

Table E9. Fuel oil consumption and energy intensities (in British thermal units [Btu]) by end use, 2018

	Total fuel oil consumption (trillion Btu)				Fuel oil energy intensity ^a (thousand Btu/square foot in buildings using fuel oil for the end use)			
	Total	Space heating	Water heating	Other	Total	Space heating	Water heating	Other
All buildings	101.2	80.5	4.0	16.8	4.8	19.5	2.2	0.9
Year constructed								
Before 1920	14.7	13.9	Q	0.5	19.6	35.7	Q	1.2
1920 to 1945	14.4	12.1	Q	2.0	9.1	28.8	Q	1.6
1946 to 1959	11.6	10.5	Q	0.7	8.6	17.9	Q	0.8
1960 to 1969	10.6	9.6	0.2	0.8	5.7	18.0	1.2	0.5
1970 to 1979	13.2	9.5	Q	3.3	4.7	17.1	Q	1.3
1980 to 1989	7.5	4.6	Q	2.3	2.3	18.9	Q	0.7
1990 to 1999	13.2	10.2	Q	1.9	4.3	17.8	Q	0.7
2000 to 2009	12.4	8.2	0.4	3.8	3.1	17.2	1.4	1.0
2010 to 2018	3.6	Q	Q	1.6	1.5	Q	Q	0.7
Census region and division								
Northeast	68.8	60.7	3.0	5.1	11.6	24.1	2.6	1.2
New England	31.2	28.1	1.5	Q	19.0	36.9	3.0	1.6
Middle Atlantic	37.6	32.5	1.5	3.6	8.8	18.6	2.3	1.1
Midwest	10.5	4.7	0.2	5.6	2.3	6.7	0.9	1.3
East North Central	6.7	2.7	Q	3.9	2.3	6.8	Q	1.4
West North Central	3.8	2.1	Q	1.7	2.3	6.5	Q	1.2
South	13.5	9.0	0.3	4.1	2.0	12.4	Q	0.6
South Atlantic	9.6	6.8	Q	2.6	2.2	12.4	Q	0.6
East South Central	1.0	Q	Q	0.4	1.2	Q	Q	0.5
West South Central	Q	Q	Q	1.2	Q	Q	Q	0.7
West	Q	Q	Q	1.9	Q	Q	Q	0.5
Mountain	Q	Q	Q	1.0	Q	Q	Q	0.5
Pacific	Q	Q	Q	0.9	Q	Q	Q	0.5
Climate zone^b								
Cold or very cold	16.2	13.0	0.8	2.5	10.0	18.0	2.4	2.3
Cool	48.5	40.0	2.1	6.4	8.4	24.3	3.2	1.3
Mixed mild	29.3	23.5	1.0	4.8	3.7	16.5	1.5	0.7
Warm	5.2	Q	Q	1.5	1.5	12.2	Q	0.4
Hot or very hot	2.0	Q	Q	1.7	0.8	Q	Q	0.7

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	Total	Space heating	Water heating	Other	Total	Space heating	Water heating	Other
All buildings	101.2	80.5	4.0	16.8	4.8	19.5	2.2	0.9
Number of floors								
1	30.3	25.8	1.2	3.2	6.2	23.5	4.0	0.8
2	34.4	29.7	0.8	3.9	9.2	28.3	2.2	1.2
3	12.8	9.4	0.5	2.9	5.3	15.7	1.5	1.4
4 to 9	17.8	12.4	1.2	4.1	2.9	13.3	2.8	0.7
10 or more	6.0	Q	Q	2.7	1.5	Q	Q	0.7
Number of workers (main shift)								
Fewer than 5	29.5	25.6	Q	2.9	16.1	27.7	Q	3.0
5 to 9	8.0	7.0	Q	Q	8.3	17.7	Q	Q
10 to 19	11.3	Q	Q	0.6	11.3	Q	Q	0.8
20 to 49	15.6	11.3	1.3	3.1	5.4	15.0	3.6	1.3
50 to 99	14.2	12.1	0.4	1.7	5.1	25.9	1.2	0.7
100 to 249	10.4	8.0	0.2	2.1	2.7	17.6	1.1	0.6
250 or more	12.3	6.1	0.5	5.7	1.6	7.1	1.0	0.7
Weekly operating hours								
Fewer than 40	8.3	7.9	Q	0.3	7.5	22.7	Q	0.4
40 to 48	22.2	19.9	Q	1.7	7.9	23.9	1.6	0.8
49 to 60	14.6	12.6	Q	1.7	3.3	13.2	Q	0.5
61 to 84	20.6	18.9	0.7	1.0	7.3	32.6	2.5	0.4
85 to 167	Q	Q	Q	1.8	Q	Q	Q	0.8
Open continuously	27.3	14.8	2.3	10.3	3.6	13.1	3.3	1.4
Ownership and occupancy								
Nongovernment owned	60.9	47.2	2.3	11.4	4.1	18.5	2.3	0.9
Owner occupied	43.0	31.6	2.2	9.2	4.5	16.4	2.8	1.1
Leased to tenant or tenants	17.8	15.6	Q	2.2	3.5	25.2	Q	0.5
Unoccupied	Q	Q	Q	Q	Q	Q	Q	Q
Government owned	40.4	33.3	1.7	5.4	6.3	21.1	2.1	0.9
Federal	Q	Q	Q	1.0	Q	Q	Q	1.3
State	4.6	Q	Q	1.2	2.6	Q	Q	0.7
Local	32.0	27.6	1.2	3.2	8.4	23.2	2.0	1.0

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	Total fuel oil consumption (trillion Btu)				Fuel oil energy intensity ^a (thousand Btu/square foot in buildings using fuel oil for the end use)			
	Total	Space heating	Water heating	Other	Total	Space heating	Water heating	Other
All buildings	101.2	80.5	4.0	16.8	4.8	19.5	2.2	0.9
Renovations since 2000 (more than one may apply)								
Any type of renovation	60.5	49.7	2.1	8.6	4.9	20.6	1.9	0.8
Addition or annex	12.5	9.5	0.3	2.7	3.3	11.3	0.9	0.8
Reduction in floorspace	Q	Q	Q	0.2	Q	Q	Q	0.3
Roof replacement	30.7	24.7	1.3	4.7	4.9	20.4	1.8	0.8
Interior wall reconfiguration	25.0	19.1	1.1	4.8	3.4	14.9	1.7	0.7
Window replacement	23.2	19.6	1.1	2.5	6.1	21.6	2.3	0.8
HVAC equipment upgrade	38.5	30.8	1.0	6.7	4.5	22.3	1.3	0.8
Lighting upgrade	38.2	32.1	0.8	5.3	4.1	20.9	1.1	0.6
Electrical upgrade	22.5	18.1	0.4	4.0	3.9	17.4	0.8	0.8
Plumbing system upgrade	20.1	15.4	Q	3.7	3.5	15.7	1.7	0.7
Insulation upgrade	15.7	13.0	0.4	2.2	4.8	18.5	0.9	0.8
Fire, safety, or security upgrade	22.9	17.0	1.2	4.7	3.4	16.5	1.7	0.7
Structural upgrade	4.9	Q	Q	1.0	2.8	Q	Q	0.7
Other	Q	Q	N	Q	Q	Q	N	Q
No renovations	38.2	29.1	1.9	7.2	5.3	19.3	2.8	1.2
Buildings constructed 2013 or later	2.6	Q	Q	0.9	1.5	Q	Q	0.6
Energy sources (more than one may apply)								
Electricity	101.2	80.5	4.0	16.8	4.8	19.5	2.2	0.9
Natural gas	27.0	16.7	0.7	9.6	1.8	9.3	1.0	0.7
Fuel oil	101.2	80.5	4.0	16.8	4.8	19.5	2.2	0.9
District heat	2.2	Q	Q	1.6	0.7	Q	Q	0.6
District chilled water	1.3	Q	Q	1.1	0.7	Q	Q	0.6
Propane	28.0	23.0	1.9	3.1	8.9	21.5	2.8	1.2
Solar	1.4	Q	Q	0.3	1.4	Q	Q	0.3
Wood, coal, and other	1.7	Q	Q	0.3	2.8	Q	Q	0.5
Space-heating energy sources								
Fuel oil	89.7	80.5	3.8	5.4	21.7	19.5	2.4	3.5
Fuel oil main	76.0	70.9	3.2	1.9	34.2	31.9	3.2	3.2
Fuel oil secondary	13.7	9.6	0.6	3.6	7.2	5.0	1.0	3.7
Other excluding fuel oil	11.0	N	Q	10.8	0.7	N	Q	0.7
Buildings without heating	0.6	N	Q	0.6	1.1	N	Q	1.1

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	Total	Space heating	Water heating	Other	Total	Space heating	Water heating	Other
All buildings	101.2	80.5	4.0	16.8	4.8	19.5	2.2	0.9
Primary space-heating energy source								
Electricity	6.8	Q	Q	5.8	1.2	Q	Q	1.1
Natural gas	15.2	8.1	0.4	6.6	1.6	6.1	0.8	0.7
Fuel oil	76.0	70.9	3.2	1.9	34.2	31.9	3.2	3.2
District heat	1.9	Q	Q	1.5	0.7	Q	Q	0.6
Propane	Q	Q	Q	Q	Q	Q	Q	Q
Other sources ^c	Q	Q	N	Q	Q	Q	N	Q
Cooling energy sources								
Fuel oil	Q	Q	N	Q	Q	Q	N	Q
Other excluding fuel oil	88.3	68.8	3.6	16.0	4.4	18.7	2.1	0.9
Buildings without cooling	12.7	11.7	Q	Q	14.4	25.2	Q	Q
Water-heating energy sources								
Fuel oil	45.7	38.9	4.0	2.8	25.3	25.2	2.2	3.0
Other excluding fuel oil	52.9	39.1	N	13.8	2.8	16.4	N	0.8
Buildings without water heating	2.6	Q	N	Q	5.0	Q	N	Q
Cooking energy sources								
Fuel oil	Q	Q	Q	Q	Q	Q	Q	Q
Other excluding fuel oil	53.5	40.5	2.6	10.4	4.2	18.4	2.2	0.9
Buildings without cooking	46.8	39.2	1.3	6.2	5.7	20.6	2.3	0.9
Energy end uses (more than one may apply)								
Buildings with space heating	100.7	80.5	4.0	16.2	4.9	19.5	2.3	0.9
Buildings with cooling	88.5	68.8	3.6	16.2	4.4	18.7	2.1	0.9
Buildings with water heating	98.6	78.0	4.0	16.6	4.8	19.8	2.2	0.9
Buildings with cooking	54.5	41.2	2.7	10.5	4.2	18.5	2.2	0.9
Buildings with manufacturing	2.4	Q	Q	Q	1.8	Q	Q	Q
Buildings with electricity generation	47.1	28.1	2.3	16.6	2.6	14.9	2.4	0.9
Buildings with lighting	101.2	80.5	4.0	16.8	4.8	19.5	2.2	0.9

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	Total	Space heating	Water heating	Other	Total	Space heating	Water heating	Other
All buildings	101.2	80.5	4.0	16.8	4.8	19.5	2.2	0.9
Percentage of floorspace heated								
Not heated	0.6	N	Q	0.6	1.1	N	Q	1.1
1% to 50%	4.7	3.9	Q	0.8	3.1	11.7	Q	0.7
51% to 99%	26.3	22.4	0.7	3.2	5.0	23.8	1.7	0.7
100%	69.6	54.2	3.2	12.2	5.0	18.9	2.6	1.0
Heating equipment (more than one may apply)								
Packaged heating units	17.3	10.2	0.7	6.4	1.8	8.8	1.5	0.7
Furnaces	17.4	16.4	Q	0.9	7.7	18.3	Q	0.6
Individual space heaters	23.3	17.5	Q	5.1	4.6	16.3	Q	1.2
Boilers	75.8	62.5	3.7	9.5	7.4	19.8	2.4	1.1
Heat pumps	7.7	4.1	Q	3.0	2.1	12.7	Q	0.9
District heat	2.0	Q	Q	1.5	0.7	Q	Q	0.6
Duct reheat	9.1	Q	Q	2.5	2.9	20.1	Q	0.8
Other	Q	N	N	Q	Q	N	N	Q
HVAC features (more than one may apply)								
Economizer cycle	35.3	22.5	1.1	11.7	2.9	12.5	1.2	1.0
Variable air volume (VAV) system	26.4	15.4	1.0	10.0	2.3	11.8	1.3	0.9
Dedicated outside air system (DOAS)	14.8	9.7	0.6	4.5	3.7	Q	Q	1.2
Demand controlled ventilation (DCV)	27.7	23.1	0.8	3.8	7.7	25.8	Q	1.2
Regular HVAC maintenance	90.0	70.9	3.7	15.4	4.6	21.4	2.2	0.9
Building automation system (BAS) controls heating or cooling	45.9	30.6	1.6	13.7	3.2	17.8	1.5	1.0
Internet-connected or smart thermostat	4.6	Q	Q	0.3	4.1	Q	Q	0.3
Programmable thermostat	23.5	21.6	Q	1.0	8.7	26.4	Q	0.5
Water-heating equipment								
Centralized system	74.0	58.6	3.4	12.0	5.6	19.9	2.5	1.1
Distributed system	16.3	14.7	Q	1.5	6.2	29.5	Q	0.7
Combination of centralized and distributed systems	8.4	4.7	0.5	3.2	1.7	9.7	1.3	0.7

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	Total	Space heating	Water heating	Other	Total	Space heating	Water heating	Other
All buildings	101.2	80.5	4.0	16.8	4.8	19.5	2.2	0.9
Generation technologies (more than one may apply)								
Reciprocating engine generators	45.7	27.0	2.3	16.3	2.7	15.0	2.4	1.0
Solar panels	1.4	Q	Q	0.3	1.4	Q	Q	0.3
Other generation technology	0.4	Q	N	0.4	0.4	Q	N	0.4
Food preparation or serving areas in non-food service buildings (more than one may apply)								
Snack bar, concession stand, or coffee shop	8.0	4.4	0.2	3.3	1.7	7.2	0.7	0.7
Fast food or small restaurant	7.4	4.5	Q	2.4	2.3	10.5	Q	0.7
Cafeteria or large restaurant	28.2	21.4	1.3	5.5	4.4	16.6	1.7	0.9
Commercial kitchen or food preparation area	19.9	13.5	1.2	5.2	3.0	14.9	2.2	0.8
Small kitchen area	24.4	19.1	1.0	4.4	3.9	18.6	1.9	0.8
Annual consumption (gallons)								
1,000 or less	13.5	9.1	Q	4.2	1.0	9.4	Q	0.3
1,001 to 5,000	27.1	21.2	1.0	5.0	6.5	18.8	1.9	1.5
5,001 to 10,000	21.3	19.5	Q	1.0	17.6	34.1	Q	1.2
10,001 to 25,000	14.2	11.2	1.3	1.7	16.6	18.7	2.9	3.4
Over 25,000	25.2	19.5	0.8	4.9	26.0	22.4	1.6	6.2

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/>.

Estimates for types of equipment represent consumption in buildings that have the equipment, not the consumption by the specific piece of equipment.

HVAC = Heating, ventilation, and air conditioning.

^aThe fuel oil intensity calculation is conditional on the presence of the end use, and therefore the intensities for each end use will not sum to the total fuel oil intensity. In this table, each column is calculated as fuel oil consumption for the end use divided by the floorspace in buildings that use fuel oil for the particular end use.

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

^c*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.