Glossary

Home > Households, Buildings & Industry > Commercial Buildings Energy Consumption Survey (CBECS) > Office Buildings

Print Report

# Office Buildings

Although no one building type dominates the commercial buildings sector, office buildings are the most common and account for more than 800,000 buildings or 17 percent of total commercial buildings. Offices comprised more than 12 billion square feet of floorspace, 17 percent of total commercial floorspace, the most of any building type.

### **Types of Office Buildings**

The 2003 CBECS Detailed Tables present data for office buildings along with other principal building activities (see Detailed Tables B13 and B14, for example). Since office buildings comprise a wide range of office-related activities, survey respondents were presented with a follow-up list of specific office types to choose from. Although we have not presented the office sub-category information in the detailed tables we make information about the sub-categories available in the 2003 Public Use Micro-Data files. Several of the sub-category choices presented to respondents were reported too few times to produce statistically reliable estimates and were aggregated with the "other type of office" category. We provide information in the micro-data files for the following office sub-categories (with examples of each):

- · Administrative or professional office
  - University administration building
  - Insurance company headquarters building
  - Local insurance agency
  - Social services office
  - Attorney's office
  - · Real estate sales office
- · Government office
  - State agency headquarters office
  - Regional Federal agency service center
  - City hall
  - Ranger station
  - Metropolitan sewage district office
- · Bank or other financial office
  - Bank
  - Savings and loan
  - Credit union
  - Check cashing
- Mixed-use office
  - Bank offices and insurance office
  - Training center and administrative office
- Medical office without medical diagnostic equipment
  - Health services administrative center
  - Mental health services
- Other type of office
  - Contractor's office
  - Call center

The following table presents summary statistics for these office sub-categories. Administrative or professional office buildings dominate the entire office building category and account for more

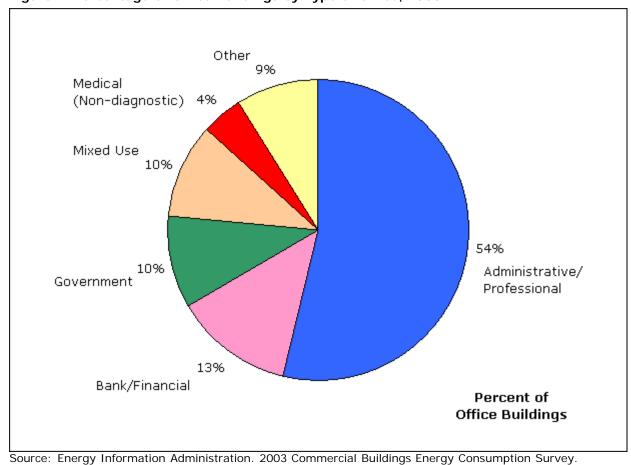
than half of office buildings and floorspace in office buildings (Figure 1).

Table 1. Totals and means of of floorspace, number of workers, and hours of operation for office buildings, 2003

	Buildings (thousand)	Total Floorspace (million sq. ft.)	Total Workers (thousand)	Mean Square Feet per Building (thousand)	Mean Square Feet per Worker	Mean Hours per Week
All Buildings	4,859	71,658	*	14.7	*	*
All Non-Mall Buildings	4,645	64,783	72,807	13.9	890	61
All Office Buildings	824	12,208	28,154	14.8	434	55
Type of Office Building						
— Administrative/ Professional	442	6,628	15,316	15.0	433	56
—Bank/Financial	104	•	2,323	10.6	474	50
—Government	84	1,549	4,042	18.4	383	50
—Medical (Non- Diagnostic)	37	223		6.0	497	54
-Mixed Use	84	2,297	5,054	27.5	454	61
—Other Office	73	410	970	5.6	422	53

<sup>\*</sup> Number of workers and hours of operation were not collected for mall buildings. Source: Energy Information Administration, 2003 Commercial Buildings Energy Consumption Survey.

Figure 1. Percentage of Office Buildings by Type of Office, 2003



Two of the office sub-categories, administrative/professional and government, can be reported for major building characteristics categories (Table 2 and Table 3). All other office sub-categories have been aggregated into the "Other" category. Below Table 2 and Table 3 are links to tables with a full set of rowstubs.

Table 2. Types of Office Building, Number of Buildings, 2003

	Total Buildings (thousand)					
			Office Buildings			
	All Buildings*	All Office	Administrative/ Professional	Government	Other	
All Buildings	4,645	824	442	84	298	
Building Floorspace (square feet)						
-Small (1,001 to 5,000)	2,552	503	273	Q	189	
-Medium (5,001 to 50,000)	1,868	285	147	38	100	
-Large (Over 50,000)	225	35	21	5	9	
Year Constructed						
—Before 1960	1,419	230	158	21	51	
—1960 to 1989	2,016	414	204	47	163	
—1990 to 2003	1,210	180	80	17	83	
Census Region and Division						
—Northeast	726	155	87	19	49	
——New England	233	47	26	Q	Q	
Middle Atlantic	493	108	61	11	36	
Midwest	1,266	231	120	28	83	
——East North Central	696	134	79	14	41	
——West North Central	571	97	41	Q	42	
—South	1,775	250	131	25	94	
——South Atlantic	874	125	72	6	47	
——East South Central	348	41	26	Q	Q	
——West South Central	553	84	33	Q	38	
—West	878	187	105	11	72	
——Mountain	299	62	28	Q	28	
——Pacific	580	125	77	Q	43	

<sup>\*</sup> Data are for non-mall buildings.

Source: Energy Information Administration, 2003 Commercial Buildings Energy Consumption Survey.

Table 2 with full set of rowstubs.

Note: Excel version includes tab for relative standard errors (RSEs).

See "What is an RSE?" for additional information.

Q=Data withheld because the Relative Standard Error (RSE) was greater than 50 percent, or fewer than 20 buildings were

Table 3. Types of Office Building, Floorspace, 2003

	Total Floorspace (million square feet)						
			Office Buildi	ings			
	All Buildings*	All Office	Administrative/ Professional	Government	Other		
All Buildings	64,783	12,208	6,628	1,549	4,031		
Building Floorspace (square feet)							
-Small (1,001 to 5,000)	6,789	1,382	730	Q	546		
-Medium (5,001 to 50,000)	26,789	4,331	2,301	560	1,470		
-Large (Over 50,000)	31,206	6,495	3,597	883	2,015		
Year Constructed							
—Before 1960	17,685	2,852	1,454	433	965		
—1960 to 1989	29,205	6,792	3,773	724	2,295		
—1990 to 2003	17,893	2,563	1,401	392	770		
Census Region and Division							
Northeast	12,905	3,012	1,560	316	1,136		
——New England	2,964	578	332	Q	Q		
Middle Atlantic	9,941	2,434	1,228	217	988		
Midwest	17,080	2,989	1,584	486	919		
——East North Central	11,595	2,190	1,242	374	575		
——West North Central	5,485	799	342	Q	345		
—South	23,489	3,782	2,011	564	1,206		
——South Atlantic	12,258	1,958	1,007	Q	633		
——East South Central	3,393	481	253	Q	Q		
——West South Central	7,837	1,343	752	Q	462		
—West	11,310	2,425	1,473	183	769		
——Mountain	3,675	629	346	Q	208		
——Pacific	7,635	1,796	1,127	Q	561		

<sup>\*</sup> Data are for non-mall buildings.

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7

**Excel** 

Source: Energy Information Administration, 2003 Commercial Buildings Energy Consumption Survey.

Table 3 with full set of rowstubs.

Note: Excel version includes tab for relative standard errors (RSEs).

See "What is an RSE?" for additional information.

## **Energy Consumption**

Office buildings consumed more than 17 percent of the total energy used by the commercial buildings sector (Table 4). At least half of total energy, electricity, and natural gas consumed by office buildings was consumed by administrative or professional office buildings (Figure 2).

Q=Data withheld because the Relative Standard Error (RSE) was greater than 50 percent, or fewer than 20 buildings were sampled.

Table 4. Energy Consumed by Office Buildings for Major Fuels, 2003

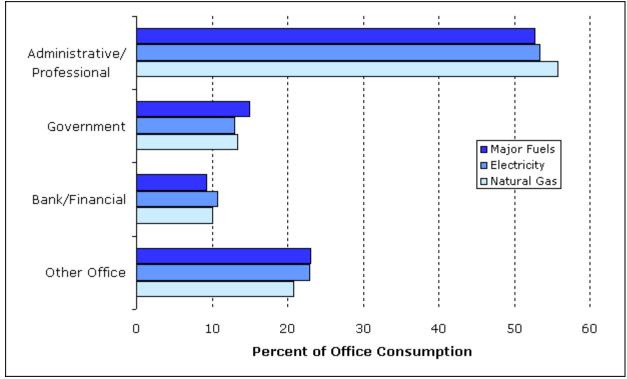
	All Build		Total Energy Consumption (trillion Btu)				
	Number of Buildings (thousand)	Total Floorspace (million sq. ft.)	Sum of Major Fuels	Electricity	Natural Gas	Fuel Oil	District Heat
All Buildings	4,859	71,658	6,523	3,559	2,100	228	636
All Non-Mall Buildings	4,645	64,783	5,820	3,037	1,928	222	634
All Office Buildings	824	12,208	1,134	719	269	18	128
Type of Office Building							
—Administrative/ Professional	442	6,628	598	384	150	9	55
—Bank/Financial	104	1,101	105	77	27	Q	N
—Government	84	1,549	170	93	36	Q	Q
—Other Office	194	2,930	261	165	56	5	Q

Q=Data withheld because the Relative Standard Error (RSE) was greater than 50 percent or fewer than 20 buildings were sampled.

N=No cases in sample.

Source: Energy Information Administration, 2003 Commercial Buildings Energy Consumption Survey.

Figure 2. Percentage of Energy Consumed in Office Buildings by Type of Office, 2003



Source: Energy Information Administration, 2003 Commercial Buildings Energy Consumption Survey.

Energy consumption per building and per square foot of floorspace varied significantly across the office sub-categories while consumption per employee showed less variation (Table 5). Consumption per square foot of floorspace for sum of major sources was greatest for government buildings.

Table 5. Summary of Consumption for Sum of Major Fuels for Office Buildings, 2003

		All Building	s	Sum	of Major F	uel Consum	ption
	Number of Buildings (thousand)	Total Floorspace (million sq. ft.)	Floorspace per Building (thousand square feet)	Total (trillion Btu)	per Building (million Btu)	per Square Foot (thousand Btu)	per Worker (million Btu)
All Buildings	4,859	71,658	14.7	6,523	1,342	91.0	*
All Non-Mall Buildings	4,645	64,783	13.9	5,820	1,253	89.8	79.9
All Office Buildings	824	12,208	14.8	1,134	1,376	92.9	40.3
Type of Office Building							
—Administrative/ Professional	442	6,628	15.0	598	1,352	90.2	39.0
—Bank/Financial	104	1,101	10.6	105	1,015	95.6	45.3
—Government	84	1,549	18.4	170	2,017	109.6	42.0
—Other Office	194	2,930	15.1	261	1,346	89.0	40.3

<sup>\*</sup> Number of workers not collected for mall buildings.

Tables 6 and 7 show electricity and natural gas intensities and the median,  $25^{th}$ , and  $75^{th}$  percentile building-level intensities. The  $25^{th}$  and  $75^{th}$  percentiles give a sense of the range of intensities for each of the office sub-categories. Figures 3 and 4 display the variation for the two energy sources.

Financial office buildings have the highest median, 25<sup>th</sup>, and 75<sup>th</sup> percentile building-level electricity intensities. For natural gas, the picture is less varied. With the exception of the "bank/financial" median value, the median, 25<sup>th</sup>, and 75<sup>th</sup> percentile values across office building types were fairly similar.

Table 6. Consumption of Electricity for Office Buildings, 2003

	Elect	Distribution of Building-Level Intensities (kWh/square foot)				
_	per Building (thousand kWh)	per Square Foot (kWh)	per Worker (thousand kWh)	25 <sup>th</sup> Percentile	Median	75 <sup>th</sup> Percentile
All Buildings	226	14.9	*	3.8	8.8	18.1
All Non-Mall Buildings	202	14.1	12.2	3.6	8.2	17.1
All Office Buildings	256	17.3	7.5	6.5	11.5	17.6
Type of Office Building						
—Administrative/ Professional	254	17.0	7.3	6.7	11.0	15.0
—Bank/Financial	217	20.4	9.7	14.5	22.2	29.5
—Government	325	17.7	6.8	8.1	10.7	19.3
—Other Office	249	16.5	7.5	4.9	10.1	15.5

<sup>\*</sup> Number of workers not collected for mall buildings.

Figure 3. Building-Level Electricity Intensities (25<sup>th</sup> percentile, median, and 75<sup>th</sup> percentile) by Type of Office Building, 2003

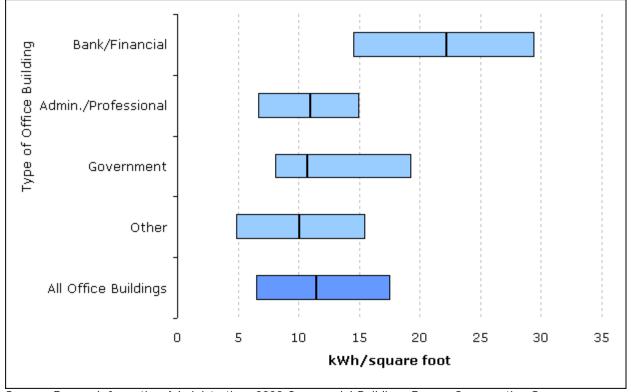
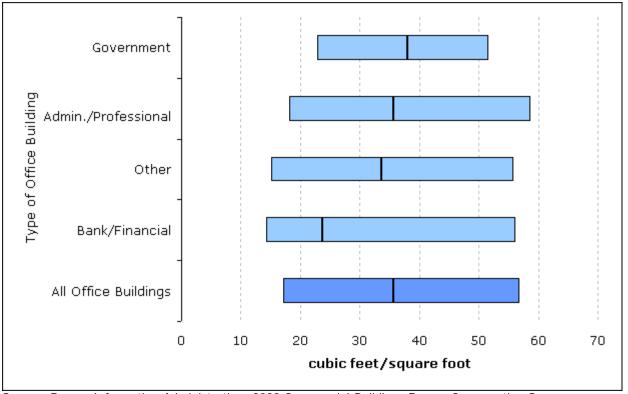


Table 7. Consumption of Natural Gas for Office Buildings, 2003

	Natura	Distribution of Building-Level Intensities (cubic feet/square foot)				
	per Building (thousand cubic feet)	per Square Foot (cubic feet)	per Worker (thousand cubic feet)	25 <sup>th</sup> Percentile	Median	75 <sup>th</sup> Percentile
All Buildings	803	42.0	*	17.9	37.4	71.0
All Non-Mall Buildings	782	43.0	36.0	17.6	37.1	70.9
All Office Buildings	535	31.8	13.8	17.2	35.7	56.9
Type of Office Building						
—Administrative/ Professional	538	32.1	13.4	18.2	35.6	58.8
-Bank/Financial	435	30.1	14.4	14.3	23.7	56.2
—Government	800	34.2	14.5	22.9	38.0	51.7
—Other Office	480	30.8	14.5	15.1	33.7	55.9

<sup>\*</sup> Number of workers not collected for mall buildings.

Figure 4. Building-Level Natural Gas Intensities (25<sup>th</sup> percentile, median, and 75<sup>th</sup> percentile) by Type of Office Building, 2003



### **End-Use Equipment**

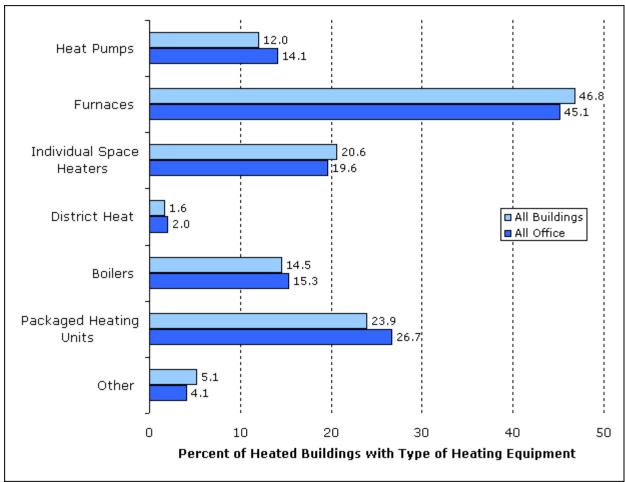
The types of space heating equipment used in office buildings were similar to those of the commercial buildings sector as a whole (Table 8 and Figure 5). Furnaces were most used followed by packaged heating systems. Individual space heaters were third-most used but were primarily used to supplement the building's main heating system. Boilers and district heat systems were more often used in larger buildings.

Table 8. Types of Heating Equipment Used in Office Buildings, 2003

	Number of Bu (thousan	•	Total Floorspace (million square feet)		
	All Buildings*	All Office Buildings	All Buildings*	All Office Buildings	
All Buildings	4,645	824	64,783	12,208	
All Buildings with Space Heating	3,982	802	60,028	11,929	
Heating Equipment (more than one may apply)					
—Heat Pumps	476	113	8,814	1,795	
——Packaged Heat Pumps	278	67	5,442	1,260	
——Split System Heat Pumps	166	42	2,581	422	
Individual Room Heat Pumps	58	8	2,691	506	
—Furnaces	1,864	362	19,615	2,405	
—Individual Space Heaters	819	157	12,545	2,186	
—District Heat	65	16	5,166	1,526	
—Boilers	579	123	20,423	4,117	
—Packaged Heating Units	953	214	18,021	3,754	
—Other	205	33	3,262	970	

<sup>\*</sup> Data are for non-mall buildings.

Figure 5. Types of Heating Equipment Used in Office Buildings, 2003



For cooling, packaged air conditioning units were most widely used for office buildings, as well as all commercial buildings (Table 9 and Figure 6). Residential-type central air conditioning systems were second-most commonly used. Central chillers and district chilled water systems were more commonly used in larger buildings.

Table 9. Types of Cooling Equipment Used in Office Buildings, 2003

	Number of Bu (thousan		Total Floorspace (million square feet)		
	All Buildings*	All Office Buildings	All Buildings*	All Office Buildings	
All Buildings	4,645	824	64,783	12,208	
All Buildings with Cooling	3,625	790	56,940	12,032	
Cooling Equipment (more than one may apply)					
—Residential Type Central Air Conditioners	1,006	273	11,035	1,669	
—Heat Pumps	492	107	9,041	1,854	
——Packaged Heat Pumps	288	65	5,426	1,259	
——Split System Heat Pumps	174	39	2,606	434	
——Individual Room Heat Pumps	58	8	2,940	615	
—Individual Air Conditioners	742	107	12,558	1,201	
—District Chilled Water	33	9	2,853	730	
—Central Chillers	111	29	11,636	3,839	
—Packaged Air Conditioning Units	1,613	339	29,969	6,171	
—Swamp Coolers	122	Q	1,561	Q	
—Other	40	15	1,232	439	

<sup>\*</sup> Data are for non-mall buildings.

Q=Data withheld because the Relative Standard Error (RSE) was greater than 50 percent, or fewer than 20 buildings were sampled.

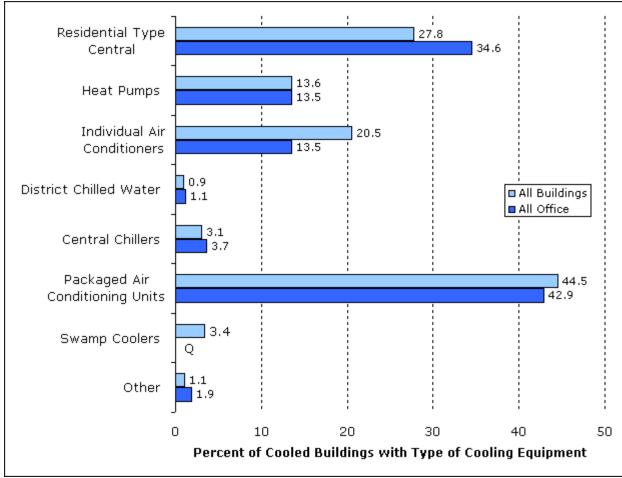


Figure 6. Types of Cooling Equipment Used in Office Buildings, 2003

Q=Data withheld because the Relative Standard Error (RSE) was greater than 50 percent, or fewer than 20 buildings were sampled.

Source: Energy Information Administration, 2003 Commercial Buildings Energy Consumption Survey.

More computers, dedicated servers, printers, and photocopiers were used in office buildings than in any other type of commercial building (Figure 7). In 2003, nearly 981 computers per 1,000 employees were reported for office buildings (Table 10). That exceeded the value for all non-mall commercial buildings (938 per 1,000 employees). Dedicated servers were less widely used in buildings (about 8% of the total number of computers). Nearly half (48.8%) of all servers were used in office buildings (Table 11).

The total number of printers was about 40 percent of the total number of computers. Office buildings used 11.6 million while the total for non-mall commercial buildings was 26.4 million units (Table 12). A total of 4.6 million photocopiers were used in non-mall buildings, with 47 percent (2.1 million) used in office buildings (Table 13).

Figure 7. Number of Computers, Dedicated Servers, Printers, and Photocopiers Used in Office Buildings, 2003

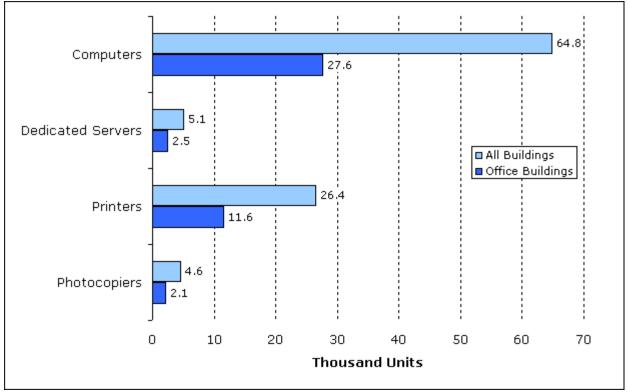


Table 10. Computers Used in Office Buildings, 2003

			Buildings with Computers					
	Number of Buildings (thousand)	Number of Buildings (thousand)	Total Floorspace (million square feet)	Number of Employees (thousand)	Number of Computers	Computers per Thousand Employees		
All Buildings*	4,645	3,081	55,627	69,046	64,773	938		
All Office Buildings	824	807	12,165	28,129	27,590	981		
Type of Office Building								
— Administrative/ Professional	442	434	6,612	15,302	15,051	984		
_	772	757	0,012	13,302	13,031	704		
Bank/Financial	104	104	1,101	2,323	2,529	1,089		
—Government	84	79	1,539	4,036	3,642	902		
—Other Office	194	190	2,914	6,447	6,367	984		

<sup>\*</sup> Data are for non-mall buildings.

Table 11. Dedicated Servers Used in Office Buildings, 2003

			Buildi	ngs with Dedic	cated Servers	
	Number of Buildings (thousand)	Number of Buildings with Dedicated Servers (thousand)	Total Floorspace (million square feet)	Number of Employees (thousand)	Number of Dedicated Servers (thousand)	Dedicated Servers per Thousand Employees
All Buildings*	4,645	1,175	36,338	52,509	5,104	97
All Office Buildings	824	450	9,932	24,378	2,489	102
Type of Office Building						
— Administrative/	442	254	E 440	12 200	1 207	104
Professional	442	256	5,469	13,388	1,397	104
— Bank/Financial	104	72	957	2,047	309	151
—Government	84	48	1,338	3,650	291	80
—Other Office	194	73	2,169	5,293	493	93

<sup>\*</sup>Data are for non-mall buildings.

Table 12. Printers Used in Office Buildings, 2003

			<b>Buildings with Printers</b>					
	Number of Buildings (thousand)	Number of Buildings with Printers (thousand)	Total Floorspace (million square feet)	Number of Computers (thousand)	Number of Printers (thousand)	Printers per Thousand Computers		
All Buildings*	4,645	2,983	54,788	64,773	26,447	408		
All Office Buildings	824	804	12,161	27,590	11,605	421		
Type of Office Building								
— Administrative/ Professional	442	431	6,608	15,051	6,237	414		
_								
Bank/Financial	104	104	1,101	2,529	840	332		
—Government	84	79	1,539	3,642	1,402	385		
—Other Office	194	190	2,914	6,367	3,126	491		

<sup>\*</sup> Data are for non-mall buildings.

Table 13. Photocopiers Used in Office Buildings, 2003

		Buildings with Photocopiers				
	Number of Buildings (thousand)	Number of Buildings with Photo- copiers (thousand)	Total Floorspace (million square feet)	Number of Employees (thousand)	Number of Photocopiers (thousand)	Photocopiers per Thousand Employees
All Buildings*	4,645	1,939	46,257	61,340	4,565	74
All Office Buildings	824	655	11,387	26,903	2,128	79
Type of Office Building						
— Administrative/						
Professional	442	371	6,150	14,710	1,179	80
Bank/Financial	104	88	1,016	2,192	187	85
—Government	84	69	1,497	3,968	262	66
—Other Office	194	127	2,725	6,033	501	83

<sup>\*</sup> Data are for non-mall buildings.

#### Full Report: PDF

#### **Detailed office tables**

Table 2. Office Building Sub-Categories, Number of Buildings, 2003

Table 3. Office Building Sub-Categories, Floorspace, 2003

Note: Excel version includes tab for relative standard errors (RSEs).

See "What is an RSE?" for additional information.

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