

Table E11. District heat consumption and energy intensities by end use, 2018

	Total district heat consumption (trillion British thermal units [Btu])					District heat energy intensity ^a (thousand Btu/square foot in buildings using district heat for the end use)				
	Total	Space heating	Water heating	Cooking	Other	Total	Space heating	Water heating	Cooking	Other
All buildings	305	270	29	1	5	45.2	41.2	6.8	1.5	12.9
Building floorspace (square feet)										
1,001 to 25,000	30	29	Q	Q	N	54.7	56.7	Q	Q	N
25,001 to 100,000	68	60	7	Q	Q	45.3	40.3	9.2	Q	Q
100,001 to 500,000	118	102	14	Q	Q	49.0	45.0	9.0	Q	Q
Over 500,000	88	78	7	1	Q	38.7	34.6	4.1	1.3	Q
Principal building activity										
Education	60	52	7	Q	Q	43.4	39.2	9.6	Q	Q
Health care	39	34	5	(*)	Q	44.2	42.9	10.7	1.3	Q
Lodging	26	15	10	Q	Q	31.5	18.9	18.7	Q	Q
Office	57	52	2	Q	Q	30.7	28.0	1.3	Q	Q
Public assembly	63	61	1	Q	Q	66.4	67.1	1.3	Q	Q
All others	61	56	Q	Q	Q	69.3	64.1	8.9	Q	Q
Year constructed										
Before 1945	57	52	4	Q	Q	42.2	38.2	4.3	Q	Q
1946 to 1979	135	118	14	(*)	Q	47.6	42.3	8.2	0.9	Q
1980 to 1999	50	43	7	Q	Q	38.1	34.5	8.5	Q	Q
2000 to 2018	62	57	4	Q	Q	50.3	49.7	5.3	Q	Q
Census region										
Northeast	87	70	12	Q	Q	47.5	39.6	8.6	Q	Q
Midwest	88	82	6	Q	Q	58.7	57.6	5.9	Q	Q
South	91	84	6	Q	Q	42.7	40.4	5.3	Q	Q
West	39	33	5	Q	Q	30.1	26.4	7.2	Q	Q
Climate Zone^b										
Cold or very cold	21	19	Q	Q	Q	56.4	50.3	Q	Q	Q
Cool	88	77	10	Q	Q	52.4	49.2	8.3	Q	Q
Mixed mild	138	123	11	Q	Q	50.3	45.2	5.7	Q	Q
Warm	50	45	6	Q	Q	31.7	28.4	7.6	Q	Q
Hot or very hot	7	6	Q	Q	Q	19.9	20.5	Q	Q	Q
Number of floors										
1	18	17	Q	Q	N	55.3	60.9	Q	Q	N
2	31	30	Q	Q	Q	53.5	51.4	Q	Q	Q
3	34	32	1	Q	Q	44.1	42.2	3.2	Q	Q
4 to 9	143	124	18	(*)	Q	47.0	42.5	9.7	0.9	Q
10 or more	79	67	8	Q	Q	38.9	33.3	4.9	1.5	Q
Number of workers (main shift)										
Fewer than 10	37	34	4	Q	N	50.8	47.8	11.4	Q	N
10 to 99	100	89	10	Q	Q	46.6	41.9	8.4	Q	Q
100 or more	167	147	15	1	4	43.3	39.6	5.6	1.2	13.3

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All buildings	305	270	29	1	5	45.2	41.2	6.8	1.5	12.9
Predominant roof material										
Metal surfacing	15	14	Q	N	Q	43.7	41.9	Q	N	Q
Synthetic or rubber	99	85	12	(*)	Q	40.8	37.3	8.6	1.3	Q
Built-up	113	103	8	Q	Q	52.3	48.0	5.9	Q	Q
Slate or tile shingles	17	16	1	Q	N	40.8	38.5	4.6	Q	N
Wooden materials (including shingles)	N	N	N	N	N	N	N	N	N	N
Asphalt, fiberglass, or other shingles	35	30	3	Q	Q	45.6	39.9	7.4	Q	Q
Concrete	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q
Other	10	9	Q	Q	N	32.5	29.3	Q	Q	N
Roof tilt										
Flat	245	215	24	1	5	45.1	41.2	6.9	1.2	12.9
Shallow pitch	36	33	3	Q	N	58.5	53.5	8.2	Q	N
Steeper pitch	24	22	2	Q	Q	33.9	31.0	5.0	Q	Q
Cool roof characteristics (more than one may apply)										
White or reflective coating or paint	94	84	8	(*)	Q	38.9	36.7	6.3	1.2	Q
White or reflective tiles or shingles	9	9	Q	N	Q	45.7	43.4	Q	N	Q
Aluminum coating	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q
Ballasted roof system	35	32	2	Q	Q	49.4	44.9	4.4	Q	Q
Other cool roof property	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q
Renovations since 2000 (more than one may apply)										
Any type of renovation	194	168	22	Q	4	45.1	39.8	7.6	1.0	16.5
Addition or annex	51	48	3	Q	Q	52.7	50.3	4.5	Q	Q
Reduction in floorspace	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q
Roof replacement	88	75	11	(*)	Q	42.8	37.1	8.7	0.8	Q
Interior wall reconfiguration	127	110	13	Q	Q	44.1	39.1	6.8	1.0	Q
Window replacement	56	49	5	Q	Q	40.9	36.5	5.6	Q	Q
HVAC equipment upgrade	142	125	13	Q	Q	42.7	38.0	5.9	1.0	Q
Lighting upgrade	147	128	15	Q	Q	42.3	37.8	6.7	1.0	Q
Electrical upgrade	94	81	10	Q	Q	40.2	35.3	6.3	1.0	Q
Plumbing system upgrade	94	82	9	Q	Q	42.4	37.2	5.9	1.1	Q
Insulation upgrade	41	37	3	Q	Q	34.5	31.1	3.5	Q	Q
Fire, safety, or security upgrade	109	96	10	Q	Q	42.0	37.3	5.7	1.0	Q
Structural upgrade	28	24	Q	Q	Q	38.4	33.8	Q	Q	Q
Other	Q	Q	Q	Q	N	Q	Q	Q	Q	N
No renovations	99	91	6	Q	Q	47.9	45.0	5.9	Q	Q
Buildings constructed 2013 or later	12	11	Q	Q	N	31.7	35.3	Q	Q	N

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All buildings	305	270	29	1	5	45.2	41.2	6.8	1.5	12.9
Energy sources (more than one may apply)										
Electricity	305	270	29	1	5	45.2	41.2	6.8	1.5	12.9
Natural gas	178	158	17	1	Q	41.2	37.9	7.0	1.6	Q
Fuel oil	115	101	11	Q	Q	38.4	35.0	5.2	1.2	Q
District heat	305	270	29	1	5	45.2	41.2	6.8	1.5	12.9
District chilled water	160	144	16	(*)	Q	46.1	43.1	7.3	1.1	Q
Propane	9	8	Q	Q	Q	26.6	24.6	Q	Q	Q
Solar	30	28	2	Q	Q	45.6	43.0	3.1	Q	Q
Wood, coal, and other	Q	Q	Q	Q	N	Q	Q	Q	Q	N
Space-heating energy sources										
District heat	301	270	25	1	5	46.0	41.2	6.3	1.4	12.9
District heat main	293	263	24	1	5	48.1	43.2	6.4	1.5	12.9
District heat secondary	17	14	2	Q	N	23.1	19.7	4.0	Q	N
Other excluding district heat	Q	N	Q	Q	N	Q	N	Q	Q	N
Buildings without heating	Q	N	Q	N	N	Q	N	Q	N	N
Primary space-heating energy source										
Electricity	Q	Q	1	Q	N	14.0	Q	6.0	Q	N
Natural gas	8	Q	Q	Q	N	21.1	Q	Q	Q	N
Fuel oil	N	N	N	N	N	N	N	N	N	N
District heat	293	263	24	1	5	48.1	43.2	6.4	1.5	12.9
Propane	N	N	N	N	N	N	N	N	N	N
Other sources ^c	N	N	N	N	N	N	N	N	N	N
Cooling energy sources										
District heat	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q
Other excluding district heat	274	246	26	1	Q	43.2	40.1	6.7	1.5	Q
Buildings without cooling	Q	Q	Q	N	N	Q	Q	Q	N	N
Water-heating energy sources										
District heat	209	175	29	1	5	49.8	43.4	6.8	1.5	14.1
Other excluding district heat	93	93	N	Q	Q	38.0	38.2	N	Q	Q
Buildings without water heating	Q	Q	N	N	N	Q	Q	N	N	N
Cooking energy sources										
District heat	33	27	5	1	Q	43.1	35.5	7.8	1.5	Q
Other excluding district heat	128	114	11	N	Q	46.1	41.5	6.1	N	Q
Buildings without cooking	143	130	13	N	Q	44.8	42.4	7.2	N	Q

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All buildings	305	270	29	1	5	45.2	41.2	6.8	1.5	12.9
Energy end uses (more than one may apply)										
Buildings with space heating	305	270	29	1	5	45.3	41.2	6.9	1.5	12.9
Buildings with cooling	292	259	27	1	5	44.6	40.8	6.6	1.5	12.9
Buildings with water heating	303	268	29	1	5	45.4	41.5	6.8	1.5	12.9
Buildings with cooking	162	140	16	1	4	45.5	40.2	6.6	1.5	16.4
Buildings with manufacturing	15	14	Q	Q	Q	53.7	51.3	Q	Q	Q
Buildings with electricity generation	155	136	15	1	Q	40.2	36.9	6.2	1.0	Q
Buildings with lighting	305	270	29	1	5	45.2	41.2	6.8	1.5	12.9
Percentage of floorspace heated										
Not heated	Q	N	Q	N	N	Q	N	Q	N	N
1% to 50%	Q	Q	Q	Q	N	Q	Q	Q	Q	N
51% to 99%	94	84	8	Q	Q	43.7	39.4	5.6	Q	Q
100%	209	185	20	Q	3	47.2	43.2	7.7	Q	11.6
Heating equipment (more than one may apply)										
Packaged heating units	35	31	3	Q	Q	30.1	29.2	4.7	Q	Q
Furnaces	Q	Q	Q	N	N	Q	Q	Q	N	N
Individual space heaters	29	27	2	Q	Q	36.1	36.9	4.1	Q	Q
Boilers	21	15	5	Q	Q	33.4	33.2	12.7	Q	Q
Heat pumps	16	13	Q	Q	Q	21.3	18.1	Q	Q	Q
District heat	301	270	25	1	5	46.0	41.2	6.3	1.4	12.9
Duct reheat	17	16	1	Q	Q	34.3	33.6	3.3	Q	Q
Other	Q	Q	N	N	N	Q	Q	N	N	N
HVAC features (more than one may apply)										
Economizer cycle	209	184	20	1	5	45.0	41.0	6.0	1.6	12.9
Variable air volume (VAV) system	216	196	16	1	3	44.9	42.2	5.3	1.9	8.9
Dedicated outside air system (DOAS)	59	49	9	Q	Q	41.6	36.9	9.2	Q	Q
Demand controlled ventilation (DCV)	48	45	3	Q	Q	48.9	46.0	4.4	Q	Q
Regular HVAC maintenance	289	256	27	1	5	44.5	40.5	6.7	1.5	12.9
Building automation system (BAS) controls heating or cooling	252	222	25	1	5	45.9	41.6	7.1	1.7	12.5
Internet-connected or smart thermostat	Q	Q	Q	Q	N	Q	Q	Q	Q	N
Programmable thermostat	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q
Water-heating equipment										
Centralized system	217	192	21	Q	Q	47.4	43.2	7.1	1.8	Q
Distributed system	31	27	Q	Q	Q	40.7	37.0	Q	Q	Q
Combination of centralized and distributed system	54	48	3	Q	Q	41.2	38.0	4.3	Q	Q

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All buildings	305	270	29	1	5	45.2	41.2	6.8	1.5	12.9
Generation technologies (more than one may apply)										
Reciprocating engine generators	135	118	14	Q	Q	41.6	38.1	6.6	1.0	Q
Solar panels	27	26	1	Q	Q	42.4	40.3	2.7	Q	Q
Other generation technology	9	8	Q	Q	Q	26.1	24.2	Q	Q	Q

Data source: U.S. Energy Information Administration, Forms EIA-871A and D 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 district heat 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 district heat intensity. In this table, each column is calculated as district heat consumption for the end use divided by the floorspace in buildings that use district heat 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.

(*) = Value rounds to zero in the units displayed.