

Table C31. Natural gas consumption and conditional energy intensity by building size, 2018

	Total natural gas consumption (billion cubic feet)			Total floorspace of buildings using natural gas (million square feet)			Natural gas energy intensity (cubic feet/square foot)		
	1,001 to 10,000 square feet	10,001 to 100,000 square feet	Over 100,000 feet	1,001 to 10,000 square feet	10,001 to 100,000 square feet	Over 100,000 feet	1,001 to 10,000 square feet	10,001 to 100,000 square feet	Over 100,000 feet
All buildings	377	1,031	807	8,492	31,978	27,252	44.4	32.3	29.6
Principal building activity									
Education	Q	146	158	369	5,052	4,833	30.8	28.9	32.7
Food sales	17	Q	Q	266	Q	Q	65.6	Q	Q
Food service	131	Q	Q	816	Q	Q	160.8	Q	Q
Health care	5	36	159	166	990	2,213	28.4	36.1	71.7
Inpatient	N	Q	150	N	Q	1,949	N	Q	77.0
Outpatient	5	22	9	166	834	264	28.4	26.1	32.5
Lodging	Q	113	94	Q	3,010	2,645	Q	37.5	35.7
Mercantile	22	174	125	773	4,589	3,630	28.7	37.9	34.4
Retail (other than mall)	12	34	38	524	1,674	1,387	22.3	20.3	27.2
Enclosed and strip malls	Q	140	87	Q	2,915	2,242	Q	48.0	38.9
Office	44	111	86	1,616	4,424	5,243	27.0	25.0	16.5
Public assembly	38	126	45	905	2,890	1,438	41.6	43.5	31.1
Public order and safety	Q	23	17	Q	579	563	Q	39.5	29.7
Religious worship	19	69	Q	745	3,161	Q	24.9	21.9	Q
Service	52	84	Q	1,482	1,757	Q	34.9	47.8	Q
Warehouse and storage	20	96	76	791	4,338	5,180	25.0	22.1	14.7
Other	Q	14	30	Q	499	933	Q	27.1	32.5
Vacant	Q	Q	Q	Q	Q	Q	Q	Q	Q
Year constructed									
Before 1920	25	36	18	585	1,301	574	43.3	27.4	30.7
1920 to 1945	22	48	49	495	1,525	1,838	44.6	31.6	26.7
1946 to 1959	33	80	54	844	2,617	1,557	38.5	30.5	34.6
1960 to 1969	53	128	97	1,390	3,629	2,793	38.0	35.2	34.9
1970 to 1979	53	131	107	1,257	4,263	3,568	42.0	30.8	30.1
1980 to 1989	62	132	106	1,104	3,966	3,700	56.2	33.3	28.8
1990 to 1999	40	151	109	1,158	5,029	4,199	34.5	30.0	26.1
2000 to 2009	56	232	170	934	6,537	5,362	59.7	35.5	31.7
2010 to 2018	34	93	96	724	3,112	3,662	47.1	30.0	26.2
Census region and division									
Northeast	45	173	191	968	4,557	5,806	47.0	37.9	32.9
New England	Q	36	28	Q	974	720	Q	37.4	39.2
Middle Atlantic	35	136	163	800	3,583	5,086	43.5	38.0	32.0
Midwest	149	387	250	2,952	9,950	7,508	50.6	38.9	33.3
East North Central	120	269	191	2,102	6,931	5,457	57.3	38.9	34.9
West North Central	29	118	59	850	3,019	2,051	34.0	39.0	28.9
South	102	271	220	2,553	10,547	8,794	40.1	25.7	25.0
South Atlantic	42	117	125	844	4,617	4,823	50.0	25.4	25.9
East South Central	28	59	35	664	1,948	1,510	42.6	30.1	23.1
West South Central	32	95	60	1,045	3,982	2,461	30.4	23.9	24.4
West	80	200	147	2,019	6,924	5,144	39.8	29.0	28.5
Mountain	46	101	75	823	2,966	2,159	56.4	34.2	34.9
Pacific	34	99	71	1,196	3,957	2,985	28.3	25.0	23.9

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All buildings	377	1,031	807	8,492	31,978	27,252	44.4	32.3	29.6
Climate zone^a									
Cold or very cold	32	112	57	678	2,624	1,669	46.6	42.6	34.0
Cool	150	388	254	2,875	10,299	7,302	52.0	37.7	34.8
Mixed mild	84	252	295	1,759	7,333	9,665	47.7	34.3	30.5
Warm	90	230	142	2,440	9,152	6,093	36.7	25.1	23.2
Hot or very hot	23	50	61	740	2,570	2,522	31.0	19.4	24.0
Number of floors									
1	282	512	181	5,883	14,405	7,056	47.9	35.5	25.7
2	72	293	145	2,046	9,845	5,310	35.0	29.8	27.3
3	21	131	108	492	4,568	3,109	43.3	28.7	34.7
4 to 9	Q	93	243	Q	3,080	7,287	Q	30.3	33.4
10 or more	N	Q	130	N	Q	4,489	N	Q	28.9
Number of workers (main shift)									
Fewer than 5	139	144	2	4,394	5,195	239	31.5	27.8	9.0
5 to 9	101	107	7	2,231	4,045	601	45.3	26.5	11.1
10 to 19	88	194	18	1,314	5,851	816	67.2	33.1	22.6
20 to 49	45	309	67	536	9,125	2,945	84.7	33.9	22.9
50 to 99	Q	195	138	Q	5,239	4,783	Q	37.1	28.8
100 to 249	N	74	280	N	2,257	8,609	N	32.7	32.5
250 or more	N	9	295	N	265	9,258	N	33.1	31.9
Weekly operating hours									
Fewer than 40	55	85	16	1,806	3,401	813	30.6	24.9	20.0
40 to 48	66	182	67	2,424	7,002	2,956	27.1	26.0	22.8
49 to 60	68	236	120	1,781	8,643	5,622	38.5	27.3	21.3
61 to 84	68	182	146	1,083	4,806	5,325	63.2	37.9	27.4
85 to 167	84	148	95	680	3,126	3,572	123.8	47.2	26.5
Open continuously	35	199	363	719	5,001	8,965	49.2	39.8	40.5
Ownership and occupancy									
Nongovernment owned	338	811	570	7,301	24,856	19,578	46.3	32.6	29.1
Owner occupied	215	471	363	5,084	15,503	10,999	42.3	30.4	33.0
Leased to tenant or tenants	121	338	207	2,160	9,254	8,520	56.0	36.5	24.3
Unoccupied	Q	Q	Q	Q	Q	Q	Q	Q	Q
Government owned	40	221	237	1,191	7,123	7,674	33.2	31.0	30.9
Federal	Q	14	21	Q	493	790	Q	28.2	27.0
State	11	73	71	384	2,149	2,406	27.7	34.0	29.6
Local	27	134	145	767	4,480	4,478	34.9	29.8	32.3
Party responsible for operation of energy systems									
Building owner	290	797	701	6,939	25,663	22,820	41.8	31.1	30.7
Business owner or tenant	82	185	73	1,416	4,774	3,036	57.5	38.8	24.1
Property management	Q	20	16	Q	721	682	Q	27.9	22.8
Other	Q	29	17	Q	820	714	Q	35.7	24.3

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All buildings	377	1,031	807	8,492	31,978	27,252	44.4	32.3	29.6
Provider of direct input on energy-related equipment purchases									
Building owner	310	853	713	7,363	27,234	23,412	42.2	31.3	30.5
Business owner or tenant	50	112	54	763	2,701	2,078	64.9	41.6	25.9
Property management	Q	Q	8	Q	Q	403	Q	Q	18.8
Other	15	53	33	320	1,672	1,359	45.8	31.7	24.0
Number of establishments									
1	330	672	466	7,023	22,107	15,409	47.1	30.4	30.2
2 to 5	43	190	171	1,335	5,567	5,335	32.4	34.1	32.1
6 to 10	Q	96	52	Q	2,410	2,021	Q	39.8	25.8
11 to 20	Q	66	45	Q	1,503	1,578	Q	44.1	28.8
More than 20	Q	4	72	Q	228	2,830	Q	15.9	25.5
Currently unoccupied	Q	Q	Q	Q	Q	Q	Q	Q	Q
Predominant exterior wall material									
Brick, stone, or stucco	214	573	457	4,176	17,944	12,828	51.2	32.0	35.6
Concrete (block or poured)	59	231	172	1,401	6,738	6,080	42.3	34.3	28.3
Concrete panels	Q	71	92	Q	2,131	4,207	Q	33.2	22.0
Siding or shingles	47	46	8	1,010	1,407	299	46.5	32.4	27.8
Metal panels	41	90	33	1,491	2,974	1,671	27.7	30.1	19.6
Window glass	Q	Q	27	Q	Q	1,365	Q	Q	20.0
Other	9	12	18	225	487	802	38.7	23.9	22.1
Predominant roof material									
Metal surfacing	85	181	37	2,484	6,200	1,772	34.1	29.2	21.0
Synthetic or rubber	93	365	425	1,472	10,433	13,553	63.1	34.9	31.3
Built-up	44	226	223	1,169	6,710	7,512	37.5	33.6	29.7
Slate or tile shingles	37	47	10	775	1,497	361	48.2	31.7	26.3
Wooden materials (including shingles)	14	20	Q	180	665	Q	76.5	30.4	Q
Asphalt, fiberglass, or other shingles	97	156	65	2,171	5,111	2,254	44.8	30.4	29.0
Concrete	Q	13	20	Q	549	647	Q	24.0	30.4
Other	Q	24	27	Q	813	1,140	Q	29.1	23.8
Roof tilt									
Flat	153	580	681	3,013	16,672	21,526	50.8	34.8	31.6
Shallow pitch	126	308	92	3,164	10,228	4,438	40.0	30.1	20.8
Steeper pitch	98	143	34	2,314	5,078	1,289	42.3	28.1	26.6
Cool roof characteristics (more than one may apply)									
White or reflective coating or paint	92	350	357	1,559	10,719	12,117	58.8	32.7	29.4
White or reflective tiles or shingles	Q	34	21	Q	960	909	Q	35.3	22.8
Aluminum coating	30	48	25	762	1,614	911	39.0	29.9	27.1
Ballasted roof system	Q	61	128	Q	1,653	3,445	Q	36.9	37.1
Other cool roof property	Q	Q	21	Q	Q	964	Q	Q	21.5

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All buildings	377	1,031	807	8,492	31,978	27,252	44.4	32.3	29.6
Renovations since 2000 (more than one may apply)									
Any type of renovation	143	475	542	3,074	14,225	16,448	46.6	33.4	32.9
Addition or annex	25	131	195	307	3,205	5,096	80.8	41.0	38.2
Reduction in floorspace	Q	Q	31	Q	Q	984	Q	Q	31.7
Roof replacement	62	188	302	1,201	5,898	8,285	51.4	31.9	36.5
Interior wall reconfiguration	42	196	291	838	6,048	9,099	50.0	32.5	32.0
Window replacement	35	111	158	808	3,138	4,602	43.8	35.3	34.4
HVAC equipment upgrade	73	251	402	1,621	8,022	11,622	45.0	31.3	34.6
Lighting upgrade	77	281	413	1,653	8,551	12,608	46.3	32.9	32.8
Electrical upgrade	52	126	277	959	3,775	7,685	54.4	33.4	36.0
Plumbing system upgrade	43	126	258	935	3,859	7,063	45.9	32.7	36.5
Insulation upgrade	22	61	147	510	1,646	4,001	42.7	37.4	36.8
Fire, safety, or security upgrade	42	195	325	627	5,739	9,262	66.4	33.9	35.1
Structural upgrade	9	39	91	252	945	2,192	36.8	41.5	41.4
Other	Q	Q	17	Q	Q	603	Q	Q	28.9
No renovations	207	493	198	4,883	15,642	8,123	42.5	31.5	24.4
Buildings constructed 2013 or later	27	64	68	535	2,111	2,681	50.0	30.2	25.3
Energy sources (more than one may apply)									
Electricity	377	1,031	807	8,492	31,978	27,252	44.4	32.3	29.6
Natural gas	377	1,031	807	8,492	31,978	27,252	44.4	32.3	29.6
Fuel oil	14	146	361	504	3,833	10,620	27.1	38.2	34.0
District heat	Q	16	72	Q	1,006	3,307	Q	16.0	21.7
District chilled water	Q	15	47	Q	826	2,078	Q	18.3	22.4
Propane	10	50	89	257	1,611	2,700	38.9	31.0	33.1
Solar	Q	31	55	Q	1,008	2,138	Q	31.2	25.7
Wood, coal, and other	16	19	19	296	515	472	55.3	37.5	39.6
Space-heating energy sources									
Natural gas	313	953	744	7,324	28,011	22,708	42.8	34.0	32.7
Natural gas main	296	856	681	6,924	23,871	19,264	42.7	35.9	35.4
Natural gas secondary	18	97	63	399	4,140	3,444	43.9	23.4	18.2
Other excluding natural gas	55	76	62	1,036	3,794	4,238	53.4	19.9	14.6
Buildings without heating	Q	Q	2	Q	Q	305	Q	Q	5.6
Primary space-heating energy source									
Electricity	72	154	69	1,300	6,898	4,651	55.7	22.3	14.7
Natural gas	296	856	681	6,924	23,871	19,264	42.7	35.9	35.4
Fuel oil	Q	Q	Q	Q	Q	Q	Q	Q	Q
District heat	Q	15	54	Q	885	2,887	Q	16.4	18.6
Propane	N	Q	N	N	Q	N	N	Q	N
Other sources ^b	Q	N	Q	Q	N	Q	Q	N	Q

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All buildings	377	1,031	807	8,492	31,978	27,252	44.4	32.3	29.6
Cooling energy sources									
Natural gas	Q	Q	20	Q	Q	325	Q	Q	60.9
Other excluding natural gas	346	1,002	772	7,559	31,005	26,237	45.8	32.3	29.4
Buildings without cooling	30	29	15	927	905	690	32.9	31.7	22.1
Water-heating energy sources									
Natural gas	258	780	670	5,336	22,226	19,089	48.4	35.1	35.1
Other excluding natural gas	104	240	134	2,557	9,103	7,893	40.5	26.3	17.0
Buildings without water heating	16	12	4	598	649	269	25.9	17.8	14.0
Cooking energy sources									
Natural gas	169	424	596	1,722	10,147	15,837	98.4	41.8	37.6
Other excluding natural gas	42	139	59	1,393	4,672	2,397	30.1	29.9	24.7
Buildings without cooking	166	468	153	5,377	17,160	9,018	30.9	27.3	16.9
Energy end uses (more than one may apply)									
Buildings with space heating	369	1,029	806	8,359	31,805	26,947	44.1	32.3	29.9
Buildings with cooling	347	1,003	792	7,565	31,073	26,562	45.9	32.3	29.8
Buildings with water heating	362	1,020	804	7,894	31,329	26,983	45.8	32.6	29.8
Buildings with cooking	211	563	655	3,115	14,819	18,234	67.9	38.0	35.9
Buildings with manufacturing	17	95	55	385	2,791	2,086	44.2	34.1	26.5
Buildings with electricity generation	49	307	507	1,118	7,861	14,998	43.7	39.0	33.8
Buildings with lighting	375	1,028	807	8,434	31,836	27,237	44.5	32.3	29.6
Percentage of floorspace heated									
Not heated	Q	Q	2	Q	Q	305	Q	Q	5.6
1% to 50%	23	47	39	913	2,770	2,586	25.5	17.1	15.2
51% to 99%	81	228	209	1,754	7,764	6,945	45.9	29.4	30.1
100%	265	753	558	5,692	21,271	17,416	46.5	35.4	32.0
Percentage of floorspace cooled									
Not cooled	30	29	15	927	905	690	32.9	31.7	22.1
1% to 50%	58	196	90	1,802	6,632	4,923	32.1	29.6	18.2
51% to 99%	89	310	309	1,839	9,306	10,055	48.6	33.3	30.7
100%	200	497	394	3,924	15,134	11,584	50.9	32.8	34.0
Heating equipment (more than one may apply)									
Packaged heating units	203	633	467	3,958	19,134	15,722	51.3	33.1	29.7
Furnaces	127	272	102	3,423	7,790	2,631	37.2	34.9	38.8
Individual space heaters	72	280	212	2,013	8,308	6,010	35.6	33.7	35.3
Boilers	55	422	536	913	10,966	13,800	60.4	38.5	38.8
Heat pumps	24	156	181	539	4,806	5,687	45.1	32.4	31.8
District heat	Q	16	64	Q	1,000	3,154	Q	16.1	20.4
Duct reheat	Q	52	105	Q	1,462	3,525	Q	35.7	29.9
Other	N	Q	23	N	Q	430	N	Q	53.4

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All buildings	377	1,031	807	8,492	31,978	27,252	44.4	32.3	29.6
Cooling equipment (more than one may apply)									
Packaged air-conditioning units	241	739	530	4,593	22,137	17,600	52.5	33.4	30.1
Residential-type central air conditioners	90	257	157	2,432	7,314	4,330	37.1	35.1	36.2
Individual air conditioners	39	185	163	985	4,929	4,469	39.7	37.6	36.4
Central chillers	Q	143	384	Q	4,142	10,635	Q	34.6	36.1
Heat pumps	16	97	138	376	3,174	4,359	42.3	30.6	31.6
District chilled water	Q	15	47	Q	826	2,078	Q	18.3	22.4
Swamp coolers	Q	32	19	Q	793	686	Q	40.0	28.3
Other	Q	Q	Q	Q	Q	Q	Q	Q	Q
HVAC features (more than one may apply)									
Economizer cycle	50	398	541	788	10,636	16,453	63.3	37.4	32.9
Variable air volume (VAV) system	57	237	464	1,026	7,561	14,443	55.4	31.3	32.1
Dedicated outside air system (DOAS)	21	88	168	323	2,448	4,514	64.5	36.0	37.1
Demand controlled ventilation (DCV)	22	116	145	577	3,511	4,422	37.7	32.9	32.8
Regular HVAC maintenance	278	899	787	5,673	27,107	26,112	48.9	33.2	30.1
Building automation system (BAS) controls heating or cooling	61	393	628	1,132	11,655	19,303	54.0	33.7	32.5
Internet-connected or smart thermostat	19	70	29	554	2,322	1,591	35.1	30.0	18.2
Programmable thermostat	141	294	67	2,951	8,950	3,148	47.7	32.9	21.3
Main equipment replaced since 2000 (more than one may apply)									
Heating	154	393	278	3,547	12,106	9,239	43.4	32.5	30.1
Cooling	78	261	260	1,931	7,373	7,530	40.3	35.4	34.6
Water-heating equipment									
Centralized system	283	742	476	6,421	22,740	15,226	44.1	32.6	31.3
Distributed system	58	159	106	1,115	4,947	4,096	52.2	32.1	25.9
Combination of centralized and distributed systems	20	119	222	358	3,642	7,661	57.3	32.8	28.9
Generation technologies (more than one may apply)									
Reciprocating engine generators	42	265	443	932	6,516	13,014	44.6	40.7	34.0
Solar panels	Q	31	54	Q	997	2,115	Q	30.8	25.6
Other generation technology	Q	16	48	Q	464	1,128	Q	34.2	42.3

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All buildings	377	1,031	807	8,492	31,978	27,252	44.4	32.3	29.6
Food preparation or serving areas in non-food service buildings (more than one may apply)									
Snack bar, concession stand, or coffee shop	Q	98	259	Q	2,070	6,970	Q	47.3	37.2
Fast food or small restaurant	11	113	230	207	2,179	6,339	54.2	51.7	36.3
Cafeteria or large restaurant	Q	97	363	Q	3,015	9,407	Q	32.2	38.5
Commercial kitchen or food preparation area	Q	216	416	Q	5,340	10,430	Q	40.4	39.9
Small kitchen area	57	244	253	1,842	7,338	7,325	30.7	33.2	34.5
Annual consumption (hundred cubic feet)									
1,000 or less	42	6	0	3,272	2,145	591	12.9	2.6	0.2
1,001 to 5,000	180	107	2	4,218	7,260	1,200	42.6	14.7	1.4
5,001 to 10,000	74	214	6	715	7,906	1,533	103.5	27.0	4.0
10,001 to 25,000	64	357	37	252	9,678	4,006	253.5	36.9	9.2
25,001 to 50,000	Q	236	104	Q	3,990	5,479	Q	59.1	19.0
50,001 to 100,000	Q	86	207	Q	904	5,926	Q	95.4	35.0
Over 100,000	N	Q	452	N	Q	8,518	N	Q	53.0

Data source: U.S. Energy Information Administration, Forms EIA-871A and C 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 in buildings that have the end use but not the consumption specifically for that end use.

HVAC = Heating, ventilation, and air conditioning.

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

^bOther 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 C31. Natural gas consumption and conditional energy intensity by building size, 2018

	RSEs for total natural gas consumption			RSEs for total floorspace of buildings using natural gas			RSEs for natural gas energy intensity		
	1,001 to 10,000 square feet	10,001 to 100,000 square feet	Over 100,000 feet	1,001 to 10,000 square feet	10,001 to 100,000 square feet	Over 100,000 feet	1,001 to 10,000 square feet	10,001 to 100,000 square feet	Over 100,000 feet
All buildings	6.5	4.7	5.2	6.3	4.1	4.4	5.0	2.9	3.5
Principal building activity									
Education	57.7	9.1	8.2	35.2	8.8	7.7	23.3	5.1	4.3
Food sales	22.5	31.0	42.4	23.1	28.4	36.8	15.0	22.2	17.4
Food service	11.5	43.1	86.2	10.7	35.1	76.6	8.3	27.5	50.1
Health care	24.7	15.5	7.5	20.9	13.4	7.3	14.7	12.6	5.0
Inpatient	0.0	33.7	7.8	0.0	31.0	7.9	0.0	17.9	5.2
Outpatient	24.7	14.8	25.4	20.9	14.3	19.2	14.7	12.1	14.1
Lodging	35.7	10.5	26.9	26.9	10.5	16.4	24.4	6.6	15.0
Mercantile	24.8	10.0	14.1	20.6	9.5	9.5	19.4	5.5	7.7
Retail (other than mall)	29.6	19.4	13.4	26.7	17.1	11.0	26.0	7.3	6.2
Enclosed and strip malls	31.2	11.4	18.6	27.5	9.7	13.1	13.6	5.6	10.2
Office	12.6	12.3	10.2	11.0	10.1	9.8	8.4	6.5	8.1
Public assembly	18.7	10.9	17.5	15.8	9.5	12.4	9.9	7.5	13.0
Public order and safety	43.2	31.6	28.3	38.1	25.4	24.1	14.3	12.5	18.6
Religious worship	25.4	14.7	34.2	25.5	12.8	29.1	10.2	7.1	21.9
Service	13.1	20.8	65.3	12.5	14.9	52.9	12.3	16.5	25.9
Warehouse and storage	21.8	14.0	15.1	17.8	12.8	11.1	14.8	8.5	7.5
Other	35.0	33.9	30.1	34.5	35.2	24.9	25.6	17.8	21.0
Vacant	35.9	41.1	40.8	33.7	35.9	33.2	21.1	15.5	30.6
Year constructed									
Before 1920	21.9	20.3	27.9	19.1	18.7	25.7	15.8	15.2	16.8
1920 to 1945	19.9	15.5	14.6	19.5	15.5	16.8	14.3	11.9	16.9
1946 to 1959	16.9	13.8	15.3	15.2	13.3	14.3	15.0	8.1	7.1
1960 to 1969	11.6	10.5	12.1	12.8	9.6	9.7	10.6	5.6	8.2
1970 to 1979	16.7	12.7	10.7	15.9	11.0	9.7	12.1	7.4	7.2
1980 to 1989	15.3	9.8	24.9	12.5	7.7	12.2	13.0	6.3	15.8
1990 to 1999	18.8	10.3	8.5	17.8	9.1	7.4	15.3	6.3	6.2
2000 to 2009	15.0	10.0	8.3	12.6	8.3	8.2	12.2	6.9	6.4
2010 to 2018	19.5	11.1	12.7	18.0	10.6	13.0	17.6	5.6	10.4
Census region and division									
Northeast	15.4	8.2	8.0	15.6	8.7	10.1	12.2	5.2	6.6
New England	27.0	20.1	20.3	34.2	16.5	16.8	38.6	10.1	13.9
Middle Atlantic	18.1	8.7	8.7	17.3	10.1	11.3	11.6	6.1	7.2
Midwest	12.2	10.0	8.2	14.4	9.5	8.4	10.0	4.6	5.1
East North Central	14.3	12.9	10.1	14.2	11.9	11.2	7.7	5.7	7.0
West North Central	24.1	17.3	10.2	37.8	16.8	10.3	29.9	8.0	6.5
South	12.0	10.5	7.0	10.1	8.5	6.3	9.7	6.9	5.2
South Atlantic	13.8	11.1	8.4	15.5	8.5	8.9	16.1	7.1	7.5
East South Central	30.8	30.8	25.4	24.5	30.7	19.8	9.6	24.0	15.3
West South Central	21.1	19.8	11.6	14.3	13.7	7.2	21.7	11.7	7.0
West	15.4	9.0	21.8	13.3	7.7	13.0	9.2	4.9	12.5
Mountain	22.3	14.0	38.6	20.2	14.0	25.1	11.8	7.3	19.3
Pacific	20.5	11.1	18.7	17.9	8.1	13.2	10.6	7.3	11.6

Relative standard errors (RSEs) for Table C31. Natural gas consumption and conditional energy intensity by building size, 2018

	RSEs for total natural gas consumption			RSEs for total floorspace of buildings using natural gas			RSEs for natural gas energy intensity		
	1,001 to 10,000 square feet	10,001 to 100,000 square feet	Over 100,000 feet	1,001 to 10,000 square feet	10,001 to 100,000 square feet	Over 100,000 feet	1,001 to 10,000 square feet	10,001 to 100,000 square feet	Over 100,000 feet
All buildings	6.5	4.7	5.2	6.3	4.1	4.4	5.0	2.9	3.5
Climate zone^a									
Cold or very cold	36.7	23.0	23.7	29.8	24.3	25.5	17.9	9.8	7.6
Cool	14.1	9.8	10.7	15.9	9.4	10.9	10.2	4.5	6.1
Mixed mild	16.4	14.6	12.8	18.9	14.1	10.4	9.5	3.8	6.9
Warm	17.9	13.7	12.6	15.6	12.5	11.0	8.9	6.9	6.5
Hot or very hot	26.7	19.3	16.9	23.7	17.3	12.8	23.8	10.8	9.5
Number of floors									
1	7.6	5.8	10.8	7.1	5.3	9.2	6.1	4.5	6.1
2	13.7	8.2	10.9	10.1	6.7	8.4	11.4	3.9	6.6
3	23.4	9.8	11.1	24.9	10.1	10.0	15.9	6.5	6.6
4 to 9	38.6	14.7	7.1	31.3	10.4	7.3	14.6	9.1	5.7
10 or more	0.0	36.4	20.2	0.0	36.4	13.1	0.0	7.2	14.7
Number of workers (main shift)									
Fewer than 5	9.3	11.1	34.0	9.4	11.4	28.2	7.1	6.6	31.4
5 to 9	12.2	11.3	21.9	10.5	10.8	24.2	6.8	7.5	11.7
10 to 19	11.5	11.8	20.2	10.4	10.9	19.6	11.0	5.4	12.3
20 to 49	21.1	7.3	9.9	20.1	6.4	9.6	20.8	4.5	8.4
50 to 99	107.5	10.0	9.3	86.9	7.5	8.6	264.3	7.3	6.4
100 to 249	0.0	17.3	7.5	0.0	12.6	6.3	0.0	7.7	4.8
250 or more	0.0	43.0	10.5	0.0	33.3	7.2	0.0	32.2	7.9
Weekly operating hours									
Fewer than 40	12.3	13.4	24.0	12.1	12.9	17.6	8.8	5.9	15.0
40 to 48	12.6	9.6	13.8	12.6	7.0	11.3	10.0	5.2	7.9
49 to 60	15.5	9.2	9.2	12.4	6.8	7.3	10.0	4.7	6.3
61 to 84	14.2	8.8	9.6	16.3	7.2	7.5	14.4	5.8	6.5
85 to 167	15.4	13.0	14.0	14.7	10.6	10.0	12.3	10.0	10.3
Open continuously	16.9	8.9	9.0	13.5	8.1	7.8	10.5	5.8	5.3
Ownership and occupancy									
Nongovernment owned	6.9	4.9	7.1	6.6	4.9	5.5	5.5	3.2	4.7
Owner occupied	8.8	6.0	8.8	8.6	5.5	6.5	6.9	4.4	6.2
Leased to tenant or tenants	10.8	7.5	9.1	9.5	6.9	7.0	8.7	4.1	5.4
Unoccupied	38.7	73.5	40.5	39.1	69.8	49.8	18.6	18.7	51.7
Government owned	18.5	8.8	6.4	17.5	7.0	6.4	11.9	5.3	4.5
Federal	57.8	39.1	24.1	61.2	28.5	23.7	6.3	24.3	20.1
State	36.6	15.4	14.9	29.0	13.4	14.0	23.9	8.7	10.2
Local	19.9	9.5	9.5	19.0	8.3	8.4	15.5	6.3	4.4
Party responsible for operation of energy systems									
Building owner	7.4	5.3	5.7	7.6	4.7	4.6	5.3	3.3	3.7
Business owner or tenant	13.6	12.3	15.7	11.1	10.2	12.7	10.8	6.9	10.1
Property management	62.5	24.0	25.6	49.5	22.2	17.9	48.9	14.8	18.0
Other	44.7	23.5	16.9	44.4	19.4	19.7	27.1	15.9	11.0

Relative standard errors (RSEs) for Table C31. Natural gas consumption and conditional energy intensity by building size, 2018

	RSEs for total natural gas consumption			RSEs for total floorspace of buildings using natural gas			RSEs for natural gas energy intensity		
	1,001 to 10,000 square feet	10,001 to 100,000 square feet	Over 100,000 feet	1,001 to 10,000 square feet	10,001 to 100,000 square feet	Over 100,000 feet	1,001 to 10,000 square feet	10,001 to 100,000 square feet	Over 100,000 feet
All buildings	6.5	4.7	5.2	6.3	4.1	4.4	5.0	2.9	3.5
Provider of direct input on energy-related equipment purchases									
Building owner	7.5	5.2	5.5	7.3	4.7	4.5	5.4	3.1	3.6
Business owner or tenant	15.9	11.3	16.4	15.2	10.8	14.6	14.4	8.0	9.7
Property management	64.9	30.3	44.2	60.4	26.2	27.0	59.7	13.0	26.0
Other	20.4	17.0	16.0	21.8	15.0	13.8	17.7	12.0	11.1
Number of establishments									
1	7.0	5.6	5.1	7.3	4.6	5.5	5.8	3.6	4.1
2 to 5	15.1	9.3	16.3	13.0	8.6	10.7	10.3	6.7	9.3
6 to 10	79.2	13.7	12.2	46.5	11.5	11.5	63.7	7.8	9.3
11 to 20	23.8	17.8	18.7	23.8	15.0	12.1	0.0	7.9	10.9
More than 20	71.7	34.6	16.6	71.7	28.4	10.7	0.0	26.0	13.0
Currently unoccupied	36.9	49.7	46.3	37.1	46.3	36.2	18.3	14.8	47.3
Predominant exterior wall material									
Brick, stone, or stucco	8.0	5.8	7.6	8.1	5.1	6.0	6.8	3.6	4.8
Concrete (block or poured)	18.3	8.7	8.3	15.6	7.9	8.3	13.3	5.3	7.9
Concrete panels	38.0	23.0	14.0	33.8	14.4	11.2	21.2	19.2	8.9
Siding or shingles	15.4	16.6	36.1	16.6	16.6	26.3	16.7	11.0	24.5
Metal panels	14.8	14.7	19.5	14.6	11.6	14.3	9.6	8.9	11.9
Window glass	109.5	29.4	18.3	90.5	31.3	14.1	92.3	13.0	10.2
Other	32.3	34.3	25.2	28.8	30.2	21.9	35.1	13.4	11.9
Predominant roof material									
Metal surfacing	12.0	9.4	15.9	10.8	8.7	12.6	9.1	5.9	9.4
Synthetic or rubber	14.5	7.4	5.1	12.0	5.2	4.9	11.7	5.1	3.7
Built-up	16.5	10.4	12.4	14.4	8.3	7.7	14.1	5.7	9.0
Slate or tile shingles	21.5	18.0	24.0	19.5	13.5	19.7	11.9	9.4	14.8
Wooden materials (including shingles)	25.1	28.2	63.8	26.5	29.1	57.4	20.5	14.8	42.8
Asphalt, fiberglass, or other shingles	11.5	10.4	16.9	13.6	9.3	14.2	9.9	5.9	9.9
Concrete	48.9	30.9	23.7	46.6	29.9	17.6	22.3	11.8	17.4
Other	32.9	23.8	15.4	30.3	16.3	13.0	24.4	19.3	11.8
Roof tilt									
Flat	10.3	6.1	5.8	8.7	4.7	4.7	8.9	4.2	4.0
Shallow pitch	9.6	7.2	11.1	9.9	7.3	10.0	8.1	3.9	6.3
Steeper pitch	10.4	9.0	18.3	10.1	8.2	14.4	6.7	4.8	11.8
Cool roof characteristics (more than one may apply)									
White or reflective coating or paint	13.9	7.0	9.4	11.7	4.9	6.7	9.1	5.4	5.4
White or reflective tiles or shingles	35.7	19.6	20.0	29.2	14.8	17.1	30.6	11.9	12.2
Aluminum coating	18.3	22.1	20.2	18.1	18.0	13.8	17.2	12.1	12.6
Ballasted roof system	38.9	17.8	20.1	32.9	16.6	11.3	26.7	8.7	11.6
Other cool roof property	61.6	40.6	27.1	49.7	35.9	27.4	39.8	21.7	17.2

Relative standard errors (RSEs) for Table C31. Natural gas consumption and conditional energy intensity by building size, 2018

	RSEs for total natural gas consumption			RSEs for total floorspace of buildings using natural gas			RSEs for natural gas energy intensity		
	1,001 to 10,000 square feet	10,001 to 100,000 square feet	Over 100,000 feet	1,001 to 10,000 square feet	10,001 to 100,000 square feet	Over 100,000 feet	1,001 to 10,000 square feet	10,001 to 100,000 square feet	Over 100,000 feet
All buildings	6.5	4.7	5.2	6.3	4.1	4.4	5.0	2.9	3.5
Renovations since 2000 (more than one may apply)									
Any type of renovation	7.7	6.7	6.3	8.9	5.9	4.7	7.6	4.5	4.2
Addition or annex	22.8	14.0	7.7	21.6	10.3	7.2	23.1	10.6	6.0
Reduction in floorspace	44.9	43.4	21.4	55.6	30.0	19.9	49.4	30.4	13.0
Roof replacement	14.5	9.0	9.5	13.7	8.2	6.4	13.1	6.9	5.6
Interior wall reconfiguration	15.8	9.3	10.8	13.6	8.4	6.7	11.6	5.1	7.1
Window replacement	13.8	11.6	15.6	17.6	8.6	10.5	13.4	8.2	11.5
HVAC equipment upgrade	11.3	6.8	7.9	13.1	6.5	5.8	11.7	5.5	5.2
Lighting upgrade	9.9	7.7	7.7	12.7	6.1	5.6	10.5	5.2	4.9
Electrical upgrade	15.3	12.8	10.0	18.1	10.3	8.0	17.9	8.2	7.5
Plumbing system upgrade	13.5	11.1	10.4	17.1	7.5	8.2	13.6	7.7	7.6
Insulation upgrade	19.7	16.0	16.6	23.0	11.6	12.2	17.6	10.4	12.7
Fire, safety, or security upgrade	15.1	9.2	9.1	17.8	7.2	7.0	20.3	6.3	6.1
Structural upgrade	29.0	20.0	25.2	41.5	14.4	17.8	31.1	12.3	18.8
Other	61.5	40.3	21.8	45.6	37.1	15.4	61.1	19.8	12.4
No renovations	8.2	6.1	8.2	7.0	5.4	7.6	6.2	3.3	5.9
Buildings constructed 2013 or later	22.1	13.3	15.6	19.6	12.1	14.4	15.5	7.9	11.3
Energy sources (more than one may apply)									
Electricity	6.5	4.7	5.2	6.3	4.1	4.4	5.0	2.9	3.5
Natural gas	6.5	4.7	5.2	6.3	4.1	4.4	5.0	2.9	3.5
Fuel oil	32.9	9.9	9.3	32.3	8.8	7.2	27.7	5.7	6.2
District heat	84.6	27.3	12.5	72.9	18.1	13.7	139.6	21.8	13.0
District chilled water	84.6	40.2	20.1	72.9	24.6	13.1	139.6	26.4	13.1
Propane	23.4	17.9	26.4	22.1	15.9	15.3	20.1	11.3	16.9
Solar	46.0	18.8	17.1	37.6	15.1	15.3	45.9	10.8	8.8
Wood, coal, and other	36.4	33.8	37.9	33.6	26.4	30.1	34.0	21.2	30.2
Space-heating energy sources									
Natural gas	7.2	4.8	5.6	7.0	4.3	4.7	4.7	3.0	3.5
Natural gas main	7.6	5.5	6.0	7.3	5.1	5.1	5.0	3.1	3.5
Natural gas secondary	20.3	10.9	12.1	20.9	9.5	11.4	19.6	6.8	11.8
Other excluding natural gas	17.0	12.5	10.4	15.3	10.6	10.1	17.5	8.7	9.4
Buildings without heating	39.2	37.4	30.9	36.4	42.7	33.1	40.5	33.3	27.7
Primary space-heating energy source									
Electricity	14.2	8.7	10.4	13.2	7.8	8.6	13.5	5.5	8.2
Natural gas	7.6	5.5	6.0	7.3	5.1	5.1	5.0	3.1	3.5
Fuel oil	72.3	85.1	35.2	72.7	60.0	29.6	166.5	72.6	39.2
District heat	84.6	28.9	12.9	72.9	19.3	15.6	139.6	24.3	13.5
Propane	0.0	48.1	0.0	0.0	48.1	0.0	0.0	0.0	0.0
Other sources ^b	71.3	0.0	55.2	71.3	0.0	61.1	0.0	0.0	21.8

Relative standard errors (RSEs) for Table C31. Natural gas consumption and conditional energy intensity by building size, 2018

	RSEs for total natural gas consumption			RSEs for total floorspace of buildings using natural gas			RSEs for natural gas energy intensity		
	1,001 to 10,000 square feet	10,001 to 100,000 square feet	Over 100,000 feet	1,001 to 10,000 square feet	10,001 to 100,000 square feet	Over 100,000 feet	1,001 to 10,000 square feet	10,001 to 100,000 square feet	Over 100,000 feet
All buildings	6.5	4.7	5.2	6.3	4.1	4.4	5.0	2.9	3.5
Cooling energy sources									
Natural gas	104.3	55.0	29.4	68.8	46.8	28.8	89.3	30.6	12.6
Other excluding natural gas	6.6	4.6	5.4	5.9	4.1	4.4	5.0	3.0	3.6
Buildings without cooling	19.9	21.4	41.0	22.4	22.0	30.7	13.0	5.8	17.9
Water-heating energy sources									
Natural gas	8.0	5.8	5.9	8.1	4.7	4.9	6.4	3.1	3.7
Other excluding natural gas	11.2	10.0	7.7	10.5	7.5	6.9	8.6	6.8	6.8
Buildings without water heating	22.0	34.6	37.5	18.7	27.5	23.8	12.2	15.9	25.3
Cooking energy sources									
Natural gas	8.9	5.8	6.0	10.5	5.5	4.4	8.4	3.8	3.6
Other excluding natural gas	14.1	11.0	13.2	13.6	8.1	12.7	10.0	6.2	14.5
Buildings without cooking	9.2	6.9	9.2	8.2	5.7	7.9	6.3	4.0	5.0
Energy end uses (more than one may apply)									
Buildings with space heating	6.6	4.7	5.2	6.4	4.2	4.4	5.1	2.9	3.5
Buildings with cooling	6.6	4.6	5.1	5.9	4.1	4.3	5.0	2.9	3.5
Buildings with water heating	6.5	4.7	5.3	6.3	4.1	4.4	5.2	2.9	3.5
Buildings with cooking	7.9	5.4	5.7	7.6	4.7	4.3	6.3	3.5	3.9
Buildings with manufacturing	24.9	15.6	14.9	26.3	13.2	13.2	20.6	9.5	12.0
Buildings with electricity generation	20.9	7.0	7.1	18.6	6.3	5.8	14.7	4.1	5.0
Buildings with lighting	6.5	4.6	5.2	6.3	4.0	4.4	5.0	2.9	3.5
Percentage of floorspace heated									
Not heated	39.2	37.4	30.9	36.4	42.7	33.1	40.5	33.3	27.7
1% to 50%	16.5	15.6	14.1	14.6	13.6	11.9	12.5	9.2	12.1
51% to 99%	15.2	8.3	9.1	12.6	7.9	8.6	11.2	4.8	6.9
100%	8.0	5.9	6.2	7.4	4.8	4.6	6.8	3.4	3.9
Percentage of floorspace cooled									
Not cooled	19.9	21.4	41.0	22.4	22.0	30.7	13.0	5.8	17.9
1% to 50%	12.8	10.1	10.1	11.9	8.6	9.6	10.7	6.4	5.8
51% to 99%	13.7	8.1	7.1	11.3	6.9	7.2	11.3	4.9	5.3
100%	8.6	5.9	8.0	7.5	5.4	5.2	7.1	3.7	5.0
Heating equipment (more than one may apply)									
Packaged heating units	9.0	5.8	7.8	7.2	4.9	5.7	7.5	4.0	5.2
Furnaces	10.0	7.7	14.1	11.0	7.7	11.6	6.8	4.3	7.9
Individual space heaters	14.2	9.6	12.8	11.9	7.4	7.6	10.6	6.2	7.8
Boilers	18.8	7.2	6.5	18.3	6.1	5.6	9.5	3.7	4.0
Heat pumps	21.4	8.8	15.2	17.5	6.8	8.8	21.9	5.2	10.3
District heat	84.6	27.3	12.2	72.9	18.2	13.9	139.6	21.9	13.1
Duct reheat	40.2	18.0	10.9	32.5	14.0	8.9	28.4	10.9	6.9
Other	0.0	34.0	30.9	0.0	31.4	27.6	0.0	16.2	9.7

Relative standard errors (RSEs) for Table C31. Natural gas consumption and conditional energy intensity by building size, 2018

	RSEs for total natural gas consumption			RSEs for total floorspace of buildings using natural gas			RSEs for natural gas energy intensity		
	1,001 to 10,000 square feet	10,001 to 100,000 square feet	Over 100,000 feet	1,001 to 10,000 square feet	10,001 to 100,000 square feet	Over 100,000 feet	1,001 to 10,000 square feet	10,001 to 100,000 square feet	Over 100,000 feet
All buildings	6.5	4.7	5.2	6.3	4.1	4.4	5.0	2.9	3.5
Cooling equipment (more than one may apply)									
Packaged air-conditioning units	8.4	5.3	5.2	7.5	4.8	4.5	6.3	3.4	3.6
Residential-type central air conditioners	10.8	8.4	8.5	10.9	7.6	7.5	7.8	4.5	4.8
Individual air conditioners	16.3	9.4	10.2	15.2	8.1	9.1	12.2	5.5	5.4
Central chillers	57.0	10.1	5.4	44.0	8.2	6.2	39.3	5.5	4.9
Heat pumps	27.5	13.0	18.6	21.7	9.4	10.8	26.3	6.9	11.9
District chilled water	84.6	40.2	20.1	72.9	24.6	13.1	139.6	26.4	13.1
Swamp coolers	34.9	23.9	26.5	36.7	20.8	21.5	24.0	9.8	14.3
Other	50.8	99.6	68.1	50.8	99.6	61.6	0.0	0.0	62.2
HVAC features (more than one may apply)									
Economizer cycle	14.9	7.1	7.0	18.3	5.2	5.8	14.4	5.0	4.6
Variable air volume (VAV) system	20.3	8.1	7.2	19.6	6.9	5.9	15.9	4.3	5.4
Dedicated outside air system (DOAS)	24.3	16.3	15.9	24.2	13.5	11.3	22.4	7.1	9.4
Demand controlled ventilation (DCV)	16.4	10.9	8.4	18.1	11.2	8.3	14.4	6.8	6.7
Regular HVAC maintenance	7.9	5.2	5.3	7.4	4.6	4.5	6.8	3.1	3.6
Building automation system (BAS) controls heating or cooling	19.3	6.1	5.8	16.6	5.1	4.5	16.4	3.6	3.9
Internet-connected or smart thermostat	25.0	19.1	18.4	19.0	15.8	21.4	20.0	10.2	19.9
Programmable thermostat	9.2	9.5	15.5	9.8	8.0	12.4	7.7	6.6	8.4
Main equipment replaced since 2000 (more than one may apply)									
Heating	9.0	7.5	6.5	10.5	6.9	5.7	8.0	4.3	4.6
Cooling	11.4	8.5	11.4	11.0	7.0	8.4	9.1	5.0	7.0
Water-heating equipment									
Centralized system	6.7	5.7	7.3	7.2	4.9	5.8	5.3	3.2	4.9
Distributed system	16.2	10.0	13.4	14.0	9.7	9.5	15.0	6.2	9.7
Combination of centralized and distributed systems	25.7	10.7	6.9	26.1	9.3	6.0	19.2	8.4	5.3
Generation technologies (more than one may apply)									
Reciprocating engine generators	23.8	7.7	7.8	22.5	7.1	6.3	16.8	4.6	5.7
Solar panels	46.0	20.1	17.4	37.6	15.3	15.4	45.9	11.7	9.0
Other generation technology	109.5	31.3	24.1	77.4	30.9	15.5	96.8	16.3	14.3

Relative standard errors (RSEs) for Table C31. Natural gas consumption and conditional energy intensity by building size, 2018

	RSEs for total natural gas consumption			RSEs for total floorspace of buildings using natural gas			RSEs for natural gas energy intensity		
	1,001 to 10,000 square feet	10,001 to 100,000 square feet	Over 100,000 feet	1,001 to 10,000 square feet	10,001 to 100,000 square feet	Over 100,000 feet	1,001 to 10,000 square feet	10,001 to 100,000 square feet	Over 100,000 feet
All buildings	6.5	4.7	5.2	6.3	4.1	4.4	5.0	2.9	3.5
Food preparation or serving areas in non-food service buildings (more than one may apply)									
Snack bar, concession stand, or coffee shop	40.1	13.3	11.6	37.4	11.1	8.8	40.5	6.5	7.7
Fast food or small restaurant	25.3	11.7	12.4	27.8	10.7	7.6	26.3	5.5	8.1
Cafeteria or large restaurant	49.3	10.7	8.7	55.4	10.2	5.9	20.8	8.0	6.1
Commercial kitchen or food preparation area	25.4	9.6	7.5	28.7	8.0	5.8	14.4	5.7	4.8
Small kitchen area	14.4	7.8	11.5	11.4	6.8	8.0	10.2	5.8	7.5
Annual consumption (hundred cubic feet)									
1,000 or less	9.9	14.8	25.7	10.7	13.3	23.4	4.9	10.6	14.3
1,001 to 5,000	8.5	9.3	19.6	7.7	8.0	25.4	4.0	4.1	22.5
5,001 to 10,000	19.1	9.0	19.0	25.4	7.1	15.8	8.1	3.9	9.0
10,001 to 25,000	18.0	6.5	9.2	18.8	6.3	8.0	8.1	2.7	5.7
25,001 to 50,000	45.7	9.0	8.0	47.6	9.3	8.3	10.4	3.6	4.0
50,001 to 100,000	52.1	15.4	7.2	52.1	15.1	6.7	0.0	4.8	3.4
Over 100,000	0.0	49.7	7.8	0.0	39.8	7.7	0.0	20.9	4.6

Data source: U.S. Energy Information Administration, Forms EIA-871A and C 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>.

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

^bOther sources includes wood, coal, solar, and all other energy sources.