

**Table C34. Fuel oil consumption and expenditure intensities, 2018**

	Fuel oil consumption		Fuel oil expenditures			
	Per building (gallons)	Per thousand square feet (gallons)	Per worker (gallons)	Per building (thousand dollars)	Per square foot (dollars)	Per gallon (dollars)
<b>All buildings</b>	1,264	34.8	29.2	\$2.80	\$77.70	\$2.23
<b>Building floorspace (square feet)</b>						
1,001 to 5,000	634	211.2	183.8	\$1.60	\$537.50	\$2.54
5,001 to 10,000	971	130.0	135.0	\$2.40	\$320.80	\$2.47
10,001 to 25,000	1,118	65.5	77.7	\$2.50	\$143.80	\$2.19
25,001 to 50,000	1,055	28.7	26.6	\$2.40	\$63.90	\$2.23
50,001 to 100,000	1,856	25.2	22.9	\$4.30	\$58.50	\$2.32
100,001 to 200,000	3,558	25.1	19.7	\$5.90	\$41.30	\$1.65
200,001 to 500,000	7,215	22.9	18.6	\$14.20	\$45.00	\$1.96
Over 500,000	10,282	9.9	8.3	\$23.70	\$22.70	\$2.31
<b>Principal building activity</b>						
Education	6,322	78.7	112.1	\$12.10	\$150.20	\$1.91
Food sales	Q	Q	Q	Q	Q	Q
Food service	Q	Q	Q	Q	Q	Q
Health care	2,958	24.2	15.2	\$7.10	\$57.80	\$2.39
Inpatient	7,315	28.2	18.0	\$17.50	\$67.40	\$2.39
Outpatient	222	6.1	3.5	\$0.50	\$14.70	\$2.42
Lodging	1,421	20.9	40.0	\$2.80	\$41.80	\$2.00
Mercantile	904	28.8	46.2	\$2.30	\$73.80	\$2.56
Retail (other than mall)	1,022	58.7	Q	\$2.60	\$151.20	\$2.58
Enclosed and strip malls	Q	Q	Q	Q	Q	Q
Office	824	15.5	7.1	\$2.00	\$37.40	\$2.42
Public assembly	1,095	35.1	44.3	\$2.60	\$82.00	\$2.34
Public order and safety	Q	Q	Q	Q	Q	\$2.43
Religious worship	1,388	113.9	Q	\$3.50	\$285.90	\$2.51
Service	692	72.2	111.5	\$1.60	\$172.00	\$2.38
Warehouse and storage	Q	Q	Q	Q	Q	\$2.27
Other	1,839	44.0	Q	\$4.00	\$95.30	\$2.17
Vacant	Q	Q	Q	Q	Q	Q

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<b>All buildings</b>	1,264	34.8	29.2	\$2.80	\$77.70	\$2.23
<b>Year constructed</b>						
Before 1920	1,993	142.8	116.8	\$4.50	\$319.00	\$2.23
1920 to 1945	2,034	65.9	54.2	\$4.80	\$156.40	\$2.37
1946 to 1959	1,501	62.8	71.9	\$3.50	\$145.00	\$2.31
1960 to 1969	1,346	41.6	34.3	\$3.20	\$97.40	\$2.34
1970 to 1979	1,108	33.8	32.4	\$2.40	\$74.50	\$2.20
1980 to 1989	785	17.0	11.6	\$2.00	\$43.60	\$2.57
1990 to 1999	1,306	31.6	26.3	\$2.40	\$58.90	\$1.86
2000 to 2009	960	22.2	22.2	\$2.00	\$46.70	\$2.10
2010 to 2018	653	10.6	8.6	\$1.50	\$25.10	\$2.36
<b>Census region and division</b>						
Northeast	2,174	84.4	71.3	\$4.80	\$187.60	\$2.22
New England	2,196	138.5	138.2	\$4.90	\$311.50	\$2.25
Middle Atlantic	2,156	63.7	50.3	\$4.70	\$140.30	\$2.20
Midwest	640	16.7	15.9	\$1.40	\$36.30	\$2.17
East North Central	704	16.7	15.2	\$1.50	\$36.50	\$2.19
West North Central	Q	16.7	17.1	Q	\$36.00	\$2.15
South	681	14.4	12.3	\$1.50	\$32.70	\$2.27
South Atlantic	840	16.1	13.1	\$2.00	\$37.40	\$2.32
East South Central	383	8.8	8.6	\$0.80	\$19.30	\$2.20
West South Central	Q	Q	Q	Q	Q	\$2.12
West	Q	Q	Q	Q	Q	\$2.36
Mountain	Q	Q	Q	Q	Q	\$2.38
Pacific	Q	Q	Q	Q	Q	\$2.34
<b>Climate zone<sup>a</sup></b>						
Cold or very cold	1,825	72.6	67.2	\$4.00	\$158.80	\$2.19
Cool	1,480	61.1	52.8	\$3.20	\$133.70	\$2.19
Mixed mild	1,457	27.2	22.7	\$3.40	\$63.80	\$2.34
Warm	444	10.8	9.0	\$1.00	\$23.70	\$2.20
Hot or very hot	301	5.9	4.9	\$0.70	\$13.00	\$2.19

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<b>All buildings</b>	1,264	34.8	29.2	\$2.80	\$77.70	\$2.23
<b>Number of floors</b>						
1	683	44.8	51.7	\$1.60	\$105.70	\$2.36
2	1,595	66.9	73.0	\$3.50	\$146.30	\$2.19
3	1,719	38.9	42.4	\$3.70	\$83.00	\$2.14
4 to 9	3,178	21.3	16.0	\$7.00	\$47.10	\$2.21
10 or more	4,844	10.8	6.6	\$10.50	\$23.40	\$2.16
<b>Number of workers (main shift)</b>						
Fewer than 5	718	116.8	276.3	\$1.80	\$286.50	\$2.45
5 to 9	753	60.2	112.8	\$2.00	\$159.50	\$2.65
10 to 19	1,373	82.5	109.9	\$3.10	\$185.20	\$2.25
20 to 49	1,739	39.6	57.9	\$3.80	\$87.20	\$2.20
50 to 99	2,694	36.8	41.8	\$4.70	\$64.60	\$1.76
100 to 249	3,259	19.6	22.5	\$6.20	\$37.30	\$1.90
250 or more	4,441	11.3	6.2	\$10.20	\$26.20	\$2.30
<b>Weekly operating hours</b>						
Fewer than 40	579	54.3	40.1	\$1.40	\$128.50	\$2.37
40 to 48	1,005	57.7	57.5	\$2.10	\$122.20	\$2.12
49 to 60	915	24.1	16.6	\$1.90	\$50.80	\$2.11
61 to 84	2,338	52.8	40.7	\$5.60	\$126.90	\$2.41
85 to 167	Q	Q	Q	Q	Q	\$2.09
Open continuously	1,776	25.9	22.2	\$4.00	\$58.70	\$2.27
<b>Ownership and occupancy</b>						
Nongovernment owned	1,001	29.9	23.6	\$2.40	\$71.80	\$2.40
Owner occupied	929	32.6	27.8	\$2.20	\$77.80	\$2.39
Leased to tenant or tenants	1,230	25.1	17.5	\$3.00	\$61.20	\$2.44
Unoccupied	Q	Q	N	Q	Q	Q
Government owned	2,091	46.1	45.9	\$4.20	\$91.50	\$1.99
Federal	Q	Q	Q	Q	Q	\$2.14
State	910	18.9	18.7	\$2.20	\$45.10	\$2.38
Local	2,381	61.1	69.5	\$4.50	\$116.80	\$1.91

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<b>All buildings</b>	1,264	34.8	29.2	\$2.80	\$77.70	\$2.23
<b>Party responsible for operation of energy systems</b>						
Building owner	1,313	36.6	30.6	\$2.90	\$80.80	\$2.21
Business owner or tenant	831	24.9	27.2	\$2.00	\$60.60	\$2.43
Property management	Q	Q	Q	Q	Q	\$2.26
Other	1,142	Q	Q	Q	Q	\$2.64
<b>Provider of direct input on energy-related equipment purchases</b>						
Building owner	1,304	36.2	30.5	\$2.90	\$79.90	\$2.21
Business owner or tenant	740	24.4	23.6	\$1.90	\$61.20	\$2.51
Property management	Q	Q	Q	Q	Q	\$2.26
Other	Q	Q	Q	Q	Q	\$2.52
<b>Number of establishments</b>						
1	1,279	45.2	44.7	\$2.90	\$100.80	\$2.23
2 to 5	1,021	24.4	19.8	\$2.30	\$54.40	\$2.23
6 to 10	Q	3.8	2.7	Q	\$8.60	\$2.25
11 to 20	1,660	10.8	5.8	\$3.80	\$24.60	\$2.28
More than 20	7,019	15.3	8.7	\$16.30	\$35.50	\$2.32
Currently unoccupied	Q	Q	N	Q	Q	Q
<b>Predominant exterior wall material</b>						
Brick, stone, or stucco	2,161	38.4	33.1	\$4.50	\$80.60	\$2.10
Concrete (block or poured)	1,011	27.4	31.7	\$2.40	\$64.20	\$2.34
Concrete panels	999	5.3	4.5	\$2.30	\$12.10	\$2.30
Siding or shingles	1,117	160.1	140.2	\$2.80	\$395.60	\$2.47
Metal panels	439	31.0	32.6	\$1.00	\$69.90	\$2.26
Window glass	427	2.3	1.0	\$1.00	\$5.40	\$2.35
Other	1,518	Q	Q	\$3.50	Q	\$2.30

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<b>All buildings</b>	1,264	34.8	29.2	\$2.80	\$77.70	\$2.23
<b>Predominant roof material</b>						
Metal surfacing	573	43.5	49.3	\$1.30	\$99.60	\$2.29
Synthetic or rubber	1,991	25.2	20.0	\$4.10	\$52.30	\$2.07
Built-up	2,077	27.7	22.3	\$4.70	\$62.00	\$2.24
Slate or tile shingles	1,029	41.6	Q	\$2.40	\$98.80	\$2.38
Wooden materials (including shingles)	Q	Q	Q	Q	Q	Q
Asphalt, fiberglass, or other shingles	1,195	84.4	85.2	\$2.80	\$200.20	\$2.37
Concrete	2,409	32.7	27.1	\$6.10	\$83.10	\$2.54
Other	2,277	12.6	Q	\$4.80	\$26.60	\$2.11
<b>Roof tilt</b>						
Flat	1,883	22.4	17.6	\$3.80	\$45.80	\$2.04
Shallow pitch	880	46.2	52.2	\$2.10	\$112.70	\$2.44
Steeper pitch	1,101	94.3	113.3	\$2.60	\$222.40	\$2.36
<b>Cool roof characteristics (more than one may apply)</b>						
White or reflective coating or paint	1,576	22.4	18.6	\$3.20	\$45.40	\$2.03
White or reflective tiles or shingles	1,024	16.1	14.4	\$2.30	\$35.80	\$2.23
Aluminum coating	714	36.8	30.3	\$1.60	\$82.30	\$2.24
Ballasted roof system	1,405	12.9	9.5	\$2.80	\$25.40	\$1.97
Other cool roof property	Q	Q	6.1	Q	Q	\$2.25

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<b>All buildings</b>	1,264	34.8	29.2	\$2.80	\$77.70	\$2.23
<b>Renovations since 2000 (more than one may apply)</b>						
Any type of renovation	1,586	35.8	27.7	\$3.60	\$81.10	\$2.27
Addition or annex	1,843	24.0	20.8	\$4.00	\$51.50	\$2.15
Reduction in floorspace	Q	Q	Q	Q	Q	\$2.19
Roof replacement	2,002	35.8	27.1	\$4.40	\$78.20	\$2.19
Interior wall reconfiguration	1,890	24.5	17.2	\$4.20	\$55.20	\$2.25
Window replacement	2,202	44.2	35.4	\$5.10	\$101.40	\$2.29
HVAC equipment upgrade	2,017	32.4	23.6	\$4.70	\$75.20	\$2.32
Lighting upgrade	1,960	29.9	22.5	\$4.40	\$67.40	\$2.25
Electrical upgrade	1,818	28.1	20.8	\$3.90	\$59.80	\$2.13
Plumbing system upgrade	2,060	25.5	18.9	\$4.40	\$54.30	\$2.13
Insulation upgrade	1,768	34.8	28.2	\$3.60	\$71.80	\$2.06
Fire, safety, or security upgrade	2,025	24.4	17.9	\$4.40	\$52.90	\$2.17
Structural upgrade	1,884	20.7	14.4	\$4.10	\$44.70	\$2.16
Other	Q	Q	Q	Q	Q	Q
No renovations	1,002	38.9	38.4	\$2.20	\$84.40	\$2.17
Buildings constructed 2013 or later	Q	10.8	9.6	Q	\$26.20	\$2.43
<b>Energy sources (more than one may apply)</b>						
Electricity	1,264	34.8	29.2	\$2.80	\$77.70	\$2.23
Natural gas	904	13.1	11.2	\$2.00	\$29.30	\$2.23
Fuel oil	1,264	34.8	29.2	\$2.80	\$77.70	\$2.23
District heat	1,124	5.3	4.1	\$2.90	\$13.60	\$2.54
District chilled water	1,336	5.2	4.5	\$3.70	\$14.40	\$2.77
Propane	2,444	64.8	93.3	\$5.40	\$142.30	\$2.20
Solar	Q	10.3	10.5	\$6.60	\$22.80	\$2.21
Wood, coal, and other	304	20.2	24.9	Q	\$49.80	\$2.47
<b>Space-heating energy sources</b>						
Fuel oil	2,456	157.8	167.5	\$5.50	\$351.90	\$2.23
Fuel oil main	2,489	248.6	315.7	\$5.60	\$556.20	\$2.24
Fuel oil secondary	2,289	52.2	48.5	\$5.00	\$114.20	\$2.19
Other excluding fuel oil	271	4.8	3.9	\$0.60	\$11.00	\$2.27
Buildings without heating	196	8.3	7.6	\$0.50	\$19.00	\$2.29

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<b>All buildings</b>	1,264	34.8	29.2	\$2.80	\$77.70	\$2.23
<b>Primary space-heating energy source</b>						
Electricity	315	8.6	6.6	\$0.70	\$19.20	\$2.23
Natural gas	746	11.4	10.1	\$1.60	\$24.90	\$2.18
Fuel oil	2,489	248.6	315.7	\$5.60	\$556.20	\$2.24
District heat	1,030	5.1	4.0	\$2.50	\$12.70	\$2.48
Propane	Q	Q	Q	Q	Q	Q
Other sources <sup>b</sup>	Q	Q	Q	Q	Q	Q
<b>Cooling energy sources</b>						
Fuel oil	Q	Q	Q	Q	Q	Q
Other excluding fuel oil	1,414	31.7	26.7	\$3.20	\$70.60	\$2.23
Buildings without cooling	724	105.0	99.0	\$1.60	\$238.60	\$2.27
<b>Water-heating energy sources</b>						
Fuel oil	4,617	184.1	169.8	\$9.80	\$389.50	\$2.12
Other excluding fuel oil	897	20.4	16.7	\$2.10	\$47.50	\$2.33
Buildings without water heating	233	36.3	Q	\$0.60	\$89.60	\$2.47
<b>Cooking energy sources</b>						
Fuel oil	Q	Q	Q	Q	Q	Q
Other excluding fuel oil	1,993	30.4	24.3	\$4.10	\$63.30	\$2.08
Buildings without cooking	886	41.3	36.8	\$2.10	\$99.20	\$2.40
<b>Energy end uses (more than one may apply)</b>						
Buildings with space heating	1,305	35.4	29.7	\$2.90	\$79.20	\$2.23
Buildings with cooling	1,415	31.7	26.7	\$3.20	\$70.70	\$2.23
Buildings with water heating	1,432	34.7	28.8	\$3.20	\$77.40	\$2.23
Buildings with cooking	1,995	30.6	24.5	\$4.20	\$64.00	\$2.09
Buildings with manufacturing	335	12.8	16.7	\$0.80	\$31.00	\$2.43
Buildings with electricity generation	1,000	18.7	15.4	\$2.10	\$39.70	\$2.12
Buildings with lighting	1,264	34.8	29.2	\$2.80	\$77.70	\$2.23
<b>Percent of floorspace heated</b>						
Not heated	196	8.3	7.6	\$0.50	\$19.00	\$2.29
1% to 50%	389	22.6	30.4	\$0.90	\$54.30	\$2.41
51% to 99%	1,786	36.1	29.4	\$3.60	\$72.90	\$2.02
100%	1,386	36.6	29.8	\$3.20	\$84.30	\$2.30

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<b>All buildings</b>	1,264	34.8	29.2	\$2.80	\$77.70	\$2.23
<b>Heating equipment (more than one may apply)</b>						
Packaged heating units	778	13.2	12.4	\$1.70	\$29.20	\$2.21
Furnaces	686	56.2	57.1	\$1.70	\$136.10	\$2.42
Individual space heaters	976	33.3	35.3	\$2.00	\$67.90	\$2.04
Boilers	3,055	54.0	45.6	\$6.70	\$118.50	\$2.20
Heat pumps	979	15.5	13.9	\$2.30	\$35.90	\$2.31
District heat	1,022	5.0	3.9	\$2.50	\$12.30	\$2.47
Duct reheat	2,811	21.1	14.4	\$4.70	\$35.60	\$1.68
Other	Q	Q	Q	Q	Q	Q
<b>HVAC features (more than one may apply)</b>						
Economizer cycle	2,189	21.0	16.7	\$4.40	\$42.50	\$2.02
Variable air volume (VAV) system	1,971	16.5	11.7	\$4.20	\$35.40	\$2.15
Dedicated outside air system (DOAS)	4,430	26.9	22.4	\$9.90	\$60.30	\$2.24
Demand controlled ventilation (DCV)	3,949	55.7	44.5	\$8.20	\$115.40	\$2.07
Regular HVAC maintenance	1,529	33.2	27.0	\$3.40	\$73.80	\$2.22
Building automation system (BAS) controls heating or cooling	2,495	23.5	18.1	\$5.10	\$48.10	\$2.05
Internet-connected or smart thermostat	1,153	29.8	26.9	\$2.90	\$74.70	\$2.50
Programmable thermostat	1,036	63.0	75.4	\$2.50	\$149.70	\$2.37
<b>Water-heating equipment</b>						
Centralized system	1,374	40.9	37.4	\$3.00	\$89.20	\$2.18
Distributed system	1,513	45.4	33.1	\$3.60	\$108.20	\$2.38
Combination of centralized and distributed systems	1,967	12.4	8.9	\$4.60	\$29.30	\$2.36
<b>Generation technologies (more than one may apply)</b>						
Reciprocating engine generators	1,030	19.3	15.7	\$2.20	\$40.90	\$2.12
Solar panels	Q	10.3	Q	Q	\$22.80	\$2.21
Other generation technology	153	2.7	2.5	\$0.30	\$6.10	\$2.25



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<b>All buildings</b>	1,264	34.8	29.2	\$2.80	\$77.70	\$2.23
<b>Food preparation or serving areas in non-food service buildings (more than one may apply)</b>						
Snack bar, concession stand, or coffee shop	3,002	12.2	10.2	\$6.70	\$27.20	\$2.23
Fast food or small restaurant	2,685	16.5	12.5	\$6.20	\$38.10	\$2.32
Cafeteria or large restaurant	7,683	31.7	25.4	\$14.40	\$59.30	\$1.87
Commercial kitchen or food preparation area	3,143	22.1	21.2	\$6.30	\$44.30	\$2.01
Small kitchen area	1,493	28.4	21.5	\$3.40	\$64.30	\$2.26
<b>Annual consumption (gallons)</b>						
1,000 or less	218	7.0	5.6	\$0.50	\$17.10	\$2.44
1,001 to 5,000	1,936	47.1	42.1	\$4.80	\$115.80	\$2.46
5,001 to 10,000	6,776	128.4	121.4	\$15.40	\$292.10	\$2.28
10,001 to 25,000	15,665	120.7	163.4	\$34.20	\$263.20	\$2.18
Over 25,000	67,296	188.9	135.7	\$126.40	\$354.80	\$1.88

Data source: U.S. Energy Information Administration, Forms EIA-871A and F of the *2018 Commercial Buildings Energy Consumption Survey*  
 Notes: Because of rounding, data may not sum to totals. The *Guide to the 2018 CBECS Tables* and *CBECS Terminology* contain definitions of terms used in these tables and comparisons between previous CBECS tables. You can access both references from <http://www.eia.gov/consumption/commercial/data/2018/>.

Data are sample survey estimates with relative standard errors published in a tab on the Excel worksheet for this table.

Estimates in the *energy end uses* category represent total consumption and expenditures in buildings that have the end use but not the consumption and expenditures specifically for that end use.

HVAC = Heating, ventilation, and air conditioning.

<sup>a</sup>Climate zones are based on ASHRAE Standard 169-2021; see <https://www.eia.gov/consumption/commercial/maps.php#defined>.

<sup>b</sup>Other sources includes wood, coal, solar, and all other energy sources.

Q = Data withheld either because the relative standard error was greater than 50% or the reporting sample had fewer than 20 buildings.

N = No buildings in reporting sample.

**Relative standard errors (RSEs) for Table C34. Fuel oil consumption and expenditure intensities, 2018**

	RSEs for fuel oil consumption			RSEs for fuel oil expenditures		
	Per building	Per square foot	Per worker	Per building	Per square foot	Per gallon
<b>All buildings</b>	16.6	15.7	16.4	15.7	15.4	4.2
<b>Building floorspace (square feet)</b>						
1,001 to 5,000	26.1	23.3	30.5	26.1	23.1	2.5
5,001 to 10,000	41.6	40.1	41.5	40.5	39.0	3.7
10,001 to 25,000	23.5	22.5	27.3	25.3	24.2	6.9
25,001 to 50,000	29.0	28.4	30.9	28.4	27.8	2.4
50,001 to 100,000	25.0	25.1	26.5	26.0	26.1	2.3
100,001 to 200,000	30.4	30.6	33.6	21.6	21.9	19.3
200,001 to 500,000	33.8	33.8	35.1	31.6	31.6	11.9
Over 500,000	18.7	18.8	17.7	19.3	19.5	2.4
<b>Principal building activity</b>						
Education	30.5	26.9	27.9	24.8	22.9	13.5
Food sales	27.1	33.9	40.4	29.1	37.1	5.2
Food service	49.2	57.8	58.5	49.2	58.6	5.8
Health care	26.9	27.2	27.3	27.1	27.3	2.3
Inpatient	19.7	28.0	28.1	19.8	28.1	2.5
Outpatient	35.2	39.2	38.7	35.7	40.2	3.7
Lodging	33.3	40.8	40.7	36.6	42.0	9.9
Mercantile	41.7	44.8	48.1	42.2	44.5	13.1
Retail (other than mall)	42.3	48.2	50.9	42.8	48.0	13.5
Enclosed and strip malls	35.9	13.8	25.4	35.7	13.6	2.0
Office	32.0	31.2	31.9	32.7	32.8	7.6
Public assembly	39.6	35.8	37.1	39.3	35.8	2.4
Public order and safety	61.2	65.3	68.6	63.5	67.7	5.6
Religious worship	23.6	35.2	45.6	21.7	34.1	3.0
Service	34.1	31.7	34.6	34.4	31.8	4.0
Warehouse and storage	59.6	57.8	55.8	62.9	61.0	6.8
Other	28.6	31.5	51.1	26.8	30.8	2.5
Vacant	35.6	53.7	388.4	27.7	55.1	11.0

## Relative standard errors (RSEs) for Table C34. Fuel oil consumption and expenditure intensities, 2018

	RSEs for fuel oil consumption			RSEs for fuel oil expenditures		
	Per building	Per square foot	Per worker	Per building	Per square foot	Per gallon
<b>All buildings</b>	16.6	15.7	16.4	15.7	15.4	4.2
<b>Year constructed</b>						
Before 1920	24.5	20.7	22.5	22.6	21.7	5.6
1920 to 1945	31.0	39.2	39.9	33.2	41.2	4.0
1946 to 1959	27.6	34.4	33.8	28.3	34.9	4.8
1960 to 1969	27.8	28.8	37.4	33.2	34.1	12.1
1970 to 1979	41.5	28.8	30.2	39.6	26.2	4.2
1980 to 1989	25.0	29.4	28.4	24.9	29.5	5.9
1990 to 1999	38.5	32.9	35.4	28.2	21.0	26.1
2000 to 2009	26.9	25.6	27.9	25.4	25.8	6.5
2010 to 2018	38.8	27.1	29.9	38.9	27.2	3.6
<b>Census region and division</b>						
Northeast	20.4	17.7	20.2	18.1	17.2	6.2
New England	31.5	29.0	36.5	29.9	27.6	6.0
Middle Atlantic	26.6	20.6	20.8	22.2	20.5	10.7
Midwest	39.1	13.2	14.3	39.3	12.4	2.4
East North Central	22.0	18.3	19.9	22.7	16.6	3.3
West North Central	164.2	16.7	18.0	164.5	17.6	3.4
South	16.7	18.9	19.9	15.9	17.9	2.8
South Atlantic	18.6	19.4	22.9	17.5	18.7	3.4
East South Central	40.4	42.4	37.3	40.8	42.9	4.9
West South Central	55.6	57.7	51.1	53.9	55.5	3.7
West	59.9	61.2	61.2	59.6	60.9	1.5
Mountain	76.2	81.6	77.9	77.0	82.1	2.2
Pacific	85.8	83.0	84.1	85.3	82.6	1.4
<b>Climate zone<sup>a</sup></b>						
Cold or very cold	19.7	16.2	22.9	26.1	19.8	9.2
Cool	33.1	28.7	32.0	31.1	27.8	8.3
Mixed mild	21.0	17.2	17.5	20.4	17.1	2.3
Warm	35.6	35.4	34.3	34.4	34.1	2.8
Hot or very hot	30.6	26.0	30.6	30.1	25.1	2.1

## Relative standard errors (RSEs) for Table C34. Fuel oil consumption and expenditure intensities, 2018

	RSEs for fuel oil consumption			RSEs for fuel oil expenditures		
	Per building	Per square foot	Per worker	Per building	Per square foot	Per gallon
<b>All buildings</b>	16.6	15.7	16.4	15.7	15.4	4.2
<b>Number of floors</b>						
1	23.8	22.9	24.9	24.9	23.9	2.3
2	22.3	21.0	22.3	17.5	18.3	12.5
3	22.9	20.7	20.7	22.5	20.6	4.5
4 to 9	19.8	19.9	21.9	20.3	20.4	3.9
10 or more	35.9	36.9	36.1	32.1	33.2	8.0
<b>Number of workers (main shift)</b>						
Fewer than 5	22.2	21.5	21.6	21.4	20.7	2.4
5 to 9	22.5	22.4	21.9	27.6	27.1	7.5
10 to 19	35.3	36.1	36.4	37.1	38.3	6.7
20 to 49	25.2	23.8	25.2	26.3	24.9	3.3
50 to 99	42.1	40.4	41.7	41.6	39.9	15.1
100 to 249	30.0	29.8	30.0	25.8	26.0	18.1
250 or more	15.3	15.0	14.6	15.6	15.3	1.9
<b>Weekly operating hours</b>						
Fewer than 40	31.3	30.0	31.9	31.4	30.0	3.0
40 to 48	29.5	24.5	25.9	25.6	21.3	15.2
49 to 60	20.4	19.6	21.6	19.8	19.5	6.3
61 to 84	27.9	28.8	30.9	28.2	29.5	3.9
85 to 167	64.1	61.2	61.8	58.9	56.0	12.2
Open continuously	13.0	14.7	15.7	13.3	14.7	2.5
<b>Ownership and occupancy</b>						
Nongovernment owned	16.2	16.7	18.2	16.0	16.6	2.3
Owner occupied	15.5	15.2	17.2	16.2	15.9	2.7
Leased to tenant or tenants	28.0	28.7	29.4	25.3	26.3	5.2
Unoccupied	89.5	92.0	0.0	88.2	90.8	5.5
Government owned	23.9	19.7	20.5	21.2	16.9	9.4
Federal	62.1	61.8	69.3	59.3	59.8	5.3
State	41.7	32.1	34.5	41.8	31.8	2.5
Local	26.9	22.7	23.9	23.1	19.6	11.9

## Relative standard errors (RSEs) for Table C34. Fuel oil consumption and expenditure intensities, 2018

	RSEs for fuel oil consumption			RSEs for fuel oil expenditures		
	Per building	Per square foot	Per worker	Per building	Per square foot	Per gallon
<b>All buildings</b>	16.6	15.7	16.4	15.7	15.4	4.2
<b>Party responsible for operation of energy systems</b>						
Building owner	17.4	16.5	17.6	16.2	16.1	4.7
Business owner or tenant	32.0	30.5	31.2	30.8	29.5	3.2
Property management	75.3	62.5	65.4	67.5	59.7	11.3
Other	48.9	65.5	70.9	51.1	67.8	7.5
<b>Provider of direct input on energy-related equipment purchases</b>						
Building owner	17.0	16.2	17.2	15.9	15.8	4.6
Business owner or tenant	35.6	34.4	34.6	34.8	33.8	2.4
Property management	67.7	64.9	69.0	63.1	62.0	11.9
Other	71.1	80.6	82.0	69.7	79.6	4.0
<b>Number of establishments</b>						
1	19.3	17.8	18.5	18.0	17.3	5.1
2 to 5	20.5	22.3	23.4	21.2	22.8	4.7
6 to 10	70.4	33.8	34.2	69.7	31.6	4.1
11 to 20	27.7	42.5	44.8	30.5	46.7	8.6
More than 20	34.6	33.9	35.2	36.8	36.5	4.2
Currently unoccupied	85.7	85.5	0.0	84.6	84.3	4.4
<b>Predominant exterior wall material</b>						
Brick, stone, or stucco	22.4	24.0	25.1	21.0	23.2	7.3
Concrete (block or poured)	22.5	24.6	26.0	23.1	25.0	2.7
Concrete panels	30.0	28.5	23.5	27.4	26.6	5.0
Siding or shingles	21.0	16.9	23.9	22.3	17.9	4.7
Metal panels	27.2	25.5	31.6	27.1	24.8	2.4
Window glass	25.0	16.3	18.8	25.8	18.0	3.8
Other	44.8	51.4	54.0	43.1	50.4	6.4

## Relative standard errors (RSEs) for Table C34. Fuel oil consumption and expenditure intensities, 2018

	RSEs for fuel oil consumption			RSEs for fuel oil expenditures		
	Per building	Per square foot	Per worker	Per building	Per square foot	Per gallon
<b>All buildings</b>	16.6	15.7	16.4	15.7	15.4	4.2
<b>Predominant roof material</b>						
Metal surfacing	23.7	21.9	22.5	24.5	22.7	2.7
Synthetic or rubber	26.2	25.4	26.6	21.8	21.7	13.1
Built-up	31.2	27.8	28.0	31.2	28.1	3.1
Slate or tile shingles	32.6	35.7	55.6	30.9	34.8	5.0
Wooden materials (including shingles)	108.1	107.1	116.9	111.7	109.5	18.7
Asphalt, fiberglass, or other shingles	19.4	17.8	17.8	19.9	17.6	5.0
Concrete	38.2	27.6	30.2	32.2	24.1	8.5
Other	47.0	45.3	52.6	45.8	44.2	1.9
<b>Roof tilt</b>						
Flat	20.4	19.6	20.2	17.4	16.4	8.2
Shallow pitch	28.3	30.1	31.8	29.6	31.5	2.7
Steeper pitch	20.4	17.3	18.1	20.4	17.2	3.8
<b>Cool roof characteristics (more than one may apply)</b>						
White or reflective coating or paint	28.4	27.0	27.5	24.7	23.4	13.0
White or reflective tiles or shingles	41.7	36.0	42.2	40.3	34.5	3.2
Aluminum coating	29.5	34.7	40.6	27.6	32.2	4.2
Ballasted roof system	22.4	26.2	28.8	20.6	25.0	10.1
Other cool roof property	66.8	52.9	49.6	61.0	53.7	9.1

## Relative standard errors (RSEs) for Table C34. Fuel oil consumption and expenditure intensities, 2018

	RSEs for fuel oil consumption			RSEs for fuel oil expenditures		
	Per building	Per square foot	Per worker	Per building	Per square foot	Per gallon
<b>All buildings</b>	16.6	15.7	16.4	15.7	15.4	4.2
<b>Renovations since 2000 (more than one may apply)</b>						
Any type of renovation	19.8	21.3	22.3	19.1	21.2	3.7
Addition or annex	18.8	24.2	26.6	18.2	23.5	3.7
Reduction in floorspace	61.6	67.5	71.5	57.7	64.1	9.0
Roof replacement	22.8	21.7	22.3	22.1	21.2	5.4
Interior wall reconfiguration	17.8	20.5	21.0	17.5	20.5	3.2
Window replacement	28.6	29.2	29.6	28.6	28.9	3.2
HVAC equipment upgrade	25.7	30.4	31.9	25.3	30.5	3.1
Lighting upgrade	25.9	28.2	28.8	24.6	27.6	5.8
Electrical upgrade	23.3	23.9	24.4	24.1	24.8	3.6
Plumbing system upgrade	16.2	19.5	19.5	16.5	20.5	4.4
Insulation upgrade	25.5	27.0	27.1	29.8	34.3	14.5
Fire, safety, or security upgrade	16.7	21.9	21.7	19.2	26.1	7.4
Structural upgrade	31.3	39.9	36.7	30.4	38.5	2.7
Other	127.6	72.8	102.6	128.4	74.0	2.4
No renovations	19.8	17.9	17.2	18.2	17.1	7.5
Buildings constructed 2013 or later	53.4	35.2	39.9	53.6	35.2	4.0
<b>Energy sources (more than one may apply)</b>						
Electricity	16.6	15.7	16.4	15.7	15.4	4.2
Natural gas	16.6	13.9	13.4	16.6	14.0	2.3
Fuel oil	16.6	15.7	16.4	15.7	15.4	4.2
District heat	31.5	28.0	26.4	33.7	30.2	6.8
District chilled water	41.8	35.5	34.5	45.4	39.4	6.1
Propane	29.8	25.8	26.9	28.0	24.2	4.2
Solar	52.8	42.9	48.9	50.0	39.5	6.9
Wood, coal, and other	45.4	39.1	42.0	50.2	41.8	8.3
<b>Space-heating energy sources</b>						
Fuel oil	15.9	12.4	17.9	14.4	12.7	4.8
Fuel oil main	18.4	11.9	15.9	16.5	11.5	5.6
Fuel oil secondary	23.7	10.6	19.6	22.8	9.8	4.0
Other excluding fuel oil	19.6	14.1	15.0	19.4	13.8	2.1
Buildings without heating	38.3	28.1	31.1	38.1	28.1	3.1

## Relative standard errors (RSEs) for Table C34. Fuel oil consumption and expenditure intensities, 2018

	RSEs for fuel oil consumption			RSEs for fuel oil expenditures		
	Per building	Per square foot	Per worker	Per building	Per square foot	Per gallon
<b>All buildings</b>	16.6	15.7	16.4	15.7	15.4	4.2
<b>Primary space-heating energy source</b>						
Electricity	24.0	19.9	23.2	23.2	18.8	2.3
Natural gas	18.1	12.5	12.3	17.4	11.6	3.6
Fuel oil	18.4	11.9	15.9	16.5	11.5	5.6
District heat	33.6	30.8	29.6	35.8	33.2	7.3
Propane	132.8	82.4	79.6	131.6	79.5	7.0
Other sources <sup>b</sup>	74.9	49.0	51.0	75.1	51.5	6.3
<b>Cooling energy sources</b>						
Fuel oil	22.5	3.3	9.7	25.8	7.0	3.8
Other excluding fuel oil	17.1	16.9	17.4	16.1	16.5	4.7
Buildings without cooling	35.3	34.1	41.2	36.5	35.2	4.3
<b>Water-heating energy sources</b>						
Fuel oil	18.1	15.7	26.4	13.8	17.2	9.4
Other excluding fuel oil	18.1	19.2	20.1	18.1	19.2	1.7
Buildings without water heating	43.1	39.6	50.3	46.9	43.0	8.1
<b>Cooking energy sources</b>						
Fuel oil	43.3	81.0	39.0	40.7	81.9	5.7
Other excluding fuel oil	19.6	16.8	18.3	15.9	14.0	7.7
Buildings without cooking	19.9	19.8	21.0	20.3	20.3	2.0
<b>Energy end uses (more than one may apply)</b>						
Buildings with space heating	16.8	15.8	16.5	15.9	15.5	4.2
Buildings with cooling	17.1	16.9	17.4	16.0	16.4	4.7
Buildings with water heating	15.5	16.0	16.7	14.6	15.7	4.3
Buildings with cooking	19.2	16.5	18.0	15.6	13.7	7.6
Buildings with manufacturing	33.8	34.3	38.5	34.0	34.2	3.1
Buildings with electricity generation	21.1	16.9	17.4	18.5	14.1	7.9
Buildings with lighting	16.6	15.7	16.4	15.7	15.4	4.2
<b>Percent of floorspace heated</b>						
Not heated	38.3	28.1	31.1	38.1	28.1	3.1
1% to 50%	38.2	36.0	39.5	41.7	39.9	6.9
51% to 99%	25.8	26.3	29.6	23.7	26.5	17.5
100%	18.1	18.2	19.3	16.9	16.9	2.2



## Relative standard errors (RSEs) for Table C34. Fuel oil consumption and expenditure intensities, 2018

	RSEs for fuel oil consumption			RSEs for fuel oil expenditures		
	Per building	Per square foot	Per worker	Per building	Per square foot	Per gallon
<b>All buildings</b>	16.6	15.7	16.4	15.7	15.4	4.2
<b>Heating equipment (more than one may apply)</b>						
Packaged heating units	17.5	17.1	17.8	17.8	17.4	3.1
Furnaces	26.4	26.9	28.5	26.2	26.4	3.2
Individual space heaters	24.1	21.0	23.6	19.7	17.5	12.9
Boilers	18.0	16.9	18.4	16.4	15.5	5.6
Heat pumps	33.2	32.0	32.0	33.2	32.3	2.4
District heat	33.1	30.2	28.9	35.3	32.7	7.2
Duct reheat	48.2	46.4	47.4	38.0	36.5	37.3
Other	36.4	47.8	66.2	24.1	48.5	13.2
<b>HVAC features (more than one may apply)</b>						
Economizer cycle	19.0	18.4	19.4	14.1	14.1	11.2
Variable air volume (VAV) system	14.1	14.6	15.6	14.0	14.9	3.5
Dedicated outside air system (DOAS)	38.6	36.2	36.9	36.6	34.5	3.9
Demand controlled ventilation (DCV)	34.2	34.6	37.1	32.0	35.5	12.1
Regular HVAC maintenance	16.6	17.9	18.8	15.8	17.5	4.7
Building automation system (BAS) controls heating or cooling	19.7	20.1	20.8	16.7	18.2	8.8
Internet-connected or smart thermostat	29.8	40.8	44.9	29.1	40.6	2.5
Programmable thermostat	26.9	27.4	31.7	28.4	29.1	5.3
<b>Water-heating equipment</b>						
Centralized system	15.6	13.7	14.7	13.9	13.1	6.1
Distributed system	34.1	41.0	44.9	35.6	41.4	4.3
Combination of centralized and distributed systems	20.2	26.8	27.6	20.3	28.1	3.5
<b>Generation technologies (more than one may apply)</b>						
Reciprocating engine generators	21.9	17.4	17.8	19.2	14.4	8.2
Solar panels	54.0	43.9	50.1	51.1	40.4	7.2
Other generation technology	41.9	27.0	30.5	42.5	27.1	2.8

## Relative standard errors (RSEs) for Table C34. Fuel oil consumption and expenditure intensities, 2018

	RSEs for fuel oil consumption			RSEs for fuel oil expenditures		
	Per building	Per square foot	Per worker	Per building	Per square foot	Per gallon
<b>All buildings</b>	16.6	15.7	16.4	15.7	15.4	4.2
<b>Food preparation or serving areas in non-food service buildings (more than one may apply)</b>						
Snack bar, concession stand, or coffee shop	16.9	15.1	15.0	16.7	15.6	1.6
Fast food or small restaurant	29.9	28.5	28.2	29.5	28.5	3.1
Cafeteria or large restaurant	26.9	27.4	27.9	21.7	22.4	13.5
Commercial kitchen or food preparation area	21.8	21.0	21.2	21.3	20.1	5.4
Small kitchen area	16.0	17.6	15.0	16.8	19.5	5.2
<b>Annual consumption (gallons)</b>						
1,000 or less	12.6	11.4	12.3	13.3	12.5	3.1
1,001 to 5,000	6.8	18.4	20.9	8.2	18.4	2.5
5,001 to 10,000	5.9	38.4	39.2	8.1	40.5	7.7
10,001 to 25,000	4.9	19.7	21.1	5.3	20.7	3.6
Over 25,000	16.5	25.8	41.0	19.7	22.2	15.4

Data source: U.S. Energy Information Administration, Forms EIA-871A and F of the 2018 Commercial Buildings Energy Consumption Survey  
 Note: RSE is a measure of the reliability or precision of a survey statistic. Variability occurs in survey statistics because the different samples that could be drawn would each produce different values for the survey statistics. *Estimation of Standard Errors* and *What is a Relative Standard Error (RSE)?* contain more information on how RSEs are estimated and used. Both references can be accessed from <https://www.eia.gov/consumption/commercial/survey-background-technical-information.php>.

<sup>a</sup>Climate zones are based on ASHRAE Standard 169-2021; see <https://www.eia.gov/consumption/commercial/maps.php#defined>.

<sup>b</sup>Other sources includes wood, coal, solar, and all other energy sources.