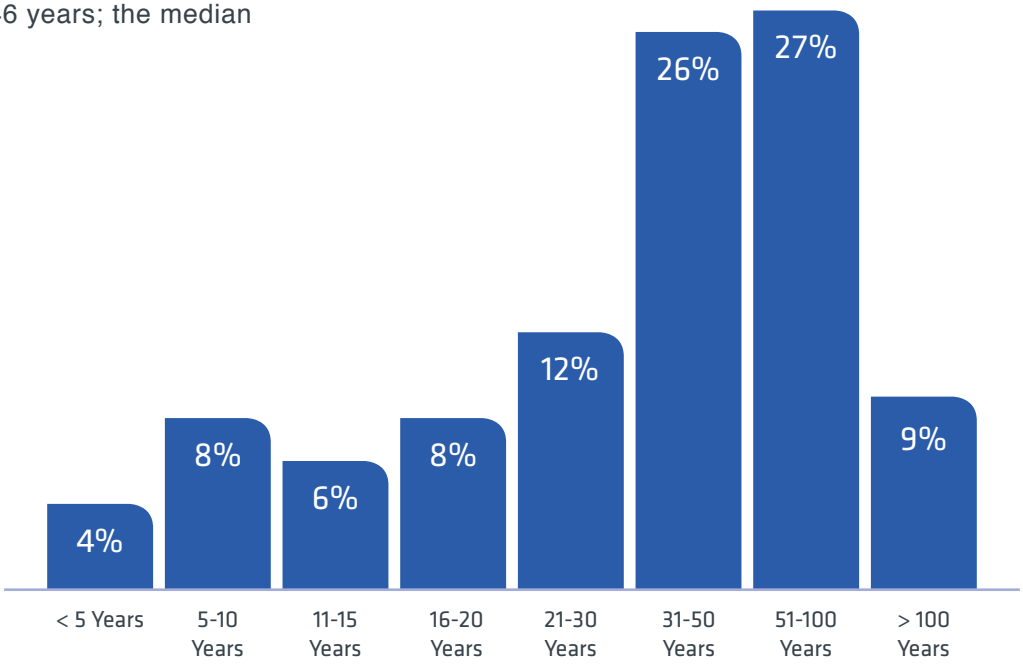
Recognizing that weather affects utility consumption, each respondent's facility zip code was used to categorize it in the appropriate climate zone. The U.S. Department of Energy (DOE) "Building America" classifies the U.S. into eight climate zones. Natural Resources Canada's Office of Energy Efficiency (OEE) regionalizes Canada into three climate zones.

CLIMATE ZONE	N
Hot-Humid	430
Mixed-Humid	689
Hot-Dry	169
Mixed-Dry	5
Cold	585
Very Cold	25
Marine	187
Canada Zone 1 (CN1)	8
Canada Zone 2 (CN2)	62
Canada Zone 3 (CN3)	2



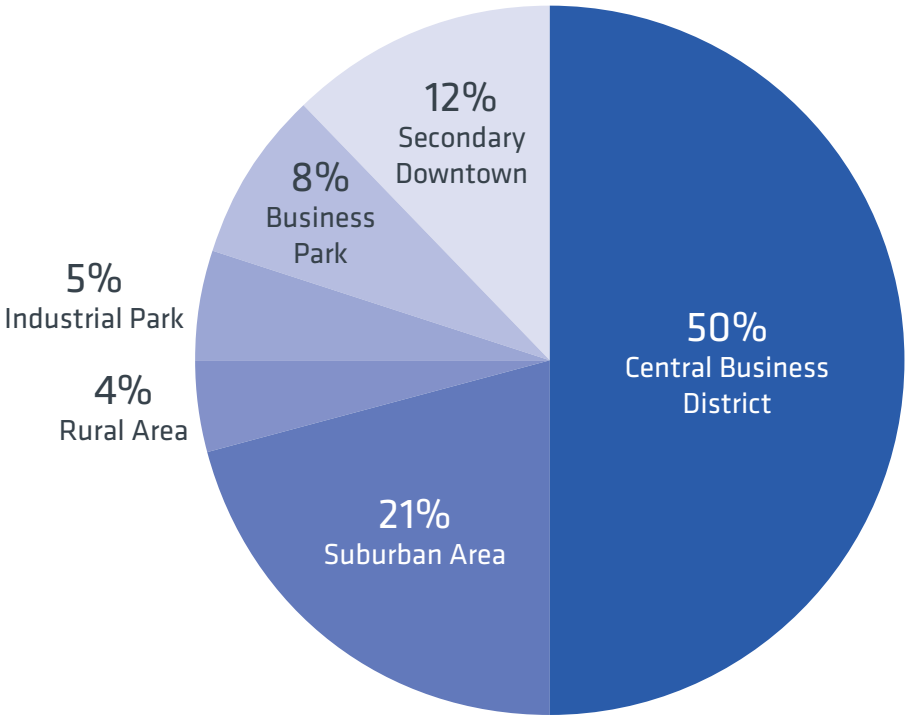
Facility Age

The average age of the facilities in this data set is 46 years; the median is 39 years.



Facility Setting

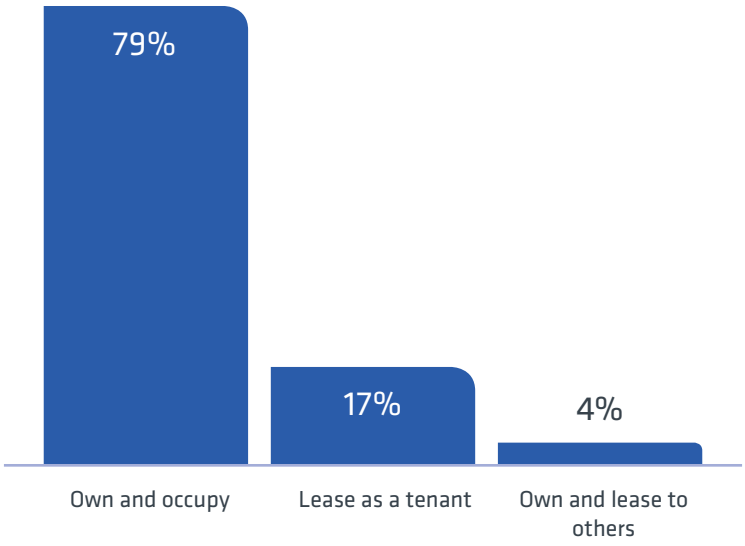
Given the large number of U.S. federal government buildings included in this data set, the percentage of buildings situated in central business districts is 50 percent. Manufacturing and warehouse facilities are more apt to be located in industrial settings.

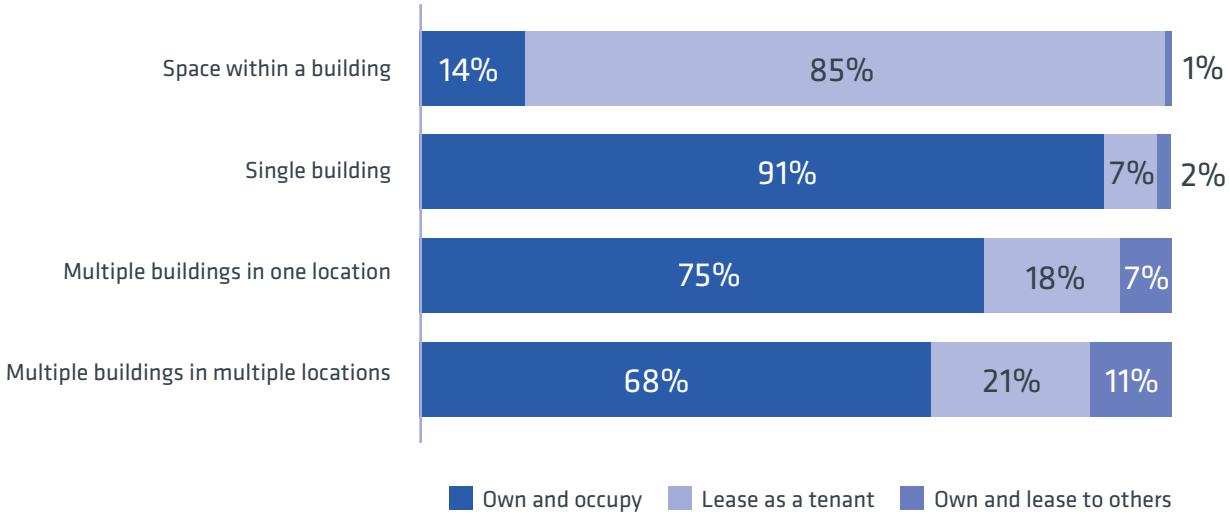


Overall Ownership

About 79 percent of the facilities in this report are owner occupied.

As the type of space managed includes more buildings and locations, the portfolio expands to include both owned and leased facilities.





Days and Hours of Facility Heating and Cooling

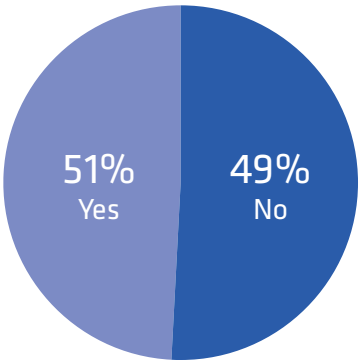
On average, the buildings in this study are cooled and heated for about 16 hours per day, 6 days per week.

FACILITY USE	N	HOURS/ DAY	DAYS/ WEEK
Headquarter	334	14	6
Mixed Use office	139	15	6
Branch/Regional Office	105	15	6
Education	85	15	7
Manufacturing	80	20	7
Research & Development	51	18	6
Medical Office	20	19	7
Multi-use	33	18	7
Warehouse	25	17	7
Transportation	18	23	7
Museum	18	21	7
Community Center	18	17	7
Biosciences	17	18	7
Lodging & Hospitality	16	21	7
Hospital	13	24	7
Library	11	14	7
Sports & Entertainment	10	20	7
Stadium/Arena/Auditorium	9	18	7
Multi-family	9	23	7
Religious	9	9	6
Convention Center/Exhibit Hall	8	18	7
Courthouse	8	15	6
Big Box/Department Store	7	14	6
Correctional	7	22	7
Data Center	5	24	7
Bank Branch	5	13	6
Military	3	13	7
Senior Housing	2	24	7
TOTAL	**1,067**	**16**	**6**

Central Plant

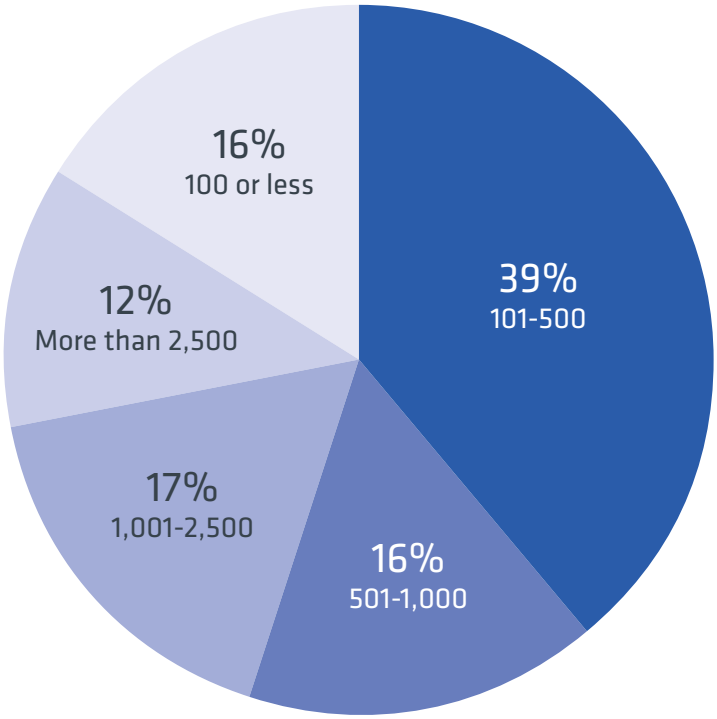
Facility managers at headquarters, mixed use and educational facilities were most apt to maintain and operate a central plant.

Central Plant Serving One or More Building?



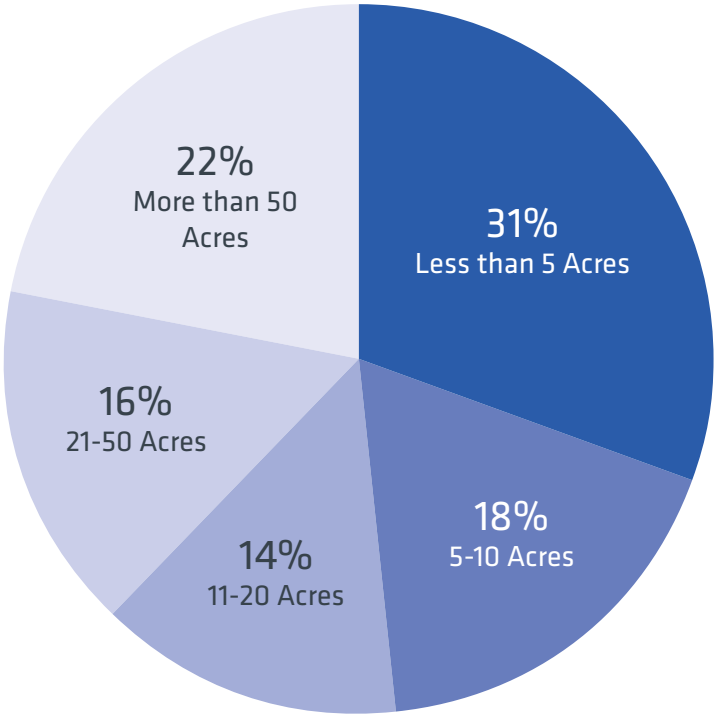
Number of Occupants

To gauge the size of the facility and determine density, respondents were asked to quantify the number of occupants they serve. Site population includes the average number of full-time, part-time and contract workers who occupy space over a 12-month period.



Developed Acres

In this report, the annual cost of maintaining roads and grounds is derived by dividing cost by the number of developed acres.



Size of Facilities and Square Footage Per Occupant

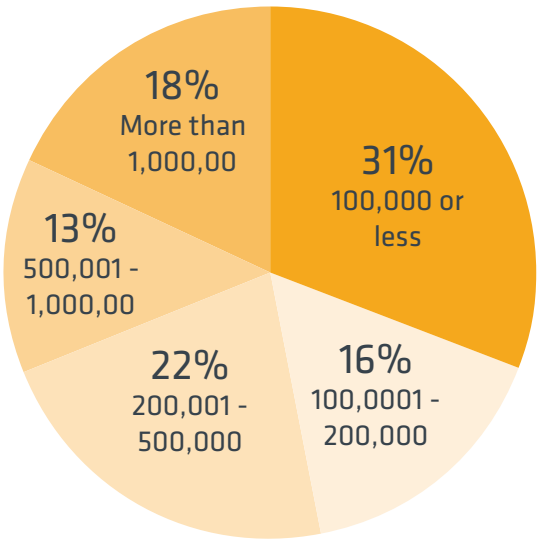
Building Exterior Gross Area (Gross)
Facility Rentable Area (Rentable)
Total Gross and Rentable (Industry Type)
Total Gross and Rentable (Facility Use)
Square Footage Per Occupant (Industry Type)
Square Footage Per Occupant (Facility Use)

Building Exterior Gross Area (Gross)

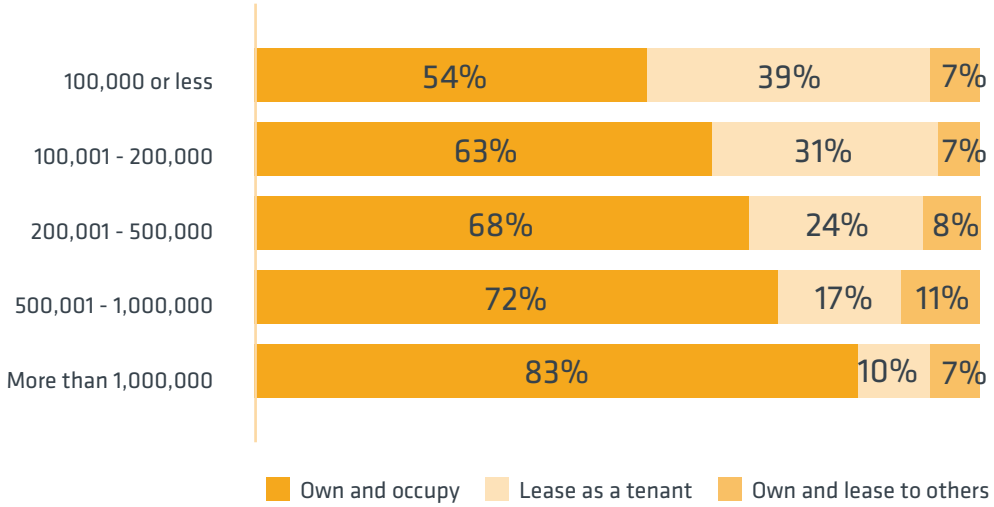
Respondents were asked to provide building exterior gross area (Gross or GSF; ASTM E1836-08) and facility rentable area (Rentable or RSF). Building exterior gross area is defined as the sum of the area of the floor measured to the outside face of the walls that enclose the floor(s) of the building. This includes interior areas, exterior gross to dominant portion, interior parking, as well as excluded, interstitial and restricted headroom areas. To learn more about this area measurement, see the glossary of definitions. Utility costs are reported as dollar per gross square foot.

PERCENTILE	GROSS SQUARE FEET
99%	11,345,486
95%	3,372,800
90%	1,800,000
75%	700,000
50%	241,000
25%	76,631
10%	30,000
5%	15,343
1%	4,160
MEAN	**2,208,156**

N = 817



Owned Versus Leased by GSF Size of Facility

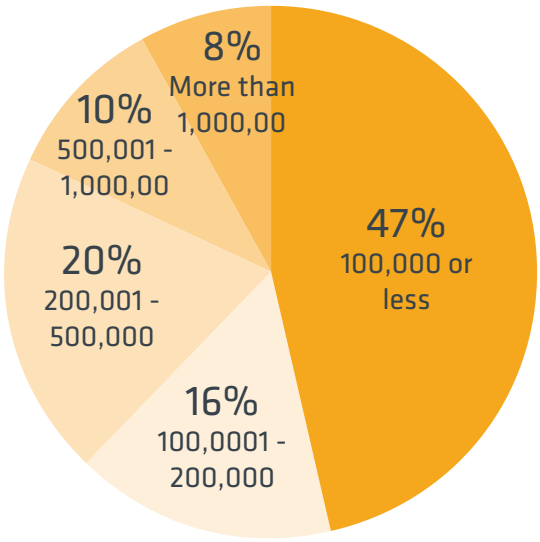


Facility Rentable Area (Rentable)

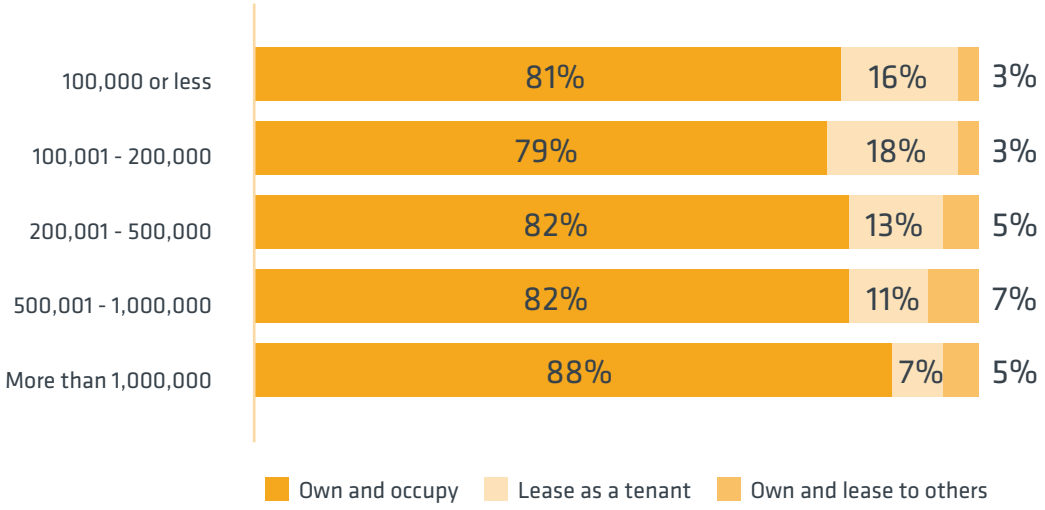
Rentable area is defined as building exterior gross area minus exterior walls, major vertical penetrations, interior parking space and void areas such as atriums and lobbies. Rentable area is a measurement used for both owned and leased properties. In this report, janitorial and maintenance costs are reported on a U.S. and Canadian dollar per rentable square feet ($/RSF) basis.

PERCENTILE	RENTABLE SQUARE FEET
99%	5,000,000
95%	1,399,654
90%	898,404
75%	346,020
50%	116,814
25%	35,827
10%	7,894
5%	3,296
1%	618
MEAN	**970,746**

N = 1,503



Owned Versus Leased by RSF Size of Facility



Total Gross and Rentable (Industry Type)

INDUSTRY TYPE	N	GROSS SQUARE FEET		RENTABLE SQUARE FEET	
		MEAN	MEDIAN	MEAN	MEDIAN
SERVICES					
Banking	48	553,055	140,853	484,017	116,720
Health Care	132	722,029	263,519	309,867	42,479
Hospitality	27	1,031,611	565,000	509,037	250,000
Information Services	31	520,446	150,000	538,859	136,000
Insurance	39	582,577	275,000	483,500	252,000
Investment Services	8	662,217	567,744	659,698	584,823
Media	11	825,601	159,828	609,792	139,142
Professional Services	68	202,783	54,500	174,957	54,682
Research	17	1,301,944	623,250	1,068,553	500,000
Telecommunications	6	1,518,431	729,000	1,268,224	546,018
Trade	15	506,154	300,000	461,130	235,000
Transportation	12	1,127,636	409,269	1,189,392	216,283
Utilities	12	657,539	639,035	554,183	577,500
Other Services (see page 12)	15	310,269	213,851	321,594	137,496
MANUFACTURING					
Aircraft/Industrial	19	7,062,191	805,000	2,696,017	600,000
Building/Construction	12	999,478	675,000	827,943	498,000
Chemical/Pharmaceutical	19	567,972	132,500	460,771	125,000
Computer	7	1,399,120	244,921	1,586,252	235,886
Consumer Products	26	4,750,484	417,800	4,382,642	315,000
Electronics	22	536,467	300,000	420,851	287,153
Energy	23	580,000	300,000	387,571	154,249
Medical Equipment	9	730,007	177,000	575,493	150,000
Motor Vehicles	7	1,273,567	835,000	1,192,871	835,000
Other Manufacturing (see page 12)	14	784,870	163,000	294,768	160,500
INSTITUTIONAL					
Association	22	1,770,165	100,000	512,581	86,000
Charitable Foundation	15	186,030	68,500	142,267	44,000
City/County Government	96	401,298	120,000	300,762	93,808
Corrections	7	559,575	190,886	270,581	115,578
Cultural	16	388,559	300,000	250,267	197,187
Educational	178	2,101,638	328,000	733,104	74,735
Federal Government	797	28,748,020	366,743	1,384,899	104,204
Military	4	488,037	490,000	359,688	296,966
Religious	16	373,338	210,000	300,752	153,829
Special Districts/Quasi-Government	18	1,383,103	395,000	899,826	265,000
State/Provincial Government	17	203,090	128,000	195,979	109,000
Other Institutions (see page 12)	12	1,593,561	251,524	460,467	177,744

Total Gross and Rentable (Facility Use)

FACILITY USE	N	GROSS SQUARE FEET		RENTABLE SQUARE FEET	
		MEAN	MEDIAN	MEAN	MEDIAN
Mixed Use Office	560	9,506,391	200,000	1,935,994	97,382
Headquarter	295	551,452	194,234	469,682	187,432
Courthouse	269	231,348	116,121	181,160	116,126
Branch/Regional Office	122	347,781	100,000	212,061	76,654
Medical Office	90	740,222	357,000	140,235	10,334
Manufacturing	82	954,481	300,000	645,226	171,000
Education	72	1,658,776	314,000	1,276,474	227,500
Research & Development	57	1,037,744	345,000	650,727	200,000
Warehouse	35	7,641,931	261,025	3,057,891	45,000
Multi-use	24	3,292,190	354,000	1,682,907	304,482
Museum	19	534,822	250,000	425,688	194,374
Community Center	17	1,099,223	195,000	659,169	60,000
Lodging & Hospitality	17	1,073,561	330,510	313,513	229,400
Multi-family	16	2,038,679	3,000,000	129,349	15,167
Biosciences	14	940,728	169,000	598,523	92,521
Library	12	289,517	110,913	195,970	62,235
Hospital	11	1,434,538	542,000	1,424,813	425,000
Stadium/Auditorium	10	438,881	425,000	287,915	212,500
Religious	8	172,499	148,829	166,563	133,829
Correctional	7	559,575	190,886	270,581	115,578
Convention Center	6	1,144,864	881,400	723,780	589,839
Sports & Entertainment	6	428,023	84,000	576,419	189,000
Big Box Store	5	943,000	1,300,000	794,200	900,000
Data Center	5	586,765	465,000	485,550	415,000
Bank Branch	3	812,193	812,193	472,138	9,500
Senior Housing	2	93,538	93,538	75,260	75,260

Square Footage Per Occupant (Industry Type)

In this report, the mean square footage per occupant has about doubled compared to the previous report; however, this is not indicative of all industries and facility types.

PERCENTILE	SQUARE FOOT PER OCCUPANT	
	GROSS	RENTABLE
99%	8,333	5,977
95%	3,277	2,500
90%	1,931	1,495
75%	833	667
50%	455	382
25%	285	240
10%	185	161
5%	116	110
1%	15	19
MEAN	**988**	**703**

N = 734

INDUSTRY TYPE	N	GROSS SQUARE FEET		RENTABLE SQUARE FEET	
		MEAN	MEDIAN	MEAN	MEDIAN
SERVICES					
Banking	48	406	350	362	305
Health Care	132	464	333	391	271
Hospitality	27	3,339	629	1,157	451
Information Services	31	692	272	692	260
Insurance	39	364	300	311	267
Investment Services	8	301	288	287	289
Media	11	1,632	1,223	1,133	400
Professional Services	68	886	422	656	378
Research	17	1,026	529	852	500
Telecommunications	6	390	311	271	263
Trade	15	560	425	488	286
Transportation	12	1,051	822	871	469
Utilities	12	641	628	535	486
Other Services (see page 12)	15	1,255	459	973	369
MANUFACTURING					
Aircraft/Industrial	19	1,711	727	1,185	623
Building/Construction	12	1,403	550	1,155	438
Chemical/Pharmaceutical	19	756	614	673	514
Computer	7	337	409	337	429
Consumer Products	26	843	463	839	354
Electronics	22	573	499	428	369
Energy	23	568	491	466	429
Medical Equipment	9	558	490	476	410
Motor Vehicles	7	1,314	492	1,386	633
Other Manufacturing (see page 12)	14	851	499	621	560
INSTITUTIONAL					
Association	22	813	400	594	372
Charitable Foundation	15	706	500	579	456
City/County Government	96	1,083	574	799	517
Corrections	7	3,234	3,234	1,838	1,838
Cultural	16	2,216	1,487	1,352	900
Educational	178	851	387	695	301
Federal Government	797	1,149	614	1,035	496
Military	4	1,250	333	933	353
Religious	16	1,531	1,113	1,287	833
Special Districts/Quasi-Government	18	1,452	589	751	324
State/Provincial Government	17	586	547	447	420
Other Institutions (see page 12)	12	3,897	619	829	466

Square Footage Per Occupant (Facility Use)

FACILITY USE	N	GROSS SQUARE FEET		RENTABLE SQUARE FEET	
		MEAN	MEDIAN	MEAN	MEDIAN
Headquarter	261	569	371	474	331
Mixed Use office	100	1,090	387	592	325
Branch/Regional Office	72	811	331	529	257
Manufacturing	62	930	649	869	600
Education	57	907	391	754	335
Multi-use	22	868	658	551	509
Warehouse	17	1,762	1,225	1,536	1,000
Medical Office	14	746	409	592	344
Biosciences	13	829	507	626	398
Lodging & Hospitality	13	4,932	418	799	364
Museum	13	2,279	1,503	1,959	1,332
Transportation	11	1,541	977	756	286
Community Center	10	1,499	875	1,481	757
Hospital	10	644	444	505	372
Library	8	1,236	1,154	978	793
Stadium/Auditorium	8	2,739	1,938	1,497	985
Courthouse	6	625	453	555	439
Sports & Entertainment	6	1,461	1,174	2,783	1,518
Convention Center	5	2,931	2,323	1,917	2,500
Religious	5	1,683	2,317	1,596	2,000
Big Box Store	4	1,545	1,329	1,116	981
Data Center	3	3,149	650	2,669	588
Multi-family	3	484	484	240	273
Bank Branch	2	486	486	438	438
Correctional	2	3,234	3,234	1,838	1,838

Sustainable Operations and Maintenance Practices

Green Certification Status
Recycling
Green Janitorial Practices
Water Conservation
Energy Management Practices

Green Certification Status

As organizations recognize the importance of conducting business in a socially responsible manner, they are scrutinizing how its facilities impact the environment. About 47 percent of the respondents reported they had some green elements, but no certification (compared to 61 percent in the previous report). The respondent was asked whether their buildings had any type of 'green certification.'

Building Green Certification Status – By Industry Served

INDUSTRY TYPE	NO GREEN ELEMENTS	PLANS FOR CERTIFICATION	GREEN ELEMENTS, NO CERTIFICATION	ONE OR MORE BUILDINGS CERTIFIED
SERVICES				
Banking	13%	2%	46%	40%
Health Care	17%	0%	60%	23%
Hospitality	12%	4%	48%	36%
Information Services	10%	3%	55%	31%
Insurance	17%	3%	64%	17%
Investment Services	0%	0%	38%	63%
Media	10%	0%	10%	80%
Professional Services	25%	2%	40%	33%
Research	24%	0%	47%	29%
Telecommunications	80%	0%	0%	20%
Trade	19%	0%	56%	25%
Transportation	0%	0%	50%	50%
Utilities	23%	0%	54%	23%
Other Services (see page 12)	23%	23%	31%	23%
MANUFACTURING				
Aircraft/Industrial	40%	0%	50%	10%
Building/Construction	18%	9%	36%	36%
Chemical/Pharmaceutical	35%	12%	35%	18%
Computer	40%	0%	40%	20%
Consumer Products	9%	9%	48%	35%
Electronics	16%	5%	68%	11%
Energy	17%	11%	44%	28%
Medical Equipment	13%	0%	75%	13%
Motor Vehicles	71%	14%	0%	14%
Other Manufacturing (see page 12)	38%	0%	46%	15%
INSTITUTIONAL				
Association	32%	0%	53%	16%
Charitable Foundation	15%	8%	54%	23%
City/County Government	22%	1%	45%	31%
Corrections	67%	0%	33%	0%
Cultural	44%	19%	31%	6%
Educational	17%	3%	45%	36%
Federal Government	15%	6%	33%	45%
Military	67%	0%	0%	33%
Religious	19%	6%	75%	0%
Special Districts/Quasi-Government	12%	0%	59%	29%
State/Provincial Government	25%	0%	56%	19%
Other Institutions (see page 12)	20%	30%	40%	10%

Green Certification Status

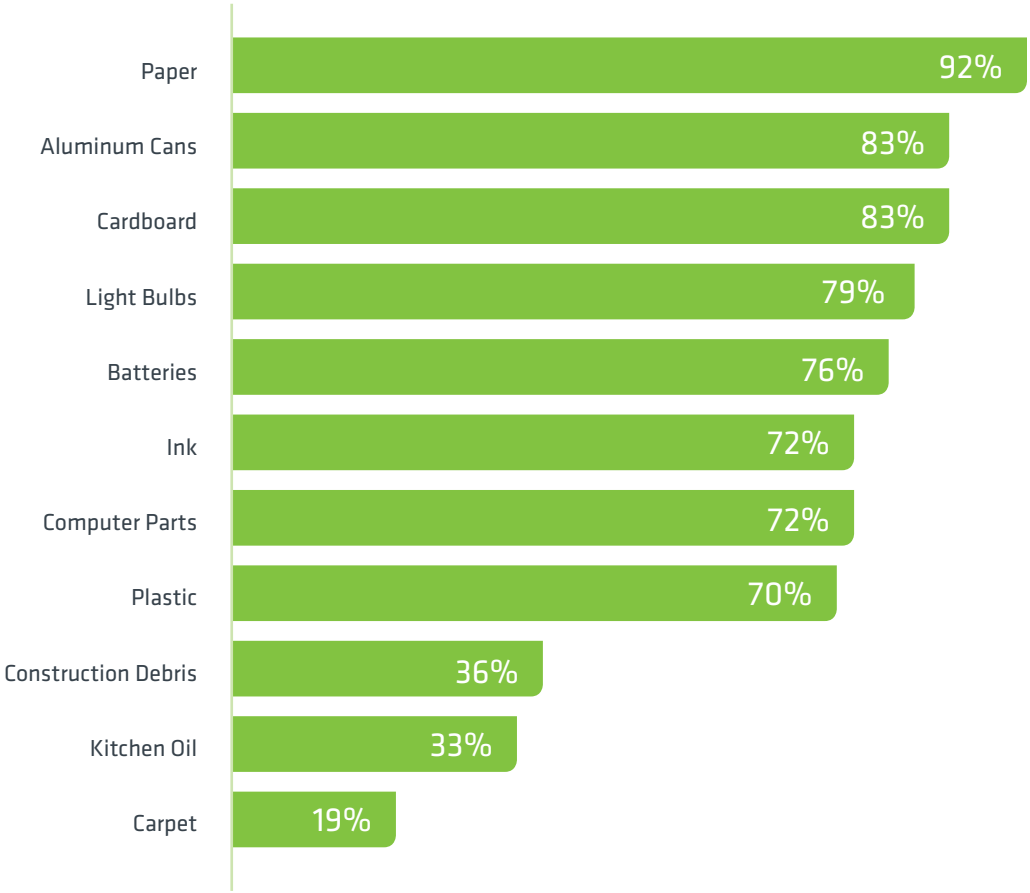
Building Green Certification Status – By Facility Use

FACILITY USE	NO GREEN ELEMENTS	PLANS FOR CERTIFICATION	GREEN ELEMENTS, NO CERTIFICATION	ONE OR MORE BUILDINGS CERTIFIED
Bank Branch	33%	0%	67%	0%
Department Store	40%	0%	40%	20%
Biosciences	38%	0%	44%	19%
Branch/Regional Office	22%	7%	46%	25%
Community Center	26%	16%	47%	11%
Convention Center	25%	0%	25%	50%
Correctional	67%	0%	33%	0%
Courthouse	43%	0%	43%	14%
Data Center	50%	0%	33%	17%
Education	22%	5%	47%	27%
Headquarter	16%	2%	52%	30%
Hospital	0%	38%	31%	31%
Library	38%	0%	38%	25%
Lodging & Hospitality	22%	6%	56%	17%
Manufacturing	32%	8%	49%	12%
Medical Office	0%	29%	50%	21%
Military	0%	0%	100%	0%
Mixed Use office	18%	3%	39%	39%
Multi-family	43%	0%	43%	14%
Multi-use	25%	7%	46%	21%
Museum	18%	18%	53%	12%
Religious	36%	18%	45%	0%
Research & Development	5%	30%	41%	25%
Sports & Entertainment	11%	0%	78%	11%
Stadium/Auditorium	29%	14%	57%	0%
Transportation	10%	0%	33%	57%
Warehouse	24%	10%	43%	24%

N = 924

Recycling

About 98 percent of the respondents have implemented some type of recycling program. Paper is the most common item recycled.



N = 952

Green Janitorial Practices

Since cleaning is a labor-intensive process, one of the goals of green cleaning is to minimize exposure of chemicals and cleaning agents to housekeeping staff, workers and visitors while minimizing waste into the environment.

%	GREEN CLEANING
60%	Use cleaning chemicals that meet green cleaning certified standards
57%	Use janitorial paper products made with recycled content/ renewable resources
49%	Have an effective walk-off mat system outside and inside each entry
49%	Use vacuum cleaners with high-filtration filters
45%	Use microfiber wipes & mops instead of traditional dusters, mops and damp mops
44%	Use automatic chemical dispensers to reduce exposure and ensure proper dilution
37%	Stand-up/upright vacuum cleaners are still used
24%	Eliminated all disinfectants and sanitizers, except where specifically required
23%	Utilize vacuum cleaners with a decibel level less than 70
19%	Replaced multi-fold hand towels with hand dryers
9%	Reduced/eliminated plastic trash liners (substituting reusable-liners)

N = 1,079

Water Conservation

The most common water conservation practices were installing low-flow water fixtures and planting native/drought tolerant plants.

CLIMATE ZONE	N	LOW-FLOW FIXTURES	WATERLESS URINALS	COOLING TOWER BLOWDOWN RECYCLING	RAIN HARVESTING	DROUGHT TOLERANT PLANTS	COMPUTERIZED IRRIGATION CONTROLLERS	REDUCED IRRIGATION	RECLAIMED WATER	OTHER
Hot-Humid	69	12%	4%	20%	10%	16%	11%	15%	29%	20%
Mixed-Humid	139	30%	27%	34%	38%	26%	26%	25%	29%	40%
Hot-Dry	54	9%	8%	9%	5%	14%	13%	15%	11%	10%
Mixed-Dry	4	0%	0%	0%	0%	1%	1%	1%	4%	0%
Cold	122	31%	35%	20%	29%	24%	26%	25%	4%	10%
Marine	68	12%	19%	9%	14%	13%	17%	15%	18%	20%
CN2	25	4%	8%	7%	5%	5%	6%	4%	7%	0%

N = 481

Energy Management Practices

Energy management practices examined included lighting, equipment and controls, building and envelope, and renewable sources. The energy management practices that are most often implemented, such as the adjustment of thermostats and HVAC operating hours, do not require an outlay of capital.

%	EQUIPMENT & CONTROLS
66%	Adjusted operating hours of HVAC
58%	Installed variable speed drives for pumps and motors
46%	Installed energy efficient motors
39%	Set back thermostat
35%	Installed energy efficient heating equipment
34%	Installed energy efficient ventilation equipment
31%	Installed energy efficient chillers
31%	Increased number of times monitored/ controlled w/building automation systems
29%	Require the purchase of energy efficient selections (e.g., Energy Star)
25%	Installed energy efficient air compressors
25%	Repaired compressed air and steam leaks
25%	Change pneumatic controls to digital
22%	Implemented smart metering
21%	Monitor power quality to balance loads and reduce waste heat
19%	Installed electrical sub-metering for usage tracking of sub-units
19%	Implemented smart or automated demand response
7%	Asset direct metering (e.g., pumps, motors, etc.)

%	BUILDING ENVELOPE
17%	Performed thermal imaging study to detect sources of building heat loss
15%	Improved building shell insulation
13%	Installed energy efficient windows

%	LIGHTING
65%	Replaced existing light fixtures with new light fixtures
62%	Installed occupancy sensors
59%	Retrofitted existing light fixtures
38%	Adjusted operating hours of lighting
27%	Selectively reduced the number of lamps in over-lit areas
22%	Implemented daylight harvesting
20%	Installed an Energy Management Systems

%	RENEWABLE
8%	Installed solar systems for electric use
8%	Has electric vehicle charging stations
5%	Purchased green power from an outside source
5%	Uses alternative or renewable energy
5%	Has onsite power generation
3%	Installed solar power for hot water
2%	Installed solar systems for heat use
2%	Installed a geo-thermal system
1%	Installed a wind generation system for electricity
1%	Other:

Janitorial

Janitorial Costs
Janitorial Staffing
Contractor Practices
Janitorial Contract Characteristics
Janitorial Practices

Janitorial Costs

Janitorial costs include wages, benefits, staff support, supervision, administration, supplies, paper goods and noncapital equipment. Respondents were asked to provide the amount of floor area cleaned and if it differed from rentable area. Janitorial costs were divided by the respondent's rentable square footage (or cleanable square footage if provided). On average, janitorial costs have increased by about 40 percent since the previous report. Costs in educational, manufacturing and mixed-use offices had the largest cost increases since the previous report (an average of 67 percent increase). Multi-use and religious facilities appeared to have the largest declines compared to the previous report (an average of 55 percent decrease).

PERCENTILE	$/RSF
99%	$12.65
95%	$5.00
90%	$3.50
75%	$2.45
50%	$1.76
25%	$1.12
10%	$0.44
5%	$0.20
1%	$0.04
MEAN	**$2.17**

BEST IN CLASS

N = 1,426

FACILITY USE	N	$/RSF
Mixed Use Office	470	$2.32
Courthouse	265	$2.04
Headquarter	220	$2.26
Branch/Regional Office	87	$1.68
Education	65	$2.29
Manufacturing	57	$1.86
Research & Development	42	$1.93
Warehouse	30	$1.83
Medical Office	28	$2.57
Multi-use	21	$1.02
Museum	16	$2.88
Community Center	14	$1.40
Transportation	14	$4.83
Lodging & Hospitality	13	$2.51
Biosciences	12	$1.70
Library	10	$2.05
Hospital	9	$2.58
Stadium/Auditorium	9	$1.55
Religious	7	$0.88
Sports & Entertainment	6	$1.52
Correctional	6	$0.69
Data Center	5	$0.75
Big Box Store	4	$0.80
Convention Center	4	$0.67
Multi-family	4	$3.04
Bank Branch	2	$2.38

COUNTRY/REGION	N	$/RSF
Canada	25	C $3.62
New England	79	$2.12
Northeast	92	$2.91
Mid-Atlantic	235	$2.53
Southeast	139	$1.90
Midwest	109	$1.81
North Central	77	$1.96
Heartland	121	$1.87
South Central	207	$2.07
Mountain	118	$1.93
Pacific	218	$2.29

INDUSTRY TYPE	N	$/RSF
SERVICES		
Banking	41	$2.50
Health Care	58	$2.33
Hospitality	22	$2.03
Information Services	20	$2.18
Insurance	34	$1.69
Investment Services	6	$1.86
Professional Services	48	$2.17
Telecommunications	5	$2.38
Trade	12	$2.33
Transportation	9	$4.74
Utilities	10	$2.18
Media	6	$1.31
Research	16	$1.49
Other Services	6	$1.04
MANUFACTURING		
Aircraft/Industrial	18	$3.31
Building/ Construction	8	$0.80
Chemical/ Pharmaceutical	14	$1.91
Computers	4	$2.09
Consumer Products	22	$2.42
Electronics	15	$1.11
Energy	15	$2.23
Medical Equipment	9	$1.39
Motor Vehicles	6	$0.91
Other Manufacturing	11	$2.04
INSTITUTIONAL		
Association	15	$1.22
Charitable Foundation	11	$1.09
City/County Government	76	$1.46
Corrections	6	$0.69
Cultural	15	$3.21
Educational	108	$1.90
Federal Government	731	$2.33
Military	3	$0.83
Religious	15	$1.27
Special Districts/ Quasi-Government	11	$4.11
State/Provincial Government	11	$2.58
Other Institutions	9	$1.74

Janitorial Costs

A number of factors can affect janitorial costs including operating schedule, provision of labor, specialized cleaning requirements and the time of day that cleaning is performed.

FACILITY SIZE (RSF)	N	$/RSF
Less than 50,000	380	$2.72
50,000-100,000	236	$2.07
100,001-250,000	329	$1.88
250,001-500,000	223	$2.03
500,001-750,000	87	$1.98
750,001-1,000,000	56	$2.10
1,000,001-1,500,000	47	$1.50
1,500,001-2,000,000	14	$1.32
2,000,001-3,000,000	18	$1.32
More than 3,000,000	25	$2.05

FACTORS	N	$/RSF
JANITORIAL FUNCTION PERFORMED BY		
In-House	172	$2.53
Contracted	390	$1.81
Equal In-House and Contracted	14	$2.02
FACILITY OPERATED		
5 days per week	143	$2.08
6 days per week	81	$2.05
7 days per week	396	$2.15
PRIMARY CLEANING PERFORMED		
Normal work hours	178	$1.99
Before/after work hours	443	$2.17
OWNERSHIP		
Owner occupied	1,121	$2.17
Leased	153	$2.26
Combination owned and leased	47	$3.39
GREEN CERTIFICATION STATUS		
One or more buildings certified	164	$2.40
Green elements, no certification	291	$1.97
No green elements	128	$2.15
Plans for certification next 12 months	22	$2.22
RECYCLING PROGRAM IN PLACE		
Yes	718	$2.92
No	11	$1.85
AGE		
<5 Years	43	$2.09
5-10 Years	96	$1.83
11-15 Years	84	$1.90
16-20 Years	115	$2.54
21-30 Years	137	$2.13
31-50 Years	366	$2.15
51-100 Years	419	$2.15
>100 Years	129	$2.60
OTHER TYPE OF CLEANING		
Specialized cleaning	177	$13.65

Janitorial Staffing

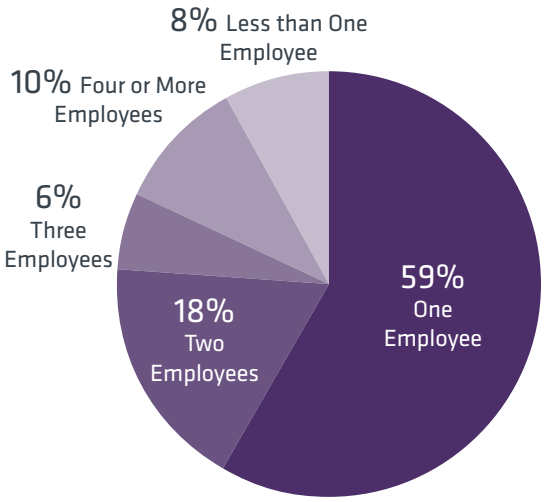
The following chart shows the average number of janitors, janitorial supervisors and project cleaners (special cleaning or floor crew) for different facility sizes. The median amount of floor area cleaned per janitor is about 37,000 rentable square feet. The reported staffing levels are for both in-house and contracted janitorial services.

FACILITY SIZE (RSF)	N	NUMBER OF JANITORIAL FTEs	NUMBER OF JANITORIAL SUPERVISOR FTEs	NUMBER OF PROJECT CLEANERS, SPECIAL CLEANING OR FLOOR CREW FTEs
Less than 50,000	106	5.2	1.2	1.8
50,000-100,000	83	4.0	1.1	1.9
100,001-250,000	108	8.0	1.3	2.6
250,001-500,000	85	13.4	1.7	2.6
500,001-750,000	35	21.8	2.4	4.5
750,001-1,000,000	30	28.2	2.4	5.5
1,000,001-1,500,000	25	33.9	4.6	6.6
1,500,001-2,000,000	6	79.2	5.8	9.8
2,000,001-3,000,000	10	63.4	5.3	9.3
More than 3,000,000	15	102.3	5.9	5.8

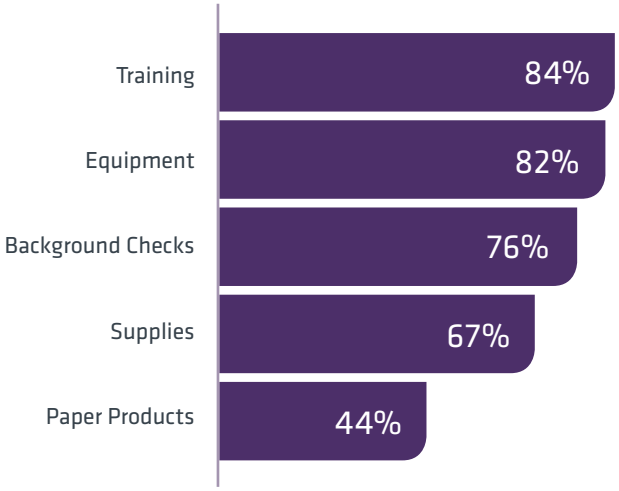
Contractor Practices

The following chart shows the average number of janitors, janitorial supervisors and project cleaners (special cleaning or floor crew) for different facility sizes. The median amount of floor area cleaned per janitor is about 37,000 rentable square feet. The reported staffing levels are for both in-house and contracted janitorial services

Number of In-House Employees Supervising Contract



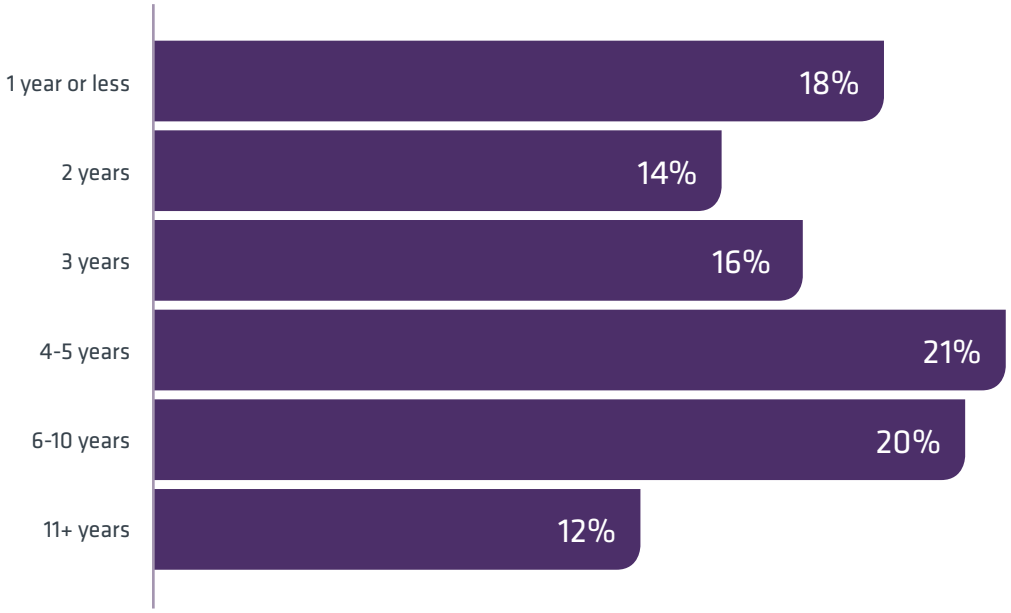
Contractor Provides



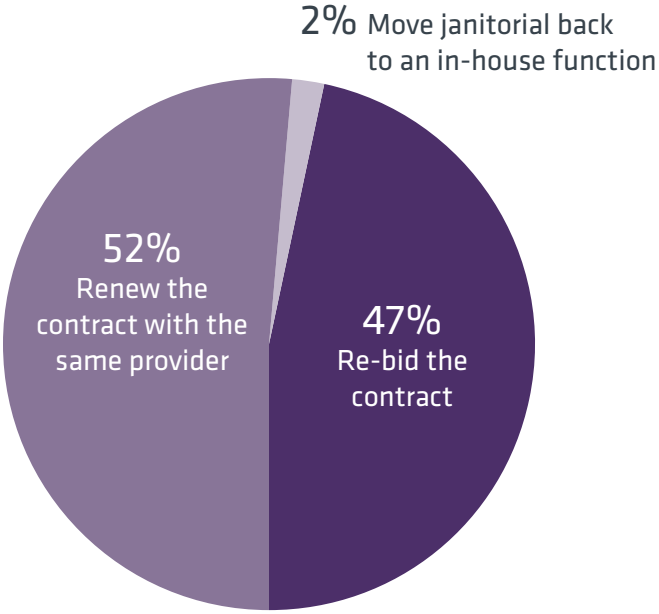
Janitorial Contract Characteristics

Facility Managers are reporting that about 54 percent of their janitorial contracts are based on tasks and frequencies, a 7-percentage-point increase from the previous study.

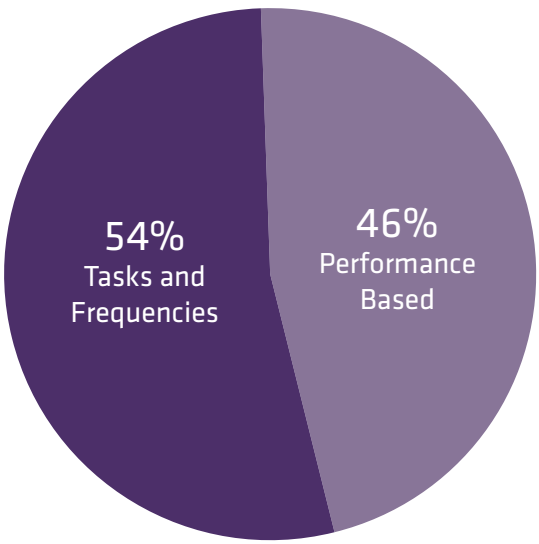
Number of Years Contract Has Been in Place



When Janitorial Contract Comes Up for Renewal



Terms of Contract



Janitorial Practices

In an effort to keep costs down, the frequency of certain tasks has decreased. Compared to IFMA's 2009 measurements, the daily task of trash removal, restroom cleaning and recyclable collections has increased while other tasks remain about the same.

JANITORIAL PRACTICE	MORE THAN ONCE A DAY	ONCE A DAY	SEMI-WEEKLY	WEEKLY	BI-MONTHLY	MONTHLY	QUARTERLY	SEMI-ANNUALLY	ANNUALLY	AS REQUIRED	NOT PERFORMED
Trash removal	30%	53%	8%	5%	1%	0%	0%	0%	0%	1%	0%
Low dusting	2%	17%	9%	33%	7%	11%	5%	1%	1%	10%	3%
High dusting	1%	2%	2%	11%	5%	17%	16%	7%	9%	22%	8%
Carpet vacuuming	6%	48%	18%	17%	3%	2%	0%	0%	0%	2%	3%
Upholstery vacuuming	2%	14%	9%	19%	7%	13%	8%	4%	2%	16%	6%
Recyclables collected	14%	49%	10%	15%	3%	2%	0%	0%	0%	4%	3%
Spot carpet cleaning	5%	21%	9%	13%	3%	10%	4%	2%	1%	28%	3%
Entire carpet cleaning	1%	4%	2%	7%	2%	10%	22%	18%	18%	14%	4%
Kitchen/break room and/or workroom cleaning	23%	54%	5%	6%	1%	2%	1%	1%	0%	4%	4%
Restroom cleaning	54%	39%	2%	2%	1%	0%	1%	0%	1%	1%	0%
Steam cleaning of ceramic walls	0%	1%	1%	2%	1%	3%	6%	5%	7%	23%	50%
Sweep/mop tile or composition flooring	15%	58%	10%	11%	1%	1%	0%	0%	0%	2%	1%
Clean light fixture/ ventilation grilles	0%	2%	0%	4%	2%	13%	16%	10%	14%	33%	6%
Spot clean walls/ switchplates	3%	18%	9%	19%	4%	9%	5%	2%	2%	26%	3%
Spot clean glass/entrance doors	15%	43%	11%	14%	2%	4%	2%	0%	0%	7%	2%
Interior window/window blind cleaning	1%	5%	2%	7%	3%	14%	14%	18%	18%	13%	4%
Exterior window washing	1%	2%	1%	2%	1%	6%	15%	26%	23%	10%	14%
Dust & clean desk equipment	1%	16%	9%	21%	5%	7%	2%	1%	1%	19%	18%
Data center cleaning	1%	8%	3%	7%	2%	6%	8%	5%	4%	20%	36%
Sanitize telephones and/or keyboards	1%	9%	3%	12%	3%	6%	3%	2%	2%	25%	34%

Maintenance

Maintenance Categories
Maintenance Costs
Roads and Grounds Costs
Maintenance Tracking
Facility Operating Current Replacement Value (CRV) Index
Maintenance Staffing
Maintenance Management
Administrative Support

Maintenance Categories

IFMA divides maintenance cost into five distinct categories which are defined below. Most maintenance costs fall within the first three categories: external building maintenance, interior systems maintenance and roads and grounds. The remaining two cost categories, utility system maintenance, and process treatment/environmental system maintenance are costs likely incurred by manufacturing facilities and large campuses with central plants. Solid waste management—a category found under environmental system maintenance—refers to industrial waste that contains non-hazardous materials, such as by-products of production, and should not be interpreted as ordinary garbage, trash or municipal waste.

External building maintenance

- Roof
- Skin (siding, masonry, sash, glazing, window washing, external doors)
- Exterior signage

Interior systems maintenance

- Electrical systems (primary and secondary systems, emergency electrical systems, uninterrupted power supply (UPS), lighting systems, egress signage, master clocks, fire/life safety systems and alarms and remote monitoring, elevator maintenance/repair)
- Mechanical systems (HVAC, chillers, boilers, plumbing, extinguishing systems, back flow prevention, refrigeration and non-process related pumps)
- Building and general maintenance (interior walls, doors, ceilings, partitions and interior finishes, pest control)
- Interior signage
- Administrative support services

Roads and grounds maintenance

- Roadways, sidewalks, parking lots (paving repairs, sealing, striping, parking, roadway lighting, power washing), snow removal and deicing
- Landscaping (planting, mowing, irrigation)
- Parking structures (surface repairs, sealing, striping, lighting and drainage systems)
- Storm sewers (catch basins, manholes, sub-surface drainage systems)
- Underground fire systems and hydrants

Utility/central system maintenance

- Electrical (generation/distribution)
- Mechanical (steam, hot and cold water systems)

Process treatment and environmental systems

- Process cooling water systems
- Process gas systems
- Air discharge scrubbers
- Waste water systems
- Water treatment plants
- Incinerator operation
- Solid waste management system

Maintenance Costs

The annual maintenance cost includes all repair, preventive, materials, direct labor and contract costs. Those who manage leased properties provided maintenance costs from common area maintenance (CAM) charges in addition to building operating expenses charged by the landlord or property manager. The dollar per square foot costs listed in the Total Maintenance column does not equal the sum of the component costs due to the different sample sizes for each category. Compared to IFMA's previous report, maintenance costs have increased by about $1.59 per square foot (72 percent). The average total maintenance cost per rentable square foot is $3.81.

REGION	N	$/RSF
Canada	32	C $4.75
New England	81	$4.00
Northeast	89	$4.13
Mid-Atlantic	257	$2.96
Southeast	142	$2.78
Midwest	108	$2.74
North Central	76	$2.97
Heartland	118	$2.85
South Central	315	$5.39
Mountain	118	$3.07
Pacific	222	$4.07

$/RSF							
PERCENTILE	EXTERNAL BUILDING	INTERIOR SYSTEM	ROADS & GROUNDS	UTILITY/ CENTRAL SYSTEM	PROCESS TREATMENT/ ENVIRONMENTAL	ALL OTHER COSTS	TOTAL MAINTENANCE
99%	$5.00	$10.44	$4.78	$11.08	$4.51	$6.08	$24.58
95%	$2.13	$5.18	$1.40	$4.94	$1.59	$2.57	$10.00
90%	$0.93	$3.60	$0.84	$3.18	$0.80	$1.64	$6.30
75%	$0.43	$2.11	$0.41	$1.54	$0.35	$0.75	$3.57
50%	$0.17	$1.15	$0.15	$0.49	$0.12	$0.37	$2.11
25%	$0.07	$0.50	$0.06	$0.14	$0.05	$0.15	$1.19
10%	$0.03	$0.23	$0.03	$0.04	$0.02	$0.07	$0.30
5%	$0.02	$0.11	$0.01	$0.02	$0.01	$0.05	$0.15
1%	$0.00	$0.02	$0.002	$0.01	$0.01	$0.02	$0.01
Mean	**$0.54**	**$1.75**	**$0.42**	**$1.31**	**$0.39**	**$0.73**	**$3.81**
	N = 503	**N = 513**	**N = 1,007**	**N = 474**	**N = 328**	**N = 448**	**N = 1,531**

BEST IN CLASS

$/RSF								
INDUSTRY TYPE	N	EXTERNAL BUILDING	INTERIOR SYSTEM	ROADS & GROUNDS	UTILITY/ CENTRAL SYSTEM	PROCESS TREATMENT/ ENVIRONMENTAL	ALL OTHER COSTS	TOTAL MAINTENANCE
SERVICES								
Banking	39	$0.39	$1.92	$0.68	$1.61	$0.08	$0.54	$5.20
Health Care	111	$0.23	$2.06	$0.42	$1.02	$0.23	$0.92	$5.61
Hospitality	22	$0.38	$1.48	$1.18	$0.97	$0.52	$0.50	$5.79
Information Services	22	$0.11	$1.18	$0.22	$0.59	$0.16	$0.33	$2.51
Insurance	31	$0.51	$3.60	$0.45	$1.72	$0.07	$0.64	$6.30
Investment Services	7	$0.15	$2.63	$0.37	$1.48	$0.16	$0.74	$4.73
Media	5	$0.34	$0.32	$0.23	$0.83	$0.33	$0.21	$2.01
Professional Services	47	$0.35	$1.23	$0.36	$0.94	$0.28	$0.54	$3.47
Research	14	$0.31	$2.17	$0.25	$2.41	$0.52	$0.42	$5.22
Telecommunications	5	$0.47	$1.97	$0.50	$1.34	$0.23	$0.33	$4.85
Trade	13	$0.56	$1.14	$0.22	$0.28	$0.14	$0.82	$2.84
Transportation	8	$0.14	$1.53	$0.45	$1.22	$0.21	$0.59	$3.95
Utilities	9	$0.26	$1.48	$0.42	$0.74	$0.05	$0.27	$3.22
Other Services	8	$0.66	$0.59	$0.54	$2.00	$0.58	$0.47	$4.24
MANUFACTURING								
Aircraft/Industrial	14	$0.56	$0.90	$0.31	$0.50	$0.37	$1.33	$3.72
Building/Construction	9	$0.20	$0.96	$0.25	$1.05	$0.24	$0.59	$3.14
Chemical/ Pharmaceutical	14	$0.91	$1.86	$0.88	$2.87	$0.80	$1.25	$7.41
Computer	4	$1.64	$4.98	$0.23	$0.55	$0.76	$0.42	$8.49
Consumer Products	20	$0.25	$1.29	$0.35	$1.18	$0.11	$0.28	$3.20
Electronics	16	$0.18	$1.28	$0.34	$1.11	$0.42	$0.55	$4.72
Energy	15	$0.52	$1.34	$0.55	$1.84	$0.21	$0.48	$6.16
Medical Equipment	8	$0.60	$2.56	$0.90	$0.26	$0.04	$0.98	$4.44
Motor Vehicles	5	$0.14	$0.85	$0.39	$1.95	$0.12	$0.58	$4.03
Other Manufacturing	10	$0.59	$1.26	$0.77	$1.05	$0.15	$0.34	$4.31
INSTITUTIONAL								
Association	15	$0.51	$1.09	$0.33	$1.84	$0.46	$0.68	$4.40
Charitable Foundation	11	$0.14	$1.28	$0.32	$0.64	$0.03	$0.87	$3.17
City/County Government	79	$0.68	$2.01	$0.47	$0.87	$0.19	$0.56	$3.88
Corrections	6	$0.35	$1.01	$0.02	$0.30	$0.07	$0.20	$1.58
Cultural	16	$2.93	$3.07	$0.80	$3.01	$0.28	$0.89	$9.90
Educational	154	$0.25	$1.12	$0.33	$0.56	$0.12	$0.39	$2.36
Federal Government	777	$0.98	$2.34	$0.24	$1.55	$0.71	$1.50	$2.63
Military	4	$0.20	$1.20	$0.05	$0.69	$0.06	$0.05	$1.89
Religious	15	$0.44	$1.03	$0.46	$1.18	$0.47	$1.11	$3.33
Special Districts/ Quasi-Government	8	$0.73	$2.65	$0.81	$1.76	$0.58	$1.20	$5.07
State/Provincial Government	11	$0.46	$3.36	$0.50	$0.98	$0.30	$1.01	$5.99
Other Institutions	9	$0.36	$1.17	$0.44	$0.27	$0.12	$0.26	$2.11

$/RSF								
FACILITY USE	N	EXTERNAL BUILDING	INTERIOR SYSTEM	ROADS & GROUNDS	UTILITY/ CENTRAL SYSTEM	PROCESS TREATMENT/ ENVIRONMENTAL	ALL OTHER COSTS	TOTAL MAINTENANCE
Mixed Use Office	524	$0.40	$1.49	$0.26	$1.07	$0.18	$0.42	$2.71
Courthouse	267	$0.04	$2.15	$0.15	$0.39	$0.04	$0.40	$2.40
Headquarters	223	$0.43	$1.44	$0.46	$1.13	$0.14	$0.62	$3.95
Branch/Regional Office	93	$0.33	$2.88	$0.38	$1.29	$0.12	$0.66	$4.17
Medical Office	81	$0.37	$1.99	$0.45	$1.15	$0.36	$0.93	$6.27
Manufacturing	62	$0.33	$1.14	$0.38	$0.86	$0.47	$0.90	$4.65
Education	61	$0.24	$1.05	$0.50	$0.61	$0.12	$0.47	$2.64
Research & Development	43	$1.18	$2.51	$0.67	$2.51	$1.04	$1.24	$5.41
Warehouse	31	$0.28	$1.55	$0.78	$0.86	$0.31	$0.52	$3.16
Transportation	18	$0.35	$1.62	$0.04	$2.17	$0.93	$1.27	$2.41
Museum	17	$3.52	$3.10	$0.84	$3.99	$0.39	$0.95	$8.41
Multi-use	17	$0.26	$2.99	$0.33	$0.57	$0.28	$0.37	$3.19
Community Center	15	$0.48	$1.69	$0.51	$0.60	$0.13	$0.55	$2.81
Multi-family	15	$0.00	$1.66	$0.15	$0.01	$0.01	$0.06	$1.67
Lodging & Hospitality	14	$0.60	$1.92	$1.08	$1.85	$0.77	$0.91	$5.63
Hospital	10	$0.46	$2.76	$0.35	$1.22	$0.22	$0.82	$4.15
Biosciences	10	$0.25	$2.87	$0.20	$1.78	$0.48	$0.97	$6.29
Stadium/Arena	10	$1.05	$3.44	$0.17	$0.65	$0.39	$0.28	$4.74
Library	9	$1.35	$1.54	$0.20	$1.29	$0.12	$0.43	$3.55
Religious	7	$0.22	$0.90	$0.23	$2.93	$1.86	$2.28	$3.42
Correctional	6	$0.35	$1.01	$0.02	$0.30	$0.07	$0.20	$1.58
Convention Center	5	$0.08	$0.95	$0.53	$1.15	$0.19	$0.23	$8.38
Data Center	5	$0.09	$1.59	$0.21	$0.78	$0.26	$0.42	$3.46
Sports & Entertainment	5	$0.09	$1.35	$2.69	$1.23	$0.26	$0.24	$3.99
Big Box Store	4	$1.22	$1.07	$0.34	$0.80	$0.33	$0.95	$4.21

AGE OF FACILITY	N	$/RSF	% PREVENTIVE MAINTENANCE	% REACTIVE MAINTENANCE	% PREDICTIVE MAINTENANCE
< 5 Years	15	$5.47	41	40	19
5-10 Years	24	$2.84	36	52	13
11-15 Years	33	$2.97	49	37	14
16-20 Years	42	$4.65	44	40	16
21-30 Years	45	$3.95	41	42	17
31-50 Years	102	$4.83	44	38	18
51-100 Years	59	$2.94	41	44	15
>100 Years	13	$4.30	23	60	16

Roads and Grounds Costs

The maintenance of roads, grounds, parking surfaces and structures are also represented as dollar per developed acre. This cost has gone up by about 23 percent since the previous report. Weather conditions such as colder than average winters and subsequent snow can affect this cost category. Cold and warm fluctuating weather can also have a large impact as these cycles may require frequent application of salt/sand.

PERCENTILE	$/DEVELOPED ACRE
99%	$34,234
95%	$22,895
90%	$18,132
75%	$8,290
50%	$3,993
25%	$1,520
10%	$576
5%	$374
1%	$72
MEAN	**$6,675**

BEST IN CLASS

N = 423

FACILITY DESCRIPTION	N	$/DEVELOPED ACRE
A single building	155	$6,597
Multiple building, one location	151	$7,358
Multiple buildings, multiple locations	95	$5,218
FACILITY SETTING	**N**	**$/DEVELOPED ACRE**
Central Business District	77	$7,270
Business Park	57	$6,535
Secondary Downtown	98	$8,050
Suburban Area	114	$6,238
Industrial Park	45	$5,824
Rural Area	32	$4,040
CLIMATE ZONE	**N**	**$/DEVELOPED ACRE**
Hot-Humid	45	$5,208
Mixed-Humid	116	$6,782
Hot-Dry	36	$7,526
Cold	166	$7,146
Very Cold	3	$2,945
Marine	35	$5,734
CN1	4	$2,252
CN2	15	$7,406
FACILITY USE	**N**	**$/DEVELOPED ACRE**
Headquarter	141	$7,713
Mixed Use office	52	$7,841
Education	41	$3,708
Manufacturing	35	$5,250
Branch/Regional Office	29	$8,933
Multi-use	12	$3,952
Warehouse	12	$2,678
Medical Office	10	$8,422
Museum	9	$7,199
Community Center	9	$2,586
Lodging & Hospitality	7	$11,449
Hospital	7	$9,953
Stadium/Auditorium	7	$8,369
Library	5	$4,456
Courthouse	4	$6,943
Religious	4	$3,485
Biosciences	3	$5,364
Data Center	3	$1,029
Convention Center/Exhibit Hall	3	$2,687
Department Store	2	$7,546
Research & Development	2	$4,155

Maintenance Tracking

To manage, schedule and track maintenance cost and activities, the majority of respondents, 31 percent, use a CMMS system, a 15-percentage-point decrease from the 2009 study. In contrast to the previous study, manual spreadsheets/Microsoft Excel was the most common method of maintenance management (37 percent).

Respondents were also asked about what type of maintenance productivity metrics they collect. The type of information most often collected is response time for work requests and percentage of work orders closed on time.

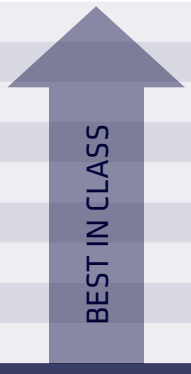
FACILITY SIZE (RSF)	N	BIM	CAFM	CMMS	SPREADSHEETS/ EXCEL	OTHER
Less than 100,000	282	5%	10%	23%	50%	5%
100,001-200,000	124	4%	18%	31%	33%	4%
200,001-500,000	160	7%	15%	35%	31%	6%
500,001-1,000,000	113	3%	18%	35%	30%	3%
More than 1,000,000	131	8%	14%	37%	25%	2%
OVERALL	**805**	**5%**	**14%**	**31%**	**37%**	**4%**

MAINTENANCE METRIC	%
Percentage of work orders closed on time	48%
Preventive maintenance backlog	47%
Time to respond to work requests	47%
Number of service complaints	46%
Time to repair work requests	45%
Cost per area ($/SF)	38%
Corrective backlog maintenance completion	33%
Equipment downtime	31%
Adherence to Planned Maintenance (time/meter reads) completion	29%
Percentage of budget spent on breakdown (unplanned maintenance)	26%
Money per number of FTEs	17%
Other metrics (percentage of open work orders, SF assigned per mechanic, billable time, cost as a % of revenue, etc.)	2%

Facility Operating Current Replacement Value (CRV) Index

The CRV index represents the level of funding provided for maintaining an organization's portfolio of capital assets. This percentage is derived by dividing total annual maintenance by current replacement value and multiplying by 100. The 1990 National Research Council report, Committing to the Cost of Ownership: The Maintenance and Repair of Public Buildings, recommends a budget allocation for routine maintenance and repair to be in the 2-to-4 percent range of aggregate current replacement value. This year's measurement, an average of 1.82 percent, demonstrates a 0.27-percentage -point increase in the CRV index compared to the previous report.

PERCENTILE	CRV INDEX %
99%	18.89%
95%	5.59%
90%	3.58%
75%	1.86%
50%	0.83%
25%	0.34%
10%	0.14%
5%	0.08%
1%	0.01%
MEAN	**1.82%**



N = 489

Maintenance Staffing

No two organizations are alike, and how they allocate staff differs as well. Survey respondents completed a worksheet quantifying the number of workers employed for base building operations. The worksheet was divided into three categories: maintenance workforce (trades), maintenance management and administrative support. Custodial workers and grounds keeping staff were not included in this maintenance headcount. The data provided shows the number of FTEs based upon facility size, provision of labor, as well as number of shifts, days worked and ratio of space per position.

PLUMBERS

FACILITY SIZE (RSF)	N	NUMBER OF FTEs	% IN-HOUSE	% CONTRACT	SHIFTS PER DAY	DAYS PER WEEK
Less than 50,000	20	1.3	60%	40%	1.1	4.3
50,000-100,000	9	1.3	44%	56%	0.7	2.4
100,001-250,000	30	0.9	49%	51%	1.1	4.2
250,001-500,000	25	1.3	63%	37%	1.0	4.2
500,001-750,000	14	3.2	86%	14%	1.8	5.2
750,001-1,000,000	18	2.4	69%	31%	1.4	4.8
1,000,001-1,500,000	17	3.4	69%	31%	1.2	5.0
1,500,001-2,000,000	6	15.8	96%	4%	1.2	5.2
2,000,001-3,000,000	9	7.0	33%	67%	1.2	5.2
More than 3,000,000	9	44.3	78%	22%	1.6	5.4

ELECTRICIANS

FACILITY SIZE (RSF)	N	NUMBER OF FTEs	% IN-HOUSE	% CONTRACT	SHIFTS PER DAY	DAYS PER WEEK
Less than 50,000	11	1.85	61%	39%	1.1	3.6
50,000-100,000	10	1.09	50%	50%	0.7	2.8
100,001-250,000	42	1.21	60%	40%	1.2	4.4
250,001-500,000	36	2.20	65%	35%	1.1	4.8
500,001-750,000	20	4.13	65%	35%	1.7	5.2
750,001-1,000,000	21	2.55	69%	31%	1.3	5.0
1,000,001-1,500,000	19	5.16	59%	41%	1.2	5.3
1,500,001-2,000,000	6	8.50	97%	3%	1.5	5.2
2,000,001-3,000,000	11	10.91	46%	54%	1.6	5.4
More than 3,000,000	10	190.30	74%	26%	1.5	5.6

CONTROLS AND LOW VOLTAGE

FACILITY SIZE (RSF)	N	NUMBER OF FTEs	% IN-HOUSE	% CONTRACT	SHIFTS PER DAY	DAYS PER WEEK
Less than 50,000	14	1.54	55%	45%	1.1	4.1
50,000-100,000	11	1.06	61%	39%	0.8	3.4
100,001-250,000	28	1.23	68%	32%	1.1	4.4
250,001-500,000	18	4.01	63%	37%	1.1	4.4
500,001-750,000	12	3.15	81%	19%	1.7	5.0
750,001-1,000,000	13	4.62	60%	40%	1.2	5.2
1,000,001-1,500,000	16	4.56	54%	46%	1.2	4.9
1,500,001-2,000,000	4	7.50	75%	25%	1.5	5.5
2,000,001-3,000,000	6	4.50	50%	50%	1.2	5.2
More than 3,000,000	7	15.07	93%	7%	1.4	5.3

Maintenance Staffing

HVAC AND CENTRAL PLANT OPERATORS						
FACILITY SIZE (RSF)	N	NUMBER OF FTEs	% IN-HOUSE	% CONTRACT	SHIFTS PER DAY	DAYS PER WEEK
Less than 50,000	23	2.36	50%	50%	1.1	4.1
50,000-100,000	13	1.02	40%	60%	0.7	2.8
100,001-250,000	46	1.76	62%	38%	1.2	4.5
250,001-500,000	40	2.26	64%	36%	1.2	4.6
500,001-750,000	19	4.17	63%	37%	1.8	5.3
750,001-1,000,000	22	4.38	77%	23%	1.6	5.3
1,000,001-1,500,000	23	5.61	69%	31%	1.7	5.7
1,500,001-2,000,000	7	21.14	97%	3%	2.1	6.1
2,000,001-3,000,000	10	15.30	59%	41%	1.6	5.4
More than 3,000,000	8	141.00	81%	19%	2.0	5.5

STATIONERY ENGINEERS						
FACILITY SIZE (RSF)	N	NUMBER OF FTEs	% IN-HOUSE	% CONTRACT	SHIFTS PER DAY	DAYS PER WEEK
Less than 50,000	8	2.00	68%	33%	1.5	4.8
50,000-100,000	13	1.15	61%	39%	0.9	3.4
100,001-250,000	15	2.09	69%	31%	1.4	5.1
250,001-500,000	13	6.00	66%	34%	1.8	5.9
500,001-750,000	12	5.67	75%	25%	2.4	5.5
750,001-1,000,000	8	4.25	75%	25%	1.9	5.8
1,000,001-1,500,000	10	7.40	85%	15%	2.5	6.3
1,500,001-2,000,000	4	4.33	100%	0%	2.5	6.5
2,000,001-3,000,000	4	9.63	50%	50%	2.3	5.5
More than 3,000,000	5	66.00	73%	27%	1.0	5.0

CARPENTERS						
FACILITY SIZE (RSF)	N	NUMBER OF FTEs	% IN-HOUSE	% CONTRACT	SHIFTS PER DAY	DAYS PER WEEK
Less than 50,000	17	2.01	62%	38%	1.1	4.1
50,000-100,000	11	1.74	77%	23%	1.0	3.8
100,001-250,000	30	1.03	72%	28%	1.1	5.0
250,001-500,000	23	2.34	71%	29%	1.1	4.8
500,001-750,000	18	4.34	83%	17%	1.4	5.2
750,001-1,000,000	17	2.53	75%	25%	1.3	4.9
1,000,001-1,500,000	17	3.32	68%	32%	1.1	5.0
1,500,001-2,000,000	6	16.50	94%	6%	1.0	5.0
2,000,001-3,000,000	11	6.45	48%	52%	1.2	5.5
More than 3,000,000	9	14.50	92%	8%	1.4	5.4

Maintenance Staffing

GENERALISTS						
FACILITY SIZE (RSF)	N	NUMBER OF FTEs	% IN-HOUSE	% CONTRACT	SHIFTS PER DAY	DAYS PER WEEK
Less than 50,000	28	3.09	87%	13%	1.2	4.9
50,000-100,000	28	3.02	95%	5%	1.3	5.1
100,001-250,000	47	4.60	78%	22%	1.3	5.1
250,001-500,000	36	5.07	77%	23%	1.3	5.2
500,001-750,000	19	3.92	72%	28%	1.7	5.2
750,001-1,000,000	17	3.94	73%	27%	1.4	5.2
1,000,001-1,500,000	18	5.61	86%	14%	1.3	5.3
1,500,001-2,000,000	6	10.00	80%	20%	1.3	5.3
2,000,001-3,000,000	7	14.00	50%	50%	1.7	5.3
More than 3,000,000	7	32.86	86%	14%	1.7	5.9

LOCKSMITHS						
FACILITY SIZE (RSF)	N	NUMBER OF FTEs	% IN-HOUSE	% CONTRACT	SHIFTS PER DAY	DAYS PER WEEK
Less than 50,000	14	1.05	65%	35%	1.1	4.1
50,000-100,000	8	0.73	30%	70%	0.7	1.3
100,001-250,000	14	0.77	67%	33%	0.9	3.7
250,001-500,000	13	0.74	75%	25%	1.0	4.2
500,001-750,000	9	1.82	56%	44%	1.3	4.6
750,001-1,000,000	15	1.03	77%	23%	1.0	3.7
1,000,001-1,500,000	9	0.97	76%	24%	1.0	4.1
1,500,001-2,000,000	5	20.40	100%	0%	1.0	5.0
2,000,001-3,000,000	8	2.25	38%	63%	1.1	5.3
More than 3,000,000	8	3.00	63%	38%	1.1	5.3

PAINTERS						
FACILITY SIZE (RSF)	N	NUMBER OF FTEs	% IN-HOUSE	% CONTRACT	SHIFTS PER DAY	DAYS PER WEEK
Less than 50,000	20	1.37	72%	28%	1.0	3.9
50,000-100,000	10	1.96	49%	51%	0.8	2.7
100,001-250,000	29	1.23	64%	36%	1.1	4.6
250,001-500,000	20	1.45	68%	33%	1.1	4.6
500,001-750,000	16	2.09	81%	19%	1.3	4.6
750,001-1,000,000	16	2.18	72%	28%	1.1	4.6
1,000,001-1,500,000	16	2.22	63%	38%	1.0	4.9
1,500,001-2,000,000	5	3.20	86%	14%	1.2	5.2
2,000,001-3,000,000	8	8.69	40%	60%	1.6	5.5
More than 3,000,000	8	21.56	72%	28%	1.3	5.5

Maintenance Staffing

OTHER FTEs						
FACILITY SIZE (RSF)	N	NUMBER OF FTEs	% IN-HOUSE	% CONTRACT	SHIFTS PER DAY	DAYS PER WEEK
Less than 50,000	16	5.80	76%	24%	1.3	4.3
50,000-100,000	6	2.13	94%	6%	1.2	4.7
100,001-250,000	18	2.51	71%	29%	1.2	5.1
250,001-500,000	18	5.11	64%	36%	1.8	5.2
500,001-750,000	4	6.88	73%	27%	1.0	5.0
750,001-1,000,000	6	30.83	83%	17%	1.5	5.3
1,000,001-1,500,000	6	17.83	83%	17%	1.0	5.0
1,500,001-2,000,000	5	6.00	90%	10%	1.2	5.8
2,000,001-3,000,000	3	76.33	0%	100%	1.7	5.7
More than 3,000,000	6	32.83	75%	25%	1.5	5.3

Maintenance Management

GROUP SUPERVISOR (e.g., Foreman)				
FACILITY SIZE (RSF)	N	NUMBER OF FTEs	% IN-HOUSE	% CONTRACT
Less than 50,000	75	2.39	86%	14%
50,000-100,000	65	1.44	82%	18%
100,001-250,000	89	1.60	82%	18%
250,001-500,000	80	1.80	79%	21%
500,001-750,000	38	2.08	74%	26%
750,001-1,000,000	34	6.38	84%	16%
1,000,001-1,500,000	28	4.64	84%	16%
1,500,001-2,000,000	8	6.38	85%	15%
2,000,001-3,000,000	13	10.77	69%	31%
More than 3,000,000	14	12.64	90%	10%

OPERATIONS AND MAINTENANCE MANAGER				
FACILITY SIZE (RSF)	N	NUMBER OF FTEs	% IN-HOUSE	% CONTRACT
Less than 50,000	64	1.49	87%	13%
50,000-100,000	58	1.64	81%	19%
100,001-250,000	90	1.69	86%	14%
250,001-500,000	72	1.62	87%	13%
500,001-750,000	36	1.67	75%	25%
750,001-1,000,000	30	2.27	90%	10%
1,000,001-1,500,000	27	3.07	82%	18%
1,500,001-2,000,000	10	3.20	99%	1%
2,000,001-3,000,000	10	4.70	75%	25%
More than 3,000,000	15	4.67	88%	12%

Administrative Support

ADMINISTRATIVE ASSISTANT

FACILITY SIZE (RSF)	N	NUMBER OF FTEs	% IN-HOUSE	% CONTRACT
Less than 50,000	59	0.93	93%	7%
50,000-100,000	47	0.85	85%	15%
100,001-250,000	75	0.91	91%	9%
250,001-500,000	55	0.84	84%	16%
500,001-750,000	32	0.88	88%	13%
750,001-1,000,000	27	0.96	96%	4%
1,000,001-1,500,000	18	0.82	82%	18%
1,500,001-2,000,000	8	0.94	94%	6%
2,000,001-3,000,000	10	0.80	80%	20%
More than 3,000,000	14	0.86	86%	14%

HELP DESK

FACILITY SIZE (RSF)	N	NUMBER OF FTEs	% IN-HOUSE	% CONTRACT
Less than 50,000	40	2.44	88%	13%
50,000-100,000	36	1.69	83%	17%
100,001-250,000	35	1.65	84%	16%
250,001-500,000	28	1.00	77%	23%
500,001-750,000	17	2.72	88%	12%
750,001-1,000,000	19	1.95	84%	16%
1,000,001-1,500,000	18	2.64	78%	22%
1,500,001-2,000,000	8	3.25	100%	0%
2,000,001-3,000,000	11	3.64	65%	35%
More than 3,000,000	12	5.75	89%	11%

OTHER ADMINISTRATIVE SUPPORT

FACILITY SIZE (RSF)	N	NUMBER OF FTEs	% IN-HOUSE	% CONTRACT
Less than 50,000	29	1.67	90%	10%
50,000-100,000	23	2.26	78%	22%
100,001-250,000	28	2.57	86%	14%
250,001-500,000	28	1.63	75%	25%
500,001-750,000	23	1.54	87%	13%
750,001-1,000,000	12	1.79	100%	0%
1,000,001-1,500,000	13	1.92	85%	15%
1,500,001-2,000,000	6	5.25	67%	33%
2,000,001-3,000,000	4	1.50	50%	50%
More than 3,000,000	10	4.70	95%	5%

TOTAL MAINTENANCE STAFF

FACILITY SIZE (RSF)	N	NUMBER OF FTEs
Less than 50,000	93	18
50,000-100,000	83	11
100,001-250,000	120	14
250,001-500,000	96	16
500,001-750,000	41	27
750,001-1,000,000	35	37
1,000,001-1,500,000	30	47
1,500,001-2,000,000	9	74
2,000,001-3,000,000	13	110
More than 3,000,000	15	212

Utilities

Utility Costs
Changes in Utility Consumption
Energy Use Index
Temperature Standards

Utility Costs

Utility costs are associated with the provision of electrical power, potable water, central heating and cooling, and sewage service. The utility categories provided were those most commonly used— electricity, fuel oil, natural gas, chilled water, steam, water and sewage. A miscellaneous category was provided as well to capture other utility costs. Items that fell into this category included diesel fuel, coal and storm water charges. The overall utility cost does not equal the sum of the separate utility costs because of different sample sizes. Compared to IFMA's previous benchmarking report, electricity and gas prices on a per square foot basis remained about the same, while water increased by about $0.34 per GSF.

$/GSF								
PERCENTILE	ELECTRICITY	FUEL OIL	NATURAL GAS	STEAM	WATER	SEWER	OTHER	TOTAL UTILITIES
99%	$20.33	$1.52	$5.43	$1.50	$6.23	$1.69	$5.47	**$21.25**
95%	$7.88	$0.31	$0.98	$1.19	$1.12	$0.72	$2.80	**$10.85**
90%	$5.27	$0.09	$0.69	$0.94	$0.64	$0.54	$1.96	**$6.15**
75%	$2.47	$0.03	$0.38	$0.47	$0.31	$0.23	$0.43	**$3.38**
50%	$1.56	$0.01	$0.18	$0.17	$0.14	$0.08	$0.18	**$2.08**
25%	$0.92	$0.004	$0.07	$0.01	$0.07	$0.03	$0.03	**$1.23**
10%	$0.26	$0.001	$0.02	--	$0.03	$0.01	$0.004	**$0.39**
5%	$0.03	--	$0.003	--	$0.01	--	--	**$0.09**
1%	--	--	--	--	--	--	--	**$0.001**
MEAN	**$2.51**	**$0.09**	**$0.43**	**$0.34**	**$0.47**	**$0.22**	**$0.71**	**$3.09**
N	**N = 294**	**N = 46**	**N = 220**	**N = 19**	**N = 231**	**N = 73**	**N = 17**	**N = 273**

INDUSTRY TYPE	N	$/GSF
SERVICES		
Banking	17	$3.91
Health Care	17	$2.80
Hospitality	7	$3.47
Information Services	5	$3.92
Insurance	16	$3.43
Investment Services	4	$2.68
Professional Services	14	$3.83
Research	3	$4.09
Trade	3	$2.72
Transportation	12	$3.93
Utilities	4	$1.23

INDUSTRY TYPE	N	$/GSF
MANUFACTURING		
Aircraft/Industrial	5	$1.41
Building/ Construction	2	$0.53
Chemical/ Pharmaceutical	6	$5.34
Consumer Products	9	$1.28
Electronics	8	$3.44
Energy	3	$1.55
Medical Equipment	5	$2.30
Other Manufacturing	2	$1.31

INDUSTRY TYPE	N	$/GSF
INSTITUTIONAL		
Association	5	$1.36
Charitable Foundation	4	$4.97
City/County Government	47	$3.12
Corrections	3	$2.06
Cultural	7	$7.69
Educational	25	$2.39
Federal Government	6	$0.85
Religious	6	$1.33
Special Districts/ Quasi-Government	4	$8.32
State/Provincial Government	5	$2.32
Other Institutions	2	$1.07

Utility Costs

FACILITY OPERATED	N	$/GSF
5 days per week	65	$3.02
6 days per week	35	$2.96
7 days per week	158	$4.10

CENTRAL PLANT	N	$/GSF
Yes	130	$4.36
No	127	$2.94

CLIMATE ZONE	N	$/GSF
Hot-Humid	33	$2.14
Mixed-Humid	65	$3.49
Hot-Dry	26	$4.46
Cold	86	$2.79
Marine	49	$3.32
CN2	12	C $2.94

GREEN CERTIFICATION STATUS	N	$/GSF
Plans to for certification in the next 12 months	8	$3.55
One or more buildings certified	55	$3.80
Green elements, no certification	140	$3.30
No green elements	52	$4.68

REGION	N	$/GSF
Canada	12	C $2.94
New England	11	$4.82
Northeast	16	$3.66
Mid-Atlantic	29	$2.98
Southeast	26	$2.93
Midwest	24	$3.06
North Central	16	$1.91
Heartland	28	$3.11
South Central	19	$1.77
Mountain	21	$2.35
Pacific	71	$3.80

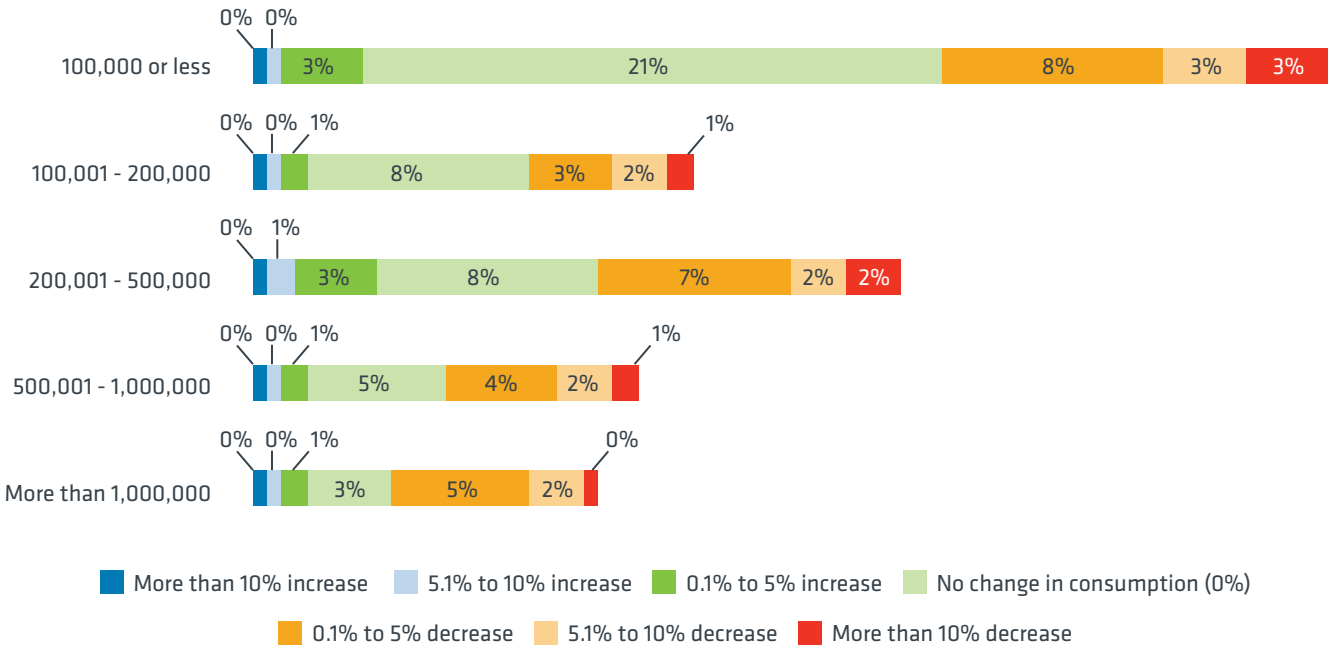
Utility Costs

$/GSF									
FACILITY USE	N	ELECTRICITY	FUEL OIL	NATURAL GAS	STEAM	WATER	SEWER	OTHER	TOTAL UTILITIES
Headquarter	82	$2.12	$0.01	$0.20	$0.22	$0.25	$0.14	$0.52	**$2.53**
Mixed Use office	35	$3.72	$0.15	$0.26	$0.03	$0.67	$0.16	$1.02	**$4.63**
Branch/ Regional Office	28	$1.85	$0.01	$0.16	--	$0.80	$0.10	$0.03	**$2.61**
Education	23	$1.33	$0.11	$0.83	$0.11	$0.14	$0.06	$0.32	**$2.43**
Manufacturing	15	$3.21	$0.03	$0.48	$0.17	$0.13	$0.16	$0.23	**$3.03**
Transportation	11	$1.41	--	$0.06	--	$0.50	$0.84	--	**$3.78**
Warehouse	11	--	$0.20	$0.17	--	$0.11	$0.05	$0.04	**$0.78**
Medical Office	6	$1.72	$0.03	$0.37	--	$0.27	$0.10	--	**$2.38**
Research & Development	8	$3.48	$0.03	$0.71	$0.44	$0.47	$0.27	$0.11	**$3.26**
Courthouse	6	$0.98	--	$0.31	--	$0.67	--	--	**$1.70**
Museum	6	$3.44	$0.05	$0.97	$0.57	$0.29	$0.31	--	**$5.01**
Biosciences	5	$4.99	$1.11	$0.24	$0.12	$0.96	$0.47	--	**$6.47**
Multi-use	5	$2.12	$0.00	$1.09	$0.00	$0.21	$0.55	$0.00	**$4.75**
Stadium/Arena	5	$2.45	--	$0.21	$0.72	$5.11	$0.06	--	**$5.83**
Community Center	4	$3.78	$0.02	$0.18	--	$0.24	$0.00	--	**$4.06**
Hospital	4	$3.35	$0.05	$0.46	$1.57	$0.48	$0.53	--	**$4.87**
Religious	4	$0.36	$0.003	$0.08	--	$0.23	$0.02	$0.20	**$0.79**
Correctional	3	$1.19	--	$0.40	--	$0.47	--	--	**$2.06**
Library	3	$1.03	--	$0.21	--	$0.21		$0.18	**$1.70**
Lodging & Hospitality	3	$1.90	--	$0.37	--	$0.30	$0.08	--	**$1.27**
Convention Center	2	$1.42	--	$0.15	--	$0.23	--	--	**$1.79**

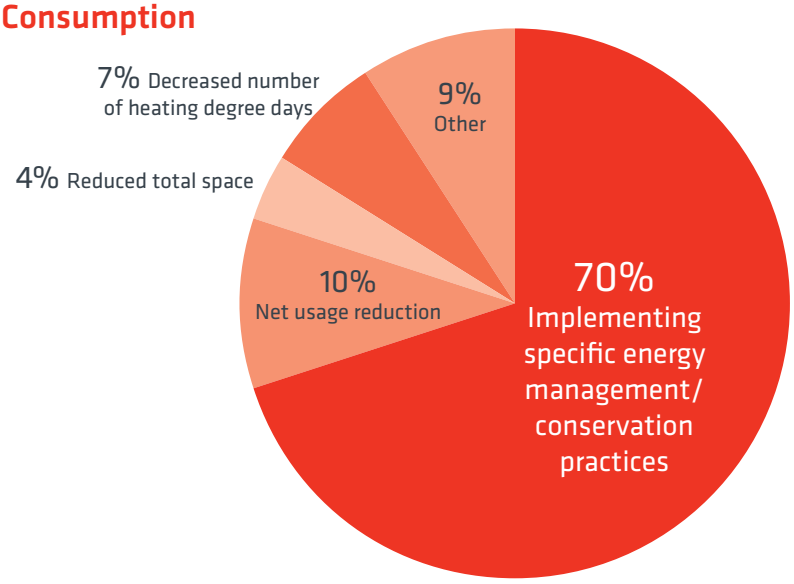
Changes in Utility Consumption

When asked to compare energy usage to the prior year, 42 percent of the respondents reported decreased consumption. The primary reason cited for using less energy implementing specific energy management/conversation practices. Facilities with 100,000 rentable square feet reported the overall highest percentage decreases.

Percentage Change in Utility Consumption



Reason for Change in Utility Consumption



Energy Use Index

FMs can compare energy based on the source's own energy units (such as kilowatt hours, gallons, therms, etc.) or it can be converted to an Energy Use Index (EUI) which uses the BTU equivalent for each energy source. There are many factors that influence a building's EUI which include the building's age, use, operating schedule, climate, occupant density, equipment and construction.

To calculate the EUI for electricity, kilowatt hours are multiplied by a conversion factor of 3.415 to derive kBtus and divided by gross square footage. To calculate the EUI for natural gas, therms (100 CF) are multiplied by a factor of 100 and divided by gross square feet. As anticipated, facilities situated in warmer climates consume larger amounts of electricity and rely less on gas as heating requirements are reduced.

PERCENTILE	ELECTRICITY kBtus/GSF	FUEL OIL GALLONS/ GSF	NATURAL GAS THERMS/GSF	STEAM 1,000lbs/GSF	WATER GALLONS/ GSF	SEWER GALLONS/ GSF
99%	185	1.62	37.85	71.59	235	268
95%	98	0.17	2.12	65.86	71	83
90%	44	0.06	1.26	43.55	50	63
75%	26	0.01	0.55	0.12	24	20
50%	17	0.003	0.2	0.06	9	6
25%	12	0.001	0.05	0.01	1	--
10%	4	--	0.02	--	--	--
5%	.03	--	0.002	--	--	--
1%	--	--	--	--	--	--
Mean	**26**	**0.11**	**1.59**	**9.72**	**464**	**25**
	N = 183	**N = 21**	**N = 129**	**N = 15**	**N = 142**	**N = 44**

BEST IN CLASS

PERCENTILE	ELECTRICITY kBtus/GSF	GAS kBtus/GSF
99%	354	159
95%	193	120
90%	138	86
75%	85	44
50%	57	18
25%	39	5
10%	12	1
5%	0.1	0.1
1%	0.001	0.007
Mean	**74**	**33**
	N = 177	**N = 121**

BEST IN CLASS

Energy Use Index

FACILITY USE	N	ELECTRICITY kBtus/GSF	GAS kBtus/GSF
Headquarter	52	55	31
Branch/Regional Office	17	54	34
Mixed Use Office	16	82	7
Manufacturing	15	130	43
Education	13	88	23
Transportation	8	84	18
Warehouse	8	31	17
Research & Development	7	157	68
Medical Office	5	78	66
Courthouse	5	106	34
Multi-use	5	89	42
Museum	5	38	2
Biosciences	3	81	18
Correctional	3	50	57
Library	3	32	18
Sports & Entertainment	3	90	100
Stadium/Auditorium	3	26	29
Data Center	2	64	5

N = 173

FACILITY OPERATED	N	ELECTRICITY kBtus/GSF	GAS kBtus/GSF
10 hours/day	33	44	21
11-12 hours/day	35	75	37
13-14 hours/day	25	75	21
15-16 hours/day	11	41	16
17-18 hours/day	2	54	43
19-21 hours/day	8	58	41
24 hours/day	38	97	41

GREEN CERTIFICATION STATUS	N	ELECTRICITY kBtus/GSF	GAS kBtus/GSF
Plans for certification in the next 12 months	7	83	55
One or more buildings certified	35	53	24
Green elements, no certification	84	70	34
No green elements	24	108	46

CLIMATE ZONES	N	ELECTRICITY kBtus/GSF	GAS kBtus/GSF
Hot-Humid	21	79	11
Mixed-Humid	37	74	22
Hot-Dry	26	61	33
Cold	58	77	39
Very Cold	2	25	14
Marine	28	79	39
CN2	5	69	108

Temperature Standards

When compared to IFMA's 2009 measurement, the average summer low temperature standard has decreased by two degrees to 70 degrees Fahrenheit and the winter low standard remained the same at 69 degrees Fahrenheit.

REGION	N	SUMMER HIGH	SUMMER LOW	WINTER HIGH	WINTER LOW
Canada	42	74	68	73	68
New England	57	74	70	72	68
Northeast	62	74	70	73	68
Mid-Atlantic	101	75	71	72	68
Southeast	65	75	71	73	69
Midwest	76	74	71	73	69
North Central	50	74	71	73	69
Heartland	70	75	71	73	69
South Central	69	74	71	73	70
Mountain	74	75	71	73	69
Pacific	114	74	70	73	69
AVERAGE	**780**	**74**	**70**	**73**	**69**

FACILITY USE	N	SUMMER HIGH	SUMMER LOW	WINTER HIGH	WINTER LOW
Headquarter	245	74	71	73	69
Mixed Use Office	102	75	71	73	69
Branch/Regional Office	73	74	71	73	69
Education	67	74	70	72	67
Manufacturing	66	75	71	72	68
Research & Development	41	75	71	73	69
Multi-use	24	74	70	73	69
Museum	19	73	70	71	69
Lodging & Hospitality	16	73	69	73	70
Transportation	15	75	70	72	68
Warehouse	15	74	71	72	68
Community Center	12	73	69	72	68
Medical Office	10	74	69	73	68
Biosciences	9	74	69	72	66
Hospital	9	75	70	73	69
Courthouse	8	75	71	73	69
Stadium/Auditorium	7	76	69	71	65
Library	7	74	71	73	70
Sports & Entertainment	7	73	70	71	67
Multi-family	7	75	71	73	69
Religious	6	74	70	72	68
Department Store	4	73	70	70	67
Data Center	4	75	73	74	71
Convention Center	4	75	70	73	69
Correctional	3	77	69	77	68
Senior Housing	2	73	67	74	69

Cost of Operations

Total Costs of Operations

Total Cost of Operations

The previous sections of this report have detailed the components of a facility's operation, janitorial, maintenance and utilities costs. This section combines these three costs — allowing for comparison by industry, facility use and region. Due to different sample sizes (N), adding together janitorial, maintenance and utility costs from previous sections will not generate the same totals in this section.

PERCENTILE	$/RSF
99%	$38.84
95%	$17.52
90%	$12.28
75%	$7.99
50%	$5.80
25%	$4.57
10%	$3.22
5%	$2.02
1%	$0.60
MEAN	$7.77

BEST IN CLASS

N = 954

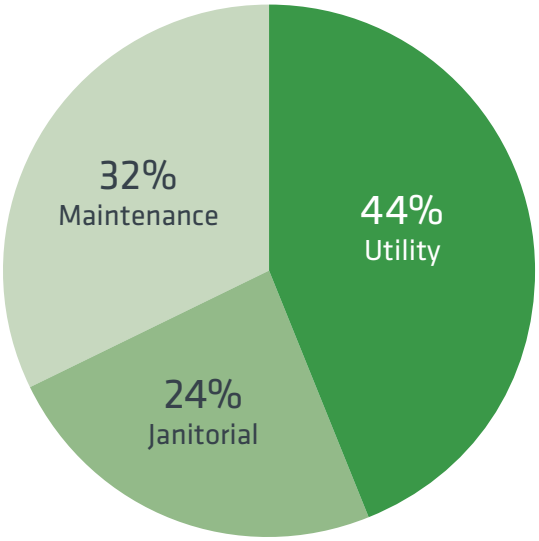
FACILITY USE	N	$/RSF
Mixed Use Office	372	$7.17
Courthouse	259	$6.05
Headquarter	94	$9.46
Branch/Regional Office	44	$6.85
Education	30	$8.13
Research & Development	20	$14.63
Manufacturing	20	$13.90
Medical Office	19	$6.55
Warehouse	15	$8.22
Museum	9	$12.11
Biosciences	6	$13.83
Library	6	$4.00
Community Center	6	$9.60
Stadium/Auditorium	5	$12.20
Transportation	5	$13.42
Multi-use	5	$11.33
Lodging & Hospitality	4	$4.10
Correctional	4	$4.44
Hospital	3	$16.22
Religious	3	$2.55
Multi-family	2	$1.86
Convention Center	2	$6.09
Big Box Store	4	$0.80
Convention Center	4	$0.67

COUNTRY/REGION	N	$/RSF
Canada	13	C $11.89
New England	50	$8.36
Northeast	55	$10.98
Mid-Atlantic	143	$9.15
Southeast	110	$7.69
Midwest	75	$6.73
North Central	50	$6.13
Heartland	83	$7.21
South Central	155	$7.10
Mountain	82	$6.29
Pacific	137	$7.94

INDUSTRY TYPE	N	$/RSF
SERVICES		
Banking	17	$10.53
Health Care	30	$7.66
Hospitality	8	$22.38
Information Services	5	$8.79
Insurance	16	$10.62
Investment Services	3	$8.18
Professional Services	13	$8.00
Research	3	$14.28
Telecommunications	2	$8.01
Trade	3	$9.53
Transportation	3	$19.97
Utilities	4	$5.84
Other Services	2	$9.58
MANUFACTURING		
Aircraft/Industrial	5	$4.43
Building/ Construction	2	$4.59
Chemical/ Pharmaceutical	6	$13.06
Consumer Products	10	$15.56
Electronics	8	$23.84
Energy	4	$15.90
Medical Equipment	5	$7.67
Other Manufacturing	2	$5.01
INSTITUTIONAL		
Association	4	$8.85
Charitable Foundation	4	$8.38
City/County Government	43	$7.49
Corrections	4	$4.44
Cultural	7	$17.52
Educational	61	$8.86
Federal Government	646	$6.74
Religious	6	$5.75
State/Provincial Government	5	$8.96
Other Institutions	3	$3.78
State/Provincial Government	11	$2.58
Other Institutions	9	$1.74

Total Cost of Operations

Upon further examination, utility cost is the largest component of a facility's operating cost. Electricity alone makes up 21 percent of the entire operating cost while gas accounts for about 2 percent.



FACILITY OPERATED	N	$/RSF
5 days per week	54	$10.36
6 days per week	34	$8.03
7 days per week	129	$11.84

FACILITY DESCRIPTION	N	$/RSF
A single building	723	$7.23
Multiple buildings, multiple locations	41	$7.69
Multiple buildings, one location	86	$11.94
Space within a building	10	$13.26
Marine	49	$3.32

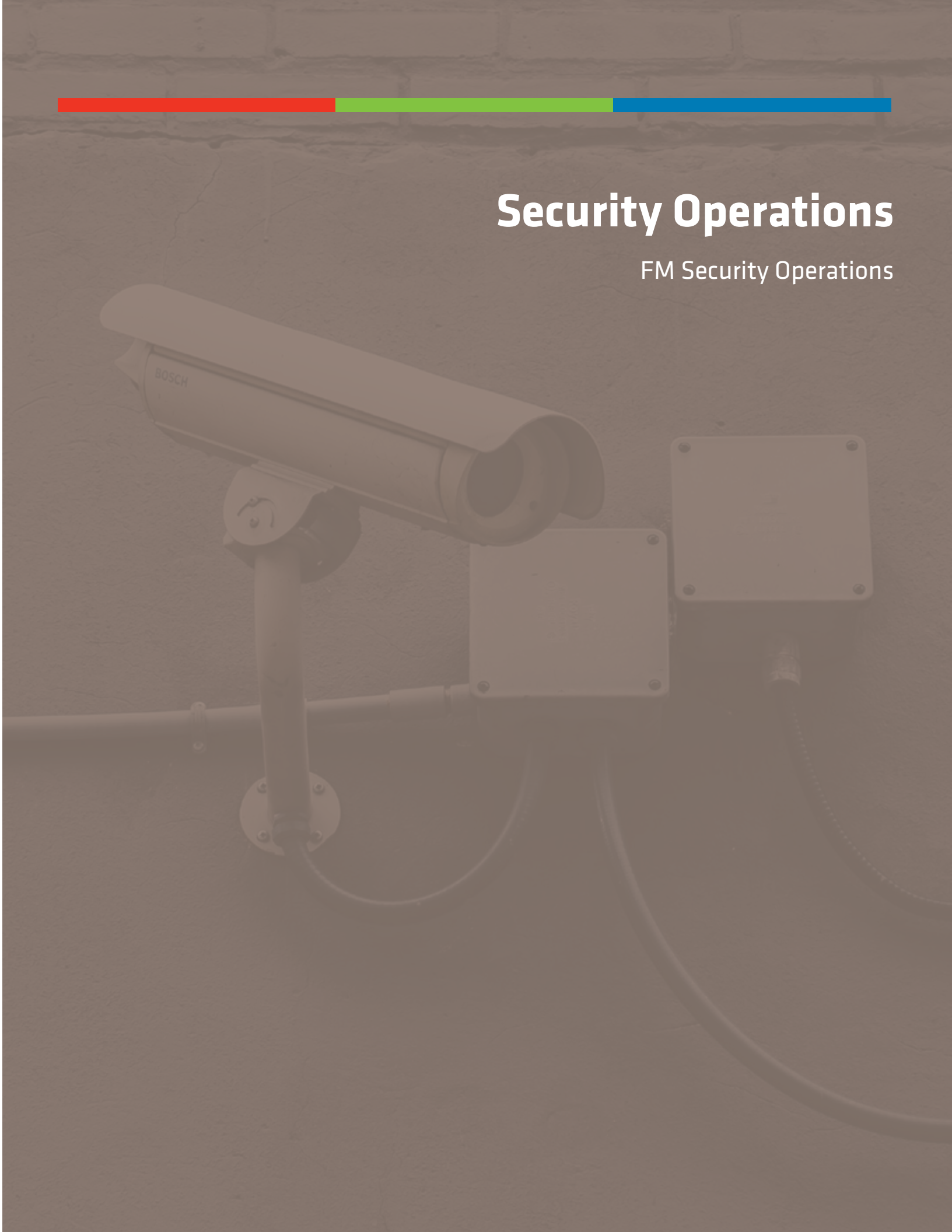
FACILITY SETTING	N	$/RSF
Central Business District	687	$6.87
Business Park	31	$14.84
Secondary Downtown Location	59	$10.98
Suburban Area	116	$9.66
Industrial Park	28	$7.88
Rural Area	19	$6.58

FACILITY AGE	N	$/RSF
< 5 Years	13	$6.12
5-10 Years	49	$7.88
11-15 Years	55	$6.81
16-20 Years	74	$8.86
21-30 Years	75	$10.84
31-50 Years	251	$8.08
51-100 Years	314	$6.39
>100 Years	101	$8.14

CENTRAL PLANT	N	$/RSF
Yes	130	$4.36
No	127	$2.94

Security Operations

FM Security Operations



FM Security Operations

This is a new section in this year's report. We asked respondents if the facility management department is responsible for providing security operations and management. Overall, 46 percent of the respondents reported that FM is responsible for provided security. For those providing security, the average cost was $1.91 per rentable square foot with about seven FTEs assigned.

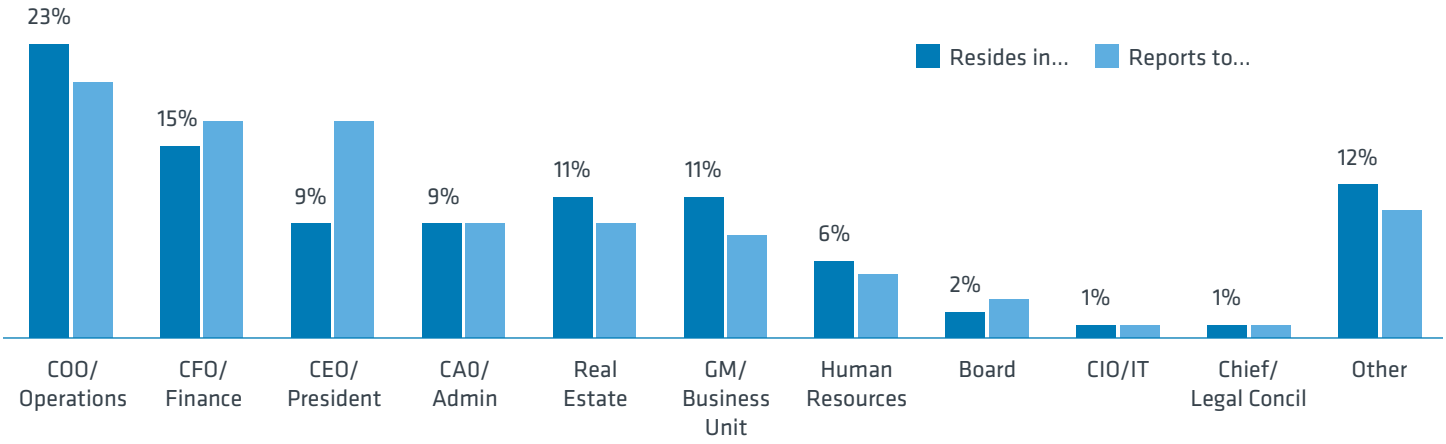
		DOES FM PROVIDE SECURITY OPERATIONS?		IF "YES" THEN...	
FACILITY USE	N	YES	NO	$/RSF	NUMBER OF FTEs
Headquarter	282	51%	49%	$1.96	9
Mixed Use Office	118	47%	53%	$1.20	7
Education	81	37%	63%	$4.56	3
Branch/Regional Office	81	41%	59%	$2.09	4
Manufacturing	78	49%	51%	$1.98	4
Research & Development	46	39%	61%	$1.77	10
Multi-use	28	32%	68%	$0.37	3
Warehouse	23	35%	65%	$0.57	4
Museum	19	21%	79%	$1.12	4
Community Center	18	50%	50%	$2.94	6
Lodging & Hospitality	18	56%	44%	$1.37	4
Biosciences	16	69%	31%	$2.21	17
Medical Office	15	33%	67%	$4.71	8
Hospital	14	36%	64%	$0.87	2
Religious	11	73%	27%	$0.10	2
Sports & Entertainment	9	33%	67%	$0.39	9
Multi-family	9	67%	33%	$1.44	8
Stadium/Auditorium	8	50%	50%	$0.69	35
Library	7	57%	43%	$0.47	12
Data Center	6	33%	67%	$1.30	13
Big Box Store	5	60%	40%	$1.69	41
Convention Center	4	75%	25%	$1.96	9

Organizational and Respondent Profiles

Where Does FM Reside and Report To in the Organization?
FM Supervision
Educational Attainment
Generational Affiliation

Where Does FM Reside and Report To in the Organization?

Many want to know where the FM department should be placed organizationally. We asked respondents who their department "reports to" and where it "resides in."



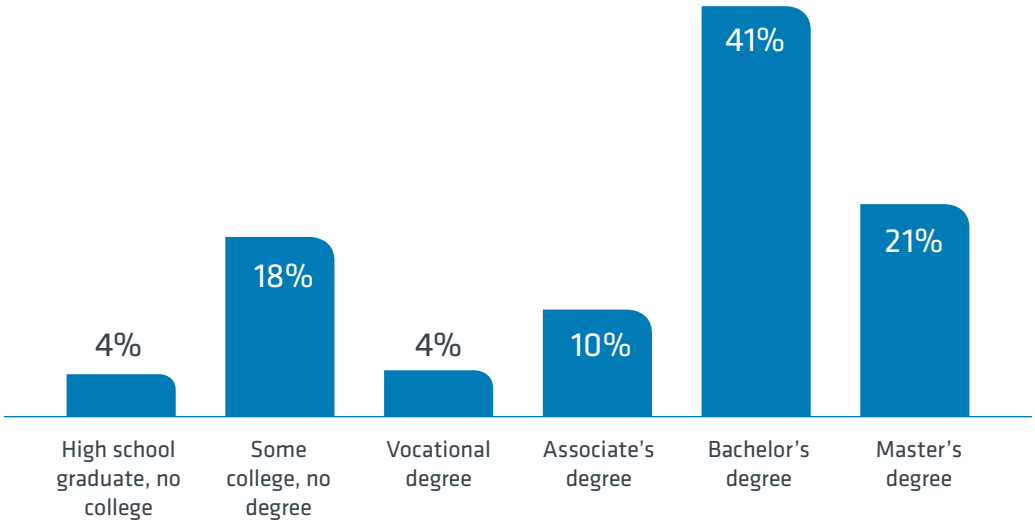
FM Supervision

We asked respondents for the number of staff that they were personally responsible for in their organization or management portfolio. We divided the respondents total rentable square feet by the number of direct and indirect staff they supervised.

FACILITY USE	N	RSF/# OF DIRECT STAFF	RSF/# OF INDIRECT STAFF
Headquarter	173	83,065	26,589
Mixed Use office	68	13,627,713	132,524
Education	50	266,804	45,300
Manufacturing	41	96,315	47,242
Branch/Regional Office	38	49,903	35,782
Research & Development	29	103,023	26,621
Warehouse	17	1,235,701	300,262
Multi-use	16	256,406	38,707
Transportation	14	184,370	12,804
Community Center	11	146,754	24,536
Museum	10	28,572	28,923
Hospital	9	265,997	64,464
Biosciences	8	138,286	21,462
Medical Office	7	76,794	19,703
Lodging & Hospitality	7	29,692	22,308
Stadium/Auditorium	7	59,323	31,766
Courthouse	6	36,184	6,643
Data Center	4	184,978	24,321
Library	4	31,890	12,564
Multi-family	4	8,611	4,337
Religious	4	46,429	15,621
Sports & Entertainment	4	143,337	28,232
Department Store	3	84,030	7,595
Convention Center	3	41,417	36,380

Educational Attainment

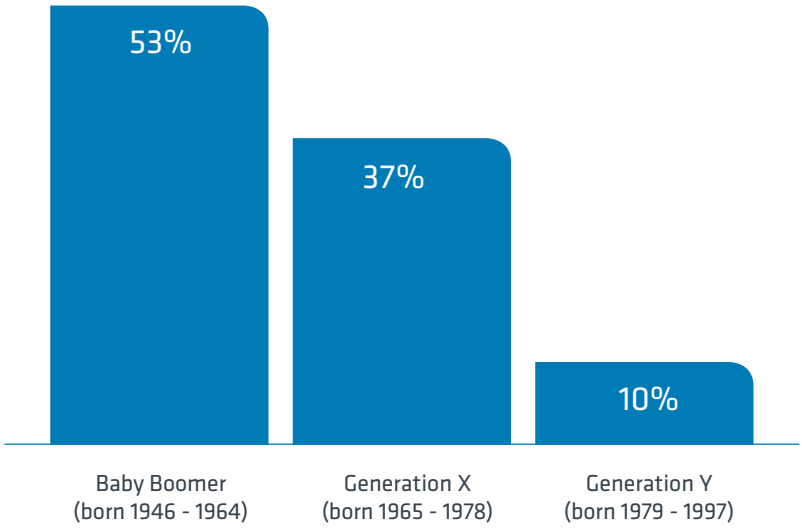
We asked respondents about their highest level of educational attainment. About 60 percent of them possessed a bachelor's or master's degree.



N = 718

Generational Affiliation

We asked respondents about their generational affiliation. Slightly more than half of the respondents identified themselves as a "Baby Boomer." Given the forthcoming retirement of many facility managers, organizations need to develop succession plans as well as aggressively attract younger talent through outreach and engagement with facility management based associations and academic institutions.



N = 717

How Energy Benchmarking Across the United States Can Benefit Your Facility

By Laurie Gilmer, P.E., CFM, SFP, CxA, LEED AP and Sara Ambry, EIT
on behalf of the IFMA Environmental Stewardship, Utilities
and Sustainability Strategic Advisory Group

As of February 2017, 24 cities across the United States have adopted mandatory benchmarking policies for at least public buildings, almost doubling the fourteen cities requiring them back in July 2015 (Institute for Market Transformation, 2017) (BUILDINGS, 2015). As more energy data becomes available, the sample size of benchmarked buildings grows. The Commercial Buildings Energy Consumption Survey (CBECS) conducts a survey every few years, but a continuously updated "master database" that consistently accumulates data among the cities has yet to be seen. The IFMA Environmental Stewardship, Utilities and Sustainability Strategic Advisory Group (IFMA ESUS SAG) has begun a preliminary database with data from eight cities across the country and performed a simple analysis to show what kind of power this tool can have.

DATA COLLECTION AND PREPARATION

IFMA collaborated with the City Energy Project (CEP) to collect and analyze nationwide energy benchmarking data. CEP is a joint initiative of the Natural Resources Defense Council and the Institute for Market Transformation to improve the energy efficiency of existing buildings in major American cities. CEP works with IFMA chapters in its partner cities[1] to raise awareness and spur energy efficiency improvements in the built environment. Through this partnership IFMA is able to access CEP knowledge and tools including the data used in this project.

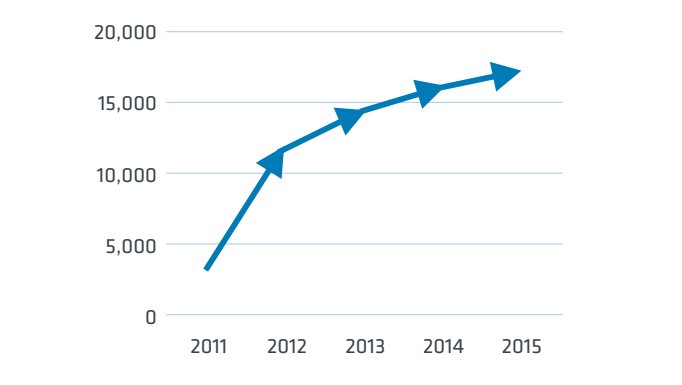
CEP compiled and provided publicly available building performance data, sourced from ENERGY STAR®'s Portfolio Manager program. This was gathered by CEP for eight different cities (including several cities that are not CEP participants) across five years (2011-2015). The data contained many categories for each city, but the most common and useful among them were extracted and combined into a table so the cities could be easily compared. These categories are defined below using definitions from ENERGY STAR:

- **Reporting Year**
- **City**
- **Primary Property Type** - The self-selected primary property type with which the organization most closely identifies.
- **Gross Floor Area** - The total property square footage, measured between the outside surface of the exterior walls of the building(s). This includes all areas inside the building(s) including supporting areas.
- **Year Built** - The year in which the property was constructed.
- **ENERGY STAR Score** - A measure of how well a property is performing relative to similar properties, when normalized for climate and operational characteristics. A 1-100 scale is set with one representing the worst performing buildings and 100 representing the best performing buildings.
- **Site EUI** (kBtu/SF) - The site energy use divided by the property square foot. Site energy is the annual amount of all the energy a property consumes onsite as reported on utility bills. Site energy is used to understand how the energy use for an individual property has changed over time.

[1] Cities participating in City Energy Project are Atlanta, Boston, Chicago, Denver, Des Moines, Ft. Collins, Houston, Kansas City, MO, Los Angeles, Miami-Dade County, New Orleans, Orlando, Philadelphia, Pittsburgh, Providence, Reno, Salt Lake City, San Jose, St. Louis, and St. Paul.

- **Weather Normalized Site EUI** (kBtu/SF) - The site energy use a property would have consumed during 30-year average weather conditions.
- **Source EUI** (kBtu/SF) - The source energy use divided by the property square foot. 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.
- **Weather Normalized Source EUI** (kBtu/SF) - The source energy use a property would have consumed during 30-year average weather conditions.
- **Total GHG Emissions** (metric tons CO_2e) - The total amount of Greenhouse Gas (GHG) Emissions. GHGs are carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N2O) released into the atmosphere as a result of energy consumption at the property. GHG emissions are expressed in carbon dioxide equivalent (CO_2e), a universal unit of measure that combines the quantity and global warming potential of each greenhouse gas.
- **GHG Intensity** (kg CO_2e/SF) - An intensity value measuring the amount of greenhouse gases per square foot.

Figure 1: Sample size of all cities, by year



DATA LIMITATIONS

The original data set was reviewed and minor adjustments were made where appropriate. First, entries were excluded for submissions in which errors or improbable data were found. Many lines had no information available for any selected categories due to exemptions, non-compliance, or not providing sufficient data. These lines were removed. In addition, any entries with "Not Available," "N/A," or similar were deleted and left blank to avoid calculations using text, though entries with a value of zero were left as is.

Another adjustment was made to the Primary Property Type category, title variation was inconsistent from city to city (e.g., "Warehouse (Unrefrigerated)" instead of "Non-Refrigerated Warehouse"). Similar types were consolidated into the corresponding title on the ENERGY STAR list.

Entries were eliminated from the data set where data was found to lie far outside acceptable ranges for certain data categories, particularly EUI and Total GHG. Acceptable ranges for each category, loosely based on a 2011 study by PNNL (Fowler, Rauch, Henderson, & Kora, 2010), are as follows:

- ENERGY STAR score: 50-100
- EUI (kBtu/SF): 50-200
- Total GHG emissions (metric tons CO_2e): 500-15,000
- GHG intensity (kgCO_2e/SF): 5-30

Each value of a data category was removed greater than ten standard deviations above the median as in Table 1 on the following page. The intention was to remove only the most extreme outliers. The data set still includes abnormally high values while still showing the wide range of the submitted data. In addition, ENERGY STAR scores were nullified from properties that did not fit the twenty-one building types eligible to receive a score.

Table 1: Data eliminated ten standard deviations above median

DATA CATEGORY	MEDIAN	10*σ ABOVE MEDIAN
Site EUI (kBtu/sq ft)	79.7	662
Weather Normalized Site EUI (kBtu/sq ft)	80.4	706
Source EUI (kBtu/sq ft)	135.2	1,179
Weather Normalized Source EUI (kBtu/sq ft)	132.0	1,118
Total GHG Emissions (metric Tons CO_2e)	553.8	38,200
GHG Intensity (kgCO_2e/sq ft)	6.3	70

Table 2: Count of property type, by year

PROPERTY TYPE	2011	2012	2013	2014	2015
Multifamily Housing	208	8,406	8,815	8,864	9,745
Office	1,471	1,713	2,321	2,827	2,945
K-12 School	71	130	304	659	806
Hotel	163	248	347	426	509
College/University	84	94	197	268	293

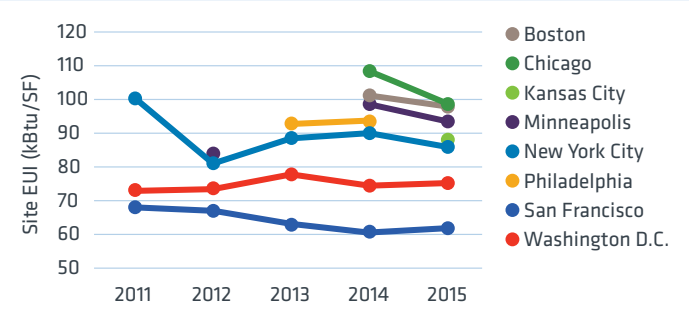
DATA ANALYSIS

After the adjustments were made, the sample size ranged from 3,016 buildings in 2011 to 17,316 in 2015. Growth has been positive for all years, starting from three cities' data gathered in 2011, to a maximum of seven cities in both 2014 and 2015.

The adjusted data set was then analyzed and displayed using several different methods, a sample of which is presented here. Table 2 shows the top five reported property types by year. With the exception of 2011, there were over three times as many multifamily housing buildings as the next highest type. Colleges and universities rank in the top five, but are not currently eligible to receive ENERGY STAR scores. Over one out of five buildings in this database fit this criterion, making them useful candidates for other types of benchmarking.

Examining the energy data itself, the average site EUI for each city across the five years can be seen in Figure 2. The higher average EUIs tended to occur in colder climates such as Boston, Chicago and Minneapolis, which have higher cooling and heating loads. Relatively temperate climates such as San Francisco and Washington, D.C., tended to have lower average EUIs.

Figure 2: Average site EUI, kBtu/SF



For the five most common building types reported in Table 2, Figure 3 below displays the trended site EUI and GHG intensity. Hotels consistently used more energy than K-12 schools, multifamily housing and offices, perhaps due to additional loads such as laundry, swimming pools or food service. Colleges and universities were comparatively erratic, likely owing to inconsistencies in campus size and how campus buildings are being counted.

Table 3 on the following pages contains the average EUI, GHG intensity, and ENERGY STAR scores for each property type, and can be used to quickly benchmark one's own facility. The summarized data is based on the 2015 calendar year.

Figure 3: Average site EUI and GHG intensity, by building type

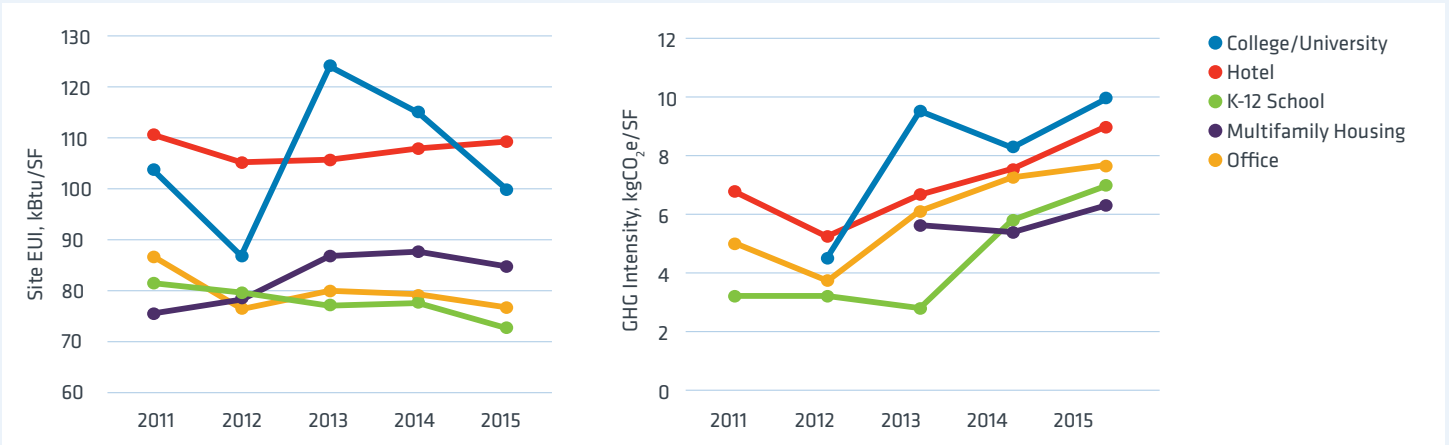


Table 3: Average energy use and GHG emissions by building type, based on 2015 data

PRIMARY PROPERTY TYPE	AVERAGE OF SITE EUI (kBtu/sq ft)	AVERAGE OF WEATHER NORMALIZED SITE EUI (kBtu/sq ft)	AVERAGE OF GHG INTENSITY (kg CO_2e/sq ft)	AVERAGE OF ENERGY STAR SCORE	COUNT OF PRIMARY PROPERTY TYPE
Multifamily Housing	84.3	86.7	6.4	57	9,745
Office	76.5	90.1	7.7	73	2,945
K-12 School	72.6	114.9	7.0	60	806
Hotel	109.3	124.9	9.0	45	509
College/University	99.8	137.2	9.9	N/A	293
Other	87.4	93.1	9.1	N/A	264
Retail Store	84.0	116.4	8.3	60	238
Non-Refrigerated Warehouse	47.2	49.1	2.9	61	236
Residence Hall/Dormitory	80.6	86.7	6.2	59	187
Mixed Use Property	86.2	107.9	8.7	N/A	184
Senior Care Community	141.5	155.9	11.3	42	139
Self-Storage Facility	22.7	23.4	1.5	N/A	106
Supermarket/Grocery Store	233.0	374.9	27.1	57	104
Parking	42.9	25.5	6.8	N/A	103
Medical Office	132.5	139.9	11.2	44	95
Hospital (General Medical & Surgical)	239.3	313.7	22.1	55	93
Distribution Center	51.4	50.4	3.7	51	90
Worship Facility	52.1	63.1	4.2	55	90
Fire Station	114.3	111.7	10.4	N/A	76
Other - Entertainment/Public Assembly	99.0	113.4	9.6	N/A	75
Laboratory	319.7	326.4	27.7	N/A	67
Other - Recreation	109.8	130.2	11.0	N/A	65
Manufacturing/Industrial Plant	80.6	83.7	6.7	N/A	64
Other - Public Service	83.7	83.3	9.4	N/A	52
Library	102.4	134.8	9.1	N/A	50
Police Station	131.8	107.2	14.2	N/A	46
Financial Office	94.5	126.2	10.0	70	42
Fitness Center/Health Club/Gym	116.1	160.1	8.9	N/A	34
Strip Mall	92.7	183.6	11.6	N/A	31
Performing Arts	90.5	125.3	9.5	N/A	30
Other - Education	72.9	84.6	5.4	N/A	30
Museum	159.7	201.7	14.7	N/A	29
Repair Services (Vehicle, Shoe, Locksmith, etc.)	83.7	100.9	6.2	N/A	29
Other - Specialty Hospital	182.9	192.3	17.8	N/A	25
Social/Meeting Hall	79.7	87.5	5.9	N/A	25
Urgent Care/Clinic/Other Outpatient	108.4	126.5	7.7	N/A	24
Other - Retail/Mall	98.2	181.0	13.2	N/A	24
Other - Lodging/Residential	86.5	107.5	7.4	N/A	24
Automobile Dealership	52.1	77.4	5.2	N/A	20

Table 3 (CONTINUED): Average energy use and GHG emissions by building type, based on 2015 data

PRIMARY PROPERTY TYPE	AVERAGE OF SITE EUI (kBtu/sq ft)	AVERAGE OF WEATHER NORMALIZED SITE EUI (kBtu/sq ft)	AVERAGE OF GHG INTENSITY (kg CO_2e/sq ft)	AVERAGE OF ENERGY STAR SCORE	COUNT OF PRIMARY PROPERTY TYPE
Refrigerated Warehouse	81.2	87.5	7.4	44	18
Enclosed Mall	120.1	181.2	13.4	N/A	17
Restaurant	270.3	273.1	19.2	N/A	15
Other - Services	66.1	68.5	5.3	N/A	15
Bank Branch	66.7	86.8	5.9	63	13
Wholesale Club/Supercenter	128.9	235.9	19.2	36	12
Outpatient Rehabilitation/Physical Therapy	187.2	229.4	16.2	N/A	12
Movie Theater	131.2	213.3	13.6	N/A	11
Adult Education	65.3	92.6	6.3	N/A	11
Convention Center	62.2	63.4	9.0	N/A	9
Indoor Arena	101.4	72.5	8.4	N/A	9
Pre-school/Daycare	57.7	74.4	6.2	N/A	7
Courthouse	105.0	141.9	9.4	78	7
Vocational School	63.7	73.1	2.4	N/A	6
Residential Care Facility	99.6	159.4	9.7	N/A	5
Bar/Nightclub	40.1	39.9	2.9	N/A	5
Prison/Incarceration	103.7	128.6	11.6	N/A	4
Ambulatory Surgical Center	198.1	357.0	21.5	N/A	4
Ice/Curling Rink	168.6	194.0	8.6	N/A	4
Data Center	236.9	353.1	40.3	51	4
Energy/Power Station	96.4	239.5	17.5	N/A	4
Veterinary Office	89.5	95.2	6.8	N/A	3
Personal Services (Health/Beauty, Dry Cleaning, etc.)	53.3	53.3	3.2	N/A	3
Stadium (Open)	78.3	235.7	8.9	N/A	3
Food Service	72.3	67.7	6.0	N/A	3
Wastewater Treatment Plant	39.0	39.4	9.2	N/A	2
Other - Stadium	49.0	N/A	3.5	N/A	2
Other - Restaurant/Bar	42.1	42.0	2.9	N/A	1
Single Family Home	56.4	N/A	3.7	N/A	1
Aquarium	204.5	493.4	30.6	N/A	1
Drinking Water Treatment & Distribution	313.0	327.0	N/A	N/A	1
Lifestyle Center	127.4	125.5	N/A	N/A	1
Swimming Pool	488.8	509.2	37.0	N/A	1
Other - Utility	526.3	N/A	48.8	N/A	1
Transportation Terminal/Station	68.0	75.0	N/A	N/A	1
Race Track	37.7	N/A	2.8	N/A	1
Food Sales	348.3	347.9	19.3	N/A	1
GRAND TOTAL	**86.6**	**95.9**	**8.4**	**60**	**17,316**

DATA ANALYSIS

Figure 4 was created by first grouping the ages of the buildings into recent construction (less than 10 years old), within expected useful life (10-50 years old), and past expected useful life (over 50 years old). Then the percentage of buildings in each ENERGY STAR score quartile for 2015 was calculated for each age group. Buildings in all age categories more frequently had higher ENERGY STAR scores, i.e., in the 75-100 range. One may have expected older buildings to have lower scores and vice versa; however, there seemed to be little correlation – in fact, buildings older than 50 years most frequently had scores 75 and over. Aging buildings are thus not necessarily high energy consumers.

Why is it so important to compile this data? The data can be used by facility managers to benchmark their facility against similar types and encourage improvement. A database can be especially useful for building types that cannot currently receive an ENERGY STAR score, or do not live in a participating city. For example, a FM in a smaller city such as Lincoln, Nebraska, can compare his or her library to one in Kansas City, a participating city in a similar climate. Commercial buildings collectively consumed over US$149 billion worth of energy in the United States in 2012 (Commercial Buildings Energy Consumption Survey (CBECS), 2016). By uniting energy data across the country, one can create a robust database that serves to support FMs and their efforts in reducing the cost of operations within the built environment.

As IFMA continues to gather data through the IFMA ENERGY STAR initiative and collaboration with the City Energy Project, the ability to provide data for benchmarking comparison and analysis will improve. For instance, future energy trends could be predicted from past performance as in Figure 5. Greater participation with more complete and higher quality data will enrich the database with greater accuracy.

Figure 4: Distribution of buildings in ENERGY STAR score quartile, by age group

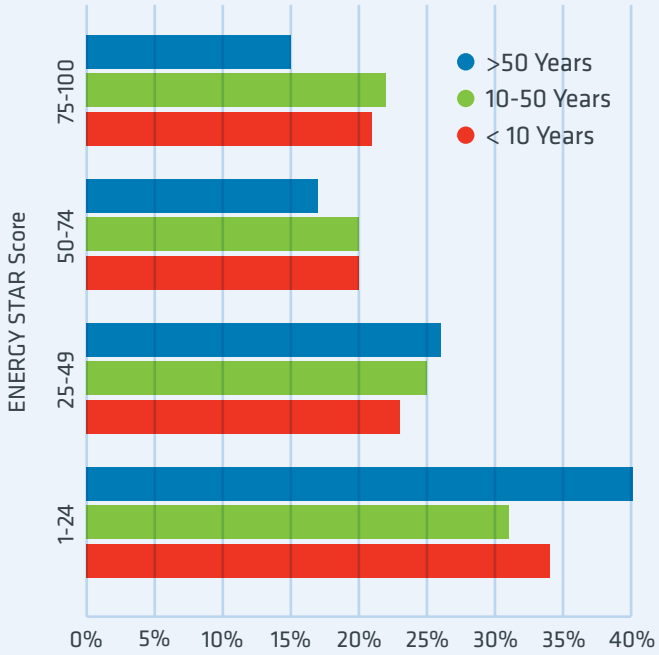
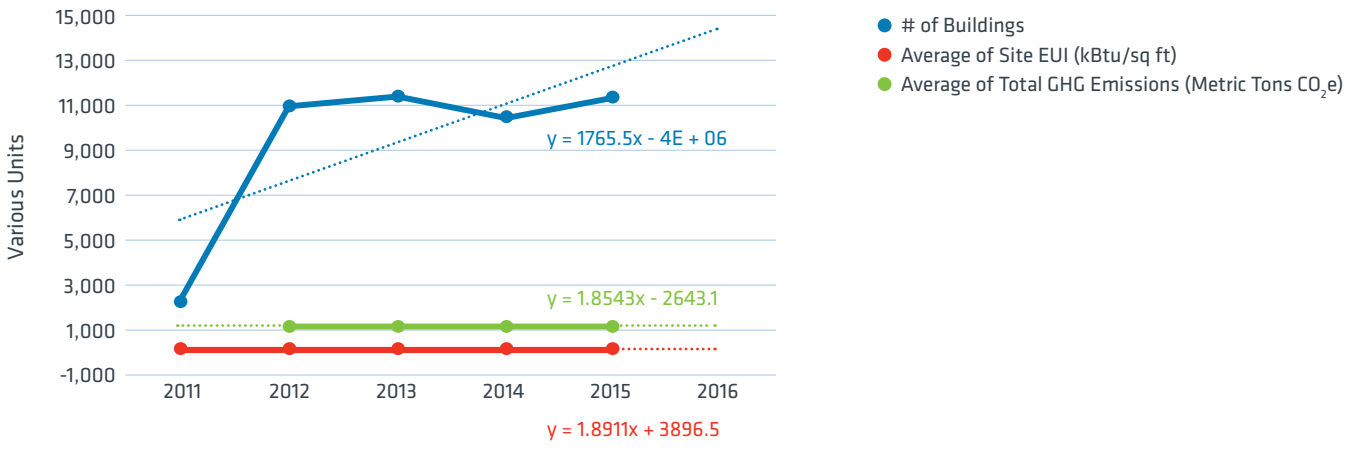


Figure 5: Trendlines for New York City to 2016



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