Appendix F

Relative Standard Errors for the Lighting Profile Tables

The CBECS is a probability sample. The statistics that are calculated from the reported CBECS data are subject to random variation, as a result of the random sampling procedure. The random uncertainty associated with these statistics is represented by the standard error. The standard error is the root mean square difference between the estimate based on the CBECS sample and the value that would be computed if the entire population of commercial buildings were included in the data base. The relative standard error (RSE) is the standard error expressed as a percent of the estimate.

The uncertainty of the estimates presented in this report stems from many sources. A crucial source of uncertainty is the assumptions made to derive many of the technical characteristics presented. The analysis has attempted to assess the sensitivity of results to a range of plausible assumptions.

The RSE indicates the uncertainty derived from the sampling only, treating the technical assumptions as known for each sampled building. For quantities involving reported CBECS items only, such as floorspace and hours, this random error is the principal source of uncertainty. For derived quantities based on technical assumptions, the uncertainty of assumptions is generally much greater than the sampling error.

For each of the tables of statistics developed in for the "Commercial Lighting Energy Profile" (Tables 1 through 9 and D1 through D4), a corresponding table of RSE's appears in this appendix. In general, the RSE's are small enough that the comparisons presented among the broad categories tabulated are valid, subject to the acceptability of the engineering assumptions, and the sensitivity of the results to those assumptions.

No RSE's are presented for the savings estimates developed in section on "Lighting Energy Conservation Potential" (Tables 10 through 12). The savings estimates are heavily assumption driven. Their uncertainties are best characterized by the range or estimates under varying assumptions. In fact, for a particular lamp type, the percent savings is completely determined by the assumed deflation factors, which are treated as known quantities; thus, the RSE, which measures the uncertainty due to random sampling, is zero.

Table F1. Relative Standard Errors for Table 1

Building Characteristics	Type of Lamp								
	Fluorescent			Incandescent			High Intensity Discharge	Total Lighted Floorspace	Total Floorspace
	Standard	Energy-Efficient	Total	Standard	Energy-Efficient	Total			
All Buildings	4.1	5.4	3.4	4.7	7.7	4.5	12.4	3.2	3.0
Principal Activity									
Assembly	12.6	13.2	9.1	11.3	18.3	10.5	19.4	7.8	5.3
Education	9.2	10.7	7.1	14.8	25.0	13.9	27.7	7.2	4.1
Food Sales	18.7	26.9	16.2	21.8	55.2	21.4	57.9	15.0	6.8
Food Service	14.9	22.0	11.7	19.1	33.3	17.0	51.7	12.0	14.4
Health Care	22.1	21.8	17.0	22.0	28.7	18.7	75.9	18.2	4.1
Lodging	13.6	25.0	14.3	12.6	24.7	12.3	66.5	10.5	5.3
Mercantile/Service	5.6	13.1	7.4	13.3	19.6	11.7	17.4	7.1	3.4
Office	8.7	8.8	6.4	12.3	15.7	11.0	23.0	6.3	2.7
Public Order and Safety	19.4	30.9	19.6	60.9	62.2	56.5	55.8	19.6	9.6
Warehouse	12.4	14.1	10.9	11.7	26.7	11.3	21.0	10.1	6.5
Vacant	12.2	32.8	14.2	30.1	48.4	24.1	37.4	11.9	20.7
Other	14.5	27.1	16.3	33.7	38.5	26.1	47.6	17.8	8.3
Building Size (square feet)									
1,001 to 5,000	6.0	7.4	5.3	8.5	17.5	8.0	23.2	5.5	3.9
5,001 to 10,000	5.7	9.6	5.1	8.0	18.0	7.4	18.7	4.6	4.1
10,001 to 25,000	7.3	9.9	5.8	9.2	14.6	7.8	20.4	5.1	5.8
25,001 to 50,000	7.7	10.7	6.6	11.1	19.5	9.7	27.6	6.0	5.7
50,001 to 100,000	10.8	10.2	7.8	15.5	20.7	12.1	21.1	7.3	6.7
100,001 to 200,000	12.7	10.7	8.6	21.0	22.1	16.1	18.5	8.2	7.6
200,001 to 500,000	16.0	13.4	9.9	25.9	23.6	19.1	33.3	10.0	7.8
Over 500,000	25.6	20.9	16.4	31.0	22.9	19.2	40.1	16.0	16.0
Year Constructed									
Before 1920	14.0	14.9	10.8	13.0	27.1	12.4	32.7	9.7	10.6
1920-1945	10.4	11.9	8.2	11.7	21.3	10.9	15.5	7.3	9.5
1946-1959	9.2	9.6	7.8	11.0	20.7	11.0	30.7	7.7	7.5
1960-1969	8.2	10.4	6.9	11.6	20.4	12.2	29.8	6.4	5.1
1970-1979	7.3	9.7	6.4	13.5	16.5	11.2	20.0	6.2	7.2
1980-1986	10.6	12.6	10.1	12.5	16.2	11.1	19.1	9.0	11.0
Census Region									
Northeast	6.6	11.8	5.8	13.4	14.1	10.4	39.4	6.5	5.4
Midwest	7.6	10.7	6.6	9.7	15.2	8.8	17.1	5.7	6.9
South	6.7	9.1	6.4	6.8	15.0	7.8	18.7	6.0	7.7
West	15.3	10.5	9.9	11.7	16.7	10.9	23.7	9.2	7.1

Source: Energy Information Administration, Office of Energy Markets and End Use, Form EIA-871A, "Building Questionnaire" of the 1986 Nonresidential Buildings Energy Consumption Survey.

Table F2. Relative Standard Errors for Table 2

Building Characteristics	Type of Lamp							Total Lighted Floorspace
	Fluorescent			Incandescent			High Intensity Discharge	
	Standard	Energy-Efficient	Total	Standard	Energy-Efficient	Total		
All Buildings	3.3	3.8	1.2	4.2	7.0	3.8	11.0	0.0
Principal Activity								
Assembly	8.7	11.3	3.9	9.7	14.7	7.4	18.9	0.0
Education	7.6	6.7	1.3	13.0	22.6	11.1	25.7	0.0
Food Sales	15.6	19.2	5.6	18.9	46.6	14.9	54.8	0.0
Food Service	14.7	16.2	7.1	11.5	29.5	8.3	50.3	0.0
Health Care	21.3	8.1	2.0	21.5	26.8	17.1	55.7	0.0
Lodging	11.0	19.8	7.9	9.2	19.9	5.8	67.1	0.0
Mercantile/Service	4.2	7.6	1.3	10.8	18.8	9.3	16.2	0.0
Office	6.3	5.9	1.2	10.4	14.5	8.9	23.4	0.0
Public Order and Safety	22.0	18.8	11.4	49.4	56.1	44.3	51.1	0.0
Warehouse	8.3	8.7	4.7	10.7	26.5	10.4	16.2	0.0
Vacant	10.0	27.7	7.5	25.9	48.4	20.4	38.7	0.0
Other	16.8	17.8	10.4	30.0	37.6	21.7	34.6	0.0
Building Size (square feet)								
1,001 to 5,000	2.8	5.9	1.6	5.8	15.5	4.8	22.5	0.0
5,001 to 10,000	3.7	7.7	1.9	6.4	16.9	5.3	18.0	0.0
10,001 to 25,000	5.1	8.1	2.1	8.4	15.4	7.6	18.7	0.0
25,001 to 50,000	5.3	8.5	2.7	11.0	18.7	9.3	25.3	0.0
50,001 to 100,000	7.6	7.6	2.7	15.3	18.9	10.8	18.6	0.0
100,001 to 200,000	8.2	9.1	3.3	18.4	22.9	14.3	16.4	0.0
200,001 to 500,000	14.0	9.5	4.5	23.4	21.8	16.0	26.6	0.0
Over 500,000	24.1	11.0	4.4	33.3	22.2	20.7	31.8	0.0
Year Constructed								
Before 1920	8.7	12.4	4.0	9.8	24.3	8.2	34.3	0.0
1920-1945	7.3	8.9	3.0	9.5	19.6	8.1	16.7	0.0
1946-1959	5.3	6.7	3.0	8.8	19.2	8.6	27.0	0.0
1960-1969	5.8	7.9	2.8	9.5	18.4	9.7	30.1	0.0
1970-1979	5.3	6.8	2.2	13.7	16.5	11.3	16.4	0.0
1980-1986	7.2	6.5	3.1	13.4	14.9	10.8	16.7	0.0
Census Region								
Northeast	9.5	6.7	2.8	11.4	12.4	7.7	35.5	0.0
Midwest	5.2	8.3	2.5	8.0	13.7	6.6	16.4	0.0
South	4.0	5.5	1.8	7.2	13.8	7.4	14.9	0.0
West	8.8	8.5	2.4	9.5	15.4	8.7	20.9	0.0

Source: Energy Information Administration, Office of Energy Markets and End Use, Form EIA-871A, "Building Questionnaire" of the 1986 Nonresidential Buildings Energy Consumption Survey.

Table F3. Relative Standard Errors for Table 3

Building Characteristics	Total Lighted Floorspace (million square feet)			Operating Hours per Week	Total Weekly Lighted Floorspace-Hours (billion square foot-hours)			Effective Lighting Hours per Week	
	Open	Closed	Ratio (Closed/ Open)		Open	Closed	Total (Open + Closed)	H^e	Ratio (Effective Lighting/ Operating)
All Buildings	3.2	7.1	5.7	2.0	4.4	4.9	4.1	1.8	0.6
Principal Activity									
Assembly	7.8	20.0	17.6	7.3	11.0	18.6	10.8	6.7	1.6
Education	7.2	10.7	10.3	3.6	8.2	10.8	7.6	3.1	1.7
Food Sales	15.0	23.7	16.7	5.8	15.1	27.5	15.3	5.1	2.8
Food Service	12.0	22.4	16.8	9.0	19.0	19.3	18.0	7.9	1.5
Health Care	18.2	23.1	8.8	2.9	19.6	27.0	19.5	2.8	0.1
Lodging	10.5	14.2	8.9	1.6	11.0	41.8	10.9	1.5	0.3
Mercantile/Service	7.1	9.8	5.7	1.5	7.4	10.9	7.7	1.8	0.9
Office	6.3	13.0	11.3	2.9	5.9	13.7	6.6	3.0	2.5
Public Order and Safety	19.6	28.7	15.4	7.4	22.9	43.6	22.2	6.2	2.7
Warehouse	10.1	20.6	17.4	5.9	12.6	16.7	12.2	5.5	1.7
Vacant	11.9	32.2	30.0	17.8	21.3	34.6	19.6	15.7	8.2
Other	17.8	24.1	14.8	10.8	22.3	23.0	20.6	9.0	2.9
Building Size (square feet)									
1,001 to 5,000	5.5	8.9	7.4	2.9	6.1	9.3	5.9	2.6	1.0
5,001 to 10,000	4.6	9.9	9.0	2.8	4.4	9.3	4.5	2.7	0.8
10,001 to 25,000	5.1	10.2	9.5	2.7	5.2	9.9	5.1	2.6	1.0
25,001 to 50,000	6.0	9.2	8.7	3.3	6.9	12.1	6.5	3.0	1.5
50,001 to 100,000	7.3	15.2	11.9	5.6	9.9	12.8	9.5	5.1	1.4
100,001 to 200,000	8.2	12.0	8.7	4.5	8.4	16.9	8.3	4.1	2.1
200,001 to 500,000	10.0	13.1	12.7	6.1	10.7	15.7	10.0	5.1	2.0
Over 500,000	16.0	26.0	15.4	8.9	21.2	24.3	19.6	6.5	3.5
Year Constructed									
Before 1920	9.7	23.6	19.9	7.0	11.4	18.8	11.5	6.1	2.3
1920-1945	7.3	15.1	12.4	5.5	10.5	10.4	9.6	4.8	1.5
1946-1959	7.7	12.4	9.7	3.5	8.6	11.8	8.4	3.0	1.2
1960-1969	6.4	11.4	8.9	3.7	7.9	16.4	7.8	3.4	1.9
1970-1979	6.2	9.3	7.3	3.1	7.4	9.6	6.8	2.6	1.4
1980-1986	9.0	18.3	12.6	4.8	11.8	12.5	11.4	4.1	1.1
Census Region									
Northeast	6.5	8.4	9.5	2.5	6.9	7.6	6.2	2.1	1.2
Midwest	5.7	11.1	8.7	3.1	6.5	15.0	6.7	3.2	1.7
South	6.0	14.5	10.4	4.4	9.5	7.1	8.7	3.7	1.1
West	9.2	11.5	8.5	3.0	9.1	12.3	8.9	2.7	1.2

Source: Energy Information Administration, Office of Energy Markets and End Use, Form EIA-871A, "Building Questionnaire" of the 1986 Nonresidential Buildings Energy Consumption Survey.

Table F4. Relative Standard Errors for Table 4

Lamp Type	Total Lighted Floorspace (million square feet)			Operating Hours per Week	Total Weekly Lighted Floorspace-Hours (billion square foot-hours)			Effective Lighting Hours per Week	
	Open	Closed	Ratio (Closed/ Open)		Open	Closed	Total (Open + Closed)	H^e	Ratio (Effective Lighting/ Operating)
Fluorescent	3.4	7.3	5.6	1.9	4.3	5.9	4.1	1.7	0.7
Standard	4.1	8.4	6.7	1.8	4.7	7.3	4.4	1.7	1.0
Energy-Efficient	5.4	9.5	7.6	3.0	6.3	10.0	6.2	2.6	1.2
Incandescent	4.5	10.7	9.1	3.8	6.2	5.9	5.9	3.5	0.6
Standard	4.7	12.4	10.4	4.3	6.5	7.5	6.1	3.9	0.7
Energy-Efficient	7.7	12.7	11.3	6.6	10.9	10.8	10.1	5.8	1.2
High-Intensity Discharge	12.4	20.7	14.5	7.6	17.5	17.2	15.9	6.4	2.4

Source: Energy Information Administration, Office of Energy Markets and End Use, Form EIA-871A, "Building Questionnaire" of the 1986 Nonresidential Buildings Energy Consumption Survey.

Table F5. Relative Standard Errors for Table 5

Building Characteristics	Average Assigned Illuminance Range (lumens per square foot)		
	Low	Medium	High
All Buildings	2.58	2.58	2.29
Principal Activity			
Assembly	0.00	0.00	0.00
Education	0.00	0.00	0.00
Food Sales	0.00	0.00	0.00
Food Service	0.00	0.00	0.00
Health Care	0.00	0.00	0.00
Lodging	0.00	0.00	0.00
Mercantile/Service	0.00	0.00	0.00
Office	0.00	0.00	0.00
Public Order & Safety	0.00	0.00	0.00
Warehouse	0.00	0.00	0.00
Vacant	0.00	0.00	0.00
Other	0.00	0.00	0.00
Building Size (square feet)			
1,001 to 5,000	1.43	1.43	1.26
5,001 to 10,000	2.58	2.58	2.16
10,001 to 25,000	2.41	2.41	2.08
25,001 to 50,000	3.65	3.65	3.39
50,001 to 100,000	3.46	3.46	3.11
100,001 to 200,000	5.86	5.86	5.30
200,001 to 500,000	6.97	6.97	6.40
Over 500,000	10.75	10.75	10.00
Year Constructed			
Before 1920	5.05	5.05	4.24
1920-1945	4.91	4.91	4.26
1946-1959	4.92	4.92	4.40
1960-1969	4.13	4.13	3.54
1970-1979	3.92	3.92	3.56
1980-1986	6.88	6.88	6.11
Census Region			
Northeast	3.74	3.74	3.21
Midwest	4.10	4.10	3.67
South	4.62	4.62	3.98
West	4.85	4.85	4.37

Sources: Adapted from Energy Information Administration, Office of Energy Markets and End Use, Form EIA-788A, "Building Form" of the 1979 Nonresidential Buildings Energy Consumption Survey; Form EIA-871A, "Building Questionnaire" of the 1986 Nonresidential Buildings Energy Consumption Survey; and Illuminating Engineering Society of North America, *IES Lighting Handbook: 1987 Application Volume.*

Table F6. Relative Standard Errors for Table 6

Lamp Type and Conservation Feature Present	Percent of Total Lighted Floorspace	Usage Factor (percent)	Illuminance (lumens per square foot)		Efficacy (lumens per square foot)	In-Use Lighting Power Density (watts per square foot)
			Time-Averaged			
Standard Fluorescent	4.1	1.7	2.0	3.1	0.0	2.0
No Conservation Features	5.4	2.6	3.1	5.2	0.0	3.1
Ballast	8.7	4.2	3.7	5.5	0.0	3.7
Controls	11.6	7.0	4.8	7.6	0.0	4.8
Delamping	18.0	5.4	6.8	10.1	0.0	6.8
Ballast and Controls	14.5	6.6	5.0	7.7	0.0	5.0
Ballast and Delamping	16.8	8.4	9.4	10.4	0.0	9.4
Controls and Delamping	33.2	10.0	15.9	29.2	0.0	15.9
Ballast, Controls, and Delamping	25.8	10.4	8.6	17.1	0.0	8.6
Energy-Efficient Fluorescent	5.4	2.6	3.1	6.2	0.0	3.1
No Conservation Features	9.1	4.0	5.7	8.3	0.0	5.7
Ballast	8.0	5.8	4.9	9.0	0.0	4.9
Controls	18.4	5.2	6.3	6.8	0.0	6.3
Delamping	12.2	6.8	7.6	11.9	0.0	7.6
Ballast and Controls	12.3	7.1	10.1	18.6	0.0	10.1
Ballast and Delamping	14.4	5.2	3.1	7.2	0.0	3.1
Controls and Delamping	26.0	9.8	3.9	10.8	0.0	3.9
Ballast, Controls, and Delamping	16.1	6.0	10.9	20.0	0.0	10.9
Standard Incandescent	4.7	3.9	2.9	4.4	0.0	2.9
No Conservation Features	5.9	5.1	2.6	6.0	0.0	2.6
Controls	13.1	9.5	5.9	7.4	0.0	5.9
Delamping	25.2	8.6	14.2	11.3	0.0	14.2
Controls and Delamping	17.2	7.3	12.0	17.9	0.0	12.0
Energy-Efficient Incandescent	7.7	5.8	4.3	6.8	0.0	4.3
No Conservation Features	9.6	8.2	5.7	8.2	0.0	5.7
Controls	14.1	8.8	9.3	14.5	0.0	9.3
Delamping	20.6	9.3	6.6	9.0	0.0	6.6
Controls and Delamping	20.7	7.8	11.4	12.8	0.0	11.4
High-Intensity Discharge	12.4	6.4	12.2	21.6	0.0	12.2
No Conservation Features	14.6	8.6	9.1	8.1	0.0	9.1
Controls	21.6	9.4	14.6	23.9	0.0	14.6
Delamping	28.6	9.9	22.3	17.2	0.0	22.3
Controls and Delamping	26.2	10.7	23.6	35.0	0.0	23.6

Sources: Percent of floorspace and usage factor from Energy Information Administration, Office of Energy Markets and End Use, Form EIA-871A, "Building Questionnaire" of the 1986 Nonresidential Buildings Energy Consumption Survey; Illuminance and efficacy derived from sources described in Appendices B and C. Lighting power density is derived from illuminance and efficacy.

Table F7. Relative Standard Errors for Table 7

Building Characteristics	Percent of Total Lighted Floorspace 1986	Usage Factor (percent)	Illuminance (lumens per square foot)		In-Use Lighting Power Density (watts/square foot)
			In-Use	Time-Averaged	
All Buildings	3.2	1.8	2.3	4.3	N/A
Principal Activity					
Assembly	7.8	6.7	0.0	6.7	N/A
Education	7.2	3.1	0.0	3.1	N/A
Food Sales	15.0	5.1	0.0	5.1	N/A
Food Service	12.0	7.9	0.0	7.9	N/A
Health Care	18.2	2.8	0.0	2.8	N/A
Lodging	10.5	1.5	0.0	1.5	N/A
Mercantile/Service	7.1	1.8	0.0	1.8	N/A
Office	6.3	3.0	0.0	3.0	N/A
Public Order and Safety	19.6	6.2	0.0	6.2	N/A
Warehouse	10.1	5.5	0.0	5.5	N/A
Vacant	11.9	15.7	0.0	15.8	N/A
Other	17.8	9.0	0.0	9.0	N/A
Building Size (square feet)					
1,001 to 5,000	5.5	2.6	1.3	3.0	N/A
5,001 to 10,000	4.6	2.7	2.2	3.1	N/A
10,001 to 25,000	5.1	2.6	2.1	3.8	N/A
25,001 to 50,000	6.0	3.0	3.4	5.9	N/A
50,001 to 100,000	7.3	5.1	3.1	5.5	N/A
100,001 to 200,000	8.2	4.1	5.3	7.6	N/A
200,001 to 500,000	10.0	5.1	6.4	7.9	N/A
Over 500,000	16.0	6.5	10.0	17.0	N/A
Year Constructed					
Before 1920	9.7	6.1	4.2	9.1	N/A
1920-1945	7.3	4.8	4.3	8.0	N/A
1946-1959	7.7	3.0	4.4	6.9	N/A
1960-1969	6.4	3.4	3.5	4.8	N/A
1970-1979	6.2	2.6	3.6	6.6	N/A
1980-1986	9.0	4.1	6.1	13.4	N/A
Census Region					
Northeast	6.5	2.1	3.2	4.2	N/A
Midwest	5.7	3.2	3.7	6.6	N/A
South	6.0	3.7	4.0	9.3	N/A
West	9.2	2.7	4.4	6.2	N/A

N/A This statistic was created using a composite of data from Table 6 and the relative standard errors are unavailable.

Sources: Percent of floorspace and usage factor from Energy Information Administration, Office of Energy Markets and End Use, Form EIA-871A, "Building Questionnaire" of the 1986 Nonresidential Buildings Energy Consumption Survey; Illuminance and efficacy derived from sources described in Appendices B and C. Lighting power density is derived from illuminance and efficacy.

Table F8. Relative Standard Errors for Table 8

Lamp Type and Conservation Feature Present	Floorspace, 1986 (million square feet)		Annual Lighting End-Use Intensity (kWh/square foot)	Annual Lighting Energy (billion kWh)
	Total Lighted	Percent of Total Lighted		
Standard Fluorescent	4.1	4.1	6.2	5.5
No Conservation Features	5.4	5.4	5.2	7.0
Ballast	8.7	8.7	5.5	10.7
Controls	11.6	11.6	7.6	15.4
Delamping	18.0	18.0	10.1	23.4
Ballast and Controls	14.5	14.5	7.7	15.7
Ballast and Delamping	16.8	16.8	10.4	19.8
Controls and Delamping	33.2	33.2	29.2	38.2
Ballast, Controls, and Delamping	25.8	25.8	17.1	24.1
Energy-Efficient Fluorescent	5.4	5.4	6.2	8.2
No Conservation Features	9.1	9.1	8.3	12.4
Ballast	8.0	8.0	9.0	11.4
Controls	18.4	18.4	6.8	16.8
Delamping	12.2	12.2	11.9	15.0
Ballast and Controls	12.3	12.3	18.6	23.5
Ballast and Delamping	14.4	14.4	7.2	16.6
Controls and Delamping	26.0	26.0	10.8	23.1
Ballast, Controls, and Delamping	16.1	16.1	20.0	28.6
Standard Incandescent	4.7	4.7	4.4	6.5
No Conservation Features	5.9	5.9	6.0	8.3
Controls	13.1	13.1	7.4	12.3
Delamping	25.2	25.2	11.3	21.1
Controls and Delamping	17.2	17.2	17.9	23.4
Energy-Efficient Incandescent	7.7	7.7	6.8	9.0
No Conservation Features	9.6	9.6	8.2	9.3
Controls	14.1	14.1	14.5	21.9
Delamping	20.6	20.6	9.0	20.6
Controls and Delamping	20.7	20.7	12.8	14.2
High-Intensity Discharge	12.4	12.4	21.6	29.0
No Conservation	14.6	14.6	8.1	15.3
Controls	21.6	21.6	23.9	46.5
Delamping	28.6	28.6	17.2	21.1
Controls and Delamping	26.2	26.2	35.0	59.4

Sources: Floorspace from Energy Information Administration, Office of Energy Markets and End Use, Form EIA-871A, "Building Questionnaire" of the Nonresidential Buildings Energy Consumption Survey; Illuminance and efficacy derived from sources described in Appendices B and C. Lighting end-use intensity and energy measures are derived from illuminance and efficacy.

Table F9. Relative Standard Errors for Table 9

Building Characteristics	Floorspace, 1986 (million square feet)			Annual Lighting End-Use Intensity (kWh/square foot)		Annual Lighting Energy (billion kWh)
	Total	Total Lighted	Percent of Total Lighted	per Total Square Feet	per Total Lighted Square Feet	
All Buildings	3.01	3.20	3.20	3.57	3.36	5.04
Principal Activity						
Assembly	7.08	7.81	7.81	5.29	5.22	9.11
Education	7.01	7.21	7.21	4.10	4.13	8.30
Food Sales	14.44	15.04	15.04	6.82	6.45	14.59
Food Service	10.12	12.04	12.04	14.35	12.15	21.91
Health Care	17.36	18.21	18.21	4.05	4.07	17.71
Lodging	9.84	10.52	10.52	5.33	4.20	12.01
Mercantile/Service	7.02	7.10	7.10	3.36	2.46	7.95
Office	6.18	6.26	6.26	2.72	2.42	6.26
Public Order and Safety	18.54	19.60	19.60	19.64	19.61	32.92
Warehouse	8.61	10.12	10.12	6.49	5.20	10.45
Vacant	9.59	11.92	11.92	20.69	17.80	20.02
Other	16.69	17.84	17.84	8.25	7.49	18.14
Building Size (square feet)						
1,001 to 5,000	5.16	5.47	5.47	3.92	3.29	6.71
5,001 to 10,000	4.54	4.62	4.62	4.10	3.83	5.42
10,001 to 25,000	4.80	5.07	5.07	5.78	5.76	6.48
25,001 to 50,000	5.78	6.01	6.01	5.66	5.64	7.50
50,001 to 100,000	6.90	7.32	7.32	6.67	6.23	9.19
100,001 to 200,000	8.54	8.19	8.19	7.59	7.71	10.37
200,001 to 500,000	9.96	10.02	10.02	7.82	7.57	11.03
Over 500,000	15.06	16.02	16.02	16.00	14.62	23.59
Year Constructed						
Before 1920	8.97	9.68	9.68	10.59	8.62	12.44
1920-1945	6.32	7.27	7.27	9.47	8.96	12.78
1946-1959	7.65	7.68	7.68	7.49	6.76	8.67
1960-1969	6.16	6.42	6.42	5.13	5.08	8.29
1970-1979	5.71	6.24	6.24	7.23	7.05	8.58
1980-1986	8.32	9.00	9.00	11.03	10.62	16.11
Census Region						
Northeast	6.96	6.46	6.46	5.36	4.95	5.09
Midwest	5.08	5.71	5.71	6.92	6.34	9.37
South	5.47	6.00	6.00	7.73	6.99	10.94
West	9.59	9.19	9.19	7.10	7.28	9.34

Sources: Floorspace from Energy Information Administration, Office of Energy Markets and End Use, Form EIA-871A, "Building Questionnaire" of the 1986 Nonresidential Buildings Energy Consumption Survey; Illuminance and efficacy derived from sources described in Appendices B and C. Lighting end-use intensity and energy measures are derived from illuminance and efficacy.

Table F10. Relative Standard Errors for Table D1

Lamp Type and Conservation Feature Present	Percent of Total Lighted Floorspace	Usage Factor (percent)	Illuminance (lumens per square foot)		Efficacy (lumens per watt)	In-Use Lighting Power Density (watts per square foot)
			In-Use	Time-Averaged		
Standard Fluorescent	4.1	1.7	2.0	3.1	0.0	2.0
No Conservation Features	5.4	2.6	3.1	5.2	0.0	3.1
Ballast	8.7	4.2	3.7	5.5	0.0	3.7
Controls	11.6	7.0	4.8	7.6	0.0	4.8
Delamping	18.0	5.4	6.8	10.1	0.0	6.8
Ballast and Controls	14.5	6.6	5.0	7.7	0.0	5.0
Ballast and Delamping	16.8	8.4	9.4	10.4	0.0	9.4
Controls and Delamping	33.2	10.0	15.9	29.2	0.0	15.9
Ballast, Controls, and Delamping	25.8	10.4	8.6	17.1	0.0	8.6
Energy-Efficient Fluorescent	5.4	2.6	3.1	5.9	0.0	3.1
No Conservation Features	9.1	4.0	5.7	8.3	0.0	5.7
Ballast	8.0	5.8	4.9	9.0	0.0	4.9
Controls	18.4	5.2	6.3	6.8	0.0	6.3
Delamping	12.2	6.8	7.6	11.9	0.0	7.6
Ballast and Controls	12.3	7.1	10.1	18.6	0.0	10.1
Ballast and Delamping	14.4	5.2	3.1	7.2	0.0	3.1
Controls and Delamping	26.0	9.8	3.9	10.8	0.0	3.9
Ballast, Controls, and Delamping	16.1	6.0	10.9	20.0	0.0	10.9
Standard Incandescent	4.7	3.9	2.9	4.4	0.0	2.9
No Conservation Features	5.9	5.1	2.6	6.0	0.0	2.6
Controls	13.1	9.5	5.9	7.4	0.0	5.9
Delamping	25.2	8.6	14.2	11.3	0.0	14.2
Controls and Delamping	17.2	7.3	12.0	17.9	0.0	12.0
Energy-Efficient Incandescent	7.7	5.8	4.3	6.6	0.0	4.3
No Conservation Features	9.6	8.2	5.7	8.2	0.0	5.7
Controls	14.1	8.8	9.3	14.5	0.0	9.3
Delamping	20.6	9.3	6.6	9.0	0.0	6.6
Controls and Delamping	20.7	7.8	11.4	12.8	0.0	11.4
High-Intensity Discharge	12.4	6.4	12.2	19.9	0.0	12.2
No Conservation Features	14.6	8.6	9.1	8.1	0.0	9.1
Controls	21.6	9.4	14.6	23.9	0.0	14.6
Delamping	28.6	9.9	22.3	17.2	0.0	22.3
Controls and Delamping	26.2	10.7	23.6	35.0	0.0	23.6

Sources: Percent of floorspace and usage factor from Energy Information Administration, Office of Energy Markets and End Use, Form EIA-871A, "Building Questionnaire" of the 1986 Nonresidential Buildings Energy Consumption Survey; Illuminance and efficacy derived from sources described in Appendices B and C. Lighting power density is derived from illuminance and efficacy.

Table F11. Relative Standard Errors for Table D2

Building Characteristics	Percent of Total Lighted Floorspace 1986	Usage Factor (percent)	Illuminance (lumens per square foot)		In-Use Lighting Power Density (watts/square foot)
			In-Use	Time-Averaged	
All Buildings	3.20	1.8	2.3	3.96	N/A
Principal Activity					
Assembly	7.81	6.7	0.0	6.43	N/A
Education	7.21	3.1	0.0	3.12	N/A
Food Sales	15.04	5.1	0.0	5.29	N/A
Food Service	12.04	7.9	0.0	7.25	N/A
Health Care	18.21	2.8	0.0	2.81	N/A
Lodging	10.52	1.5	0.0	1.6	N/A
Mercantile/Service	7.10	1.8	0.0	1.51	N/A
Office	6.26	3.0	0.0	2.96	N/A
Public Order and Safety	19.60	6.2	0.0	6.19	N/A
Warehouse	10.12	5.5	0.0	5.32	N/A
Vacant	11.92	15.7	0.0	15.61	N/A
Other	17.84	9.0	0.0	8.65	N/A
Building Size (square feet)					
1,001 to 5,000	5.47	2.6	1.3	2.89	N/A
5,001 to 10,000	4.62	2.7	2.2	3.1	N/A
10,001 to 25,000	5.07	2.6	2.1	3.75	N/A
25,001 to 50,000	6.01	3.0	3.4	5.91	N/A
50,001 to 100,000	7.32	5.1	3.1	5.62	N/A
100,001 to 200,000	8.19	4.1	5.3	8.05	N/A
200,001 to 500,000	10.02	5.1	6.4	8.01	N/A
Over 500,000	16.02	6.5	10.0	16.18	N/A
Year Constructed					
Before 1920	9.68	6.1	4.2	9.29	N/A
1920-1945	7.27	4.8	4.3	8.28	N/A
1946-1959	7.68	3.0	4.4	6.99	N/A
1960-1969	6.42	3.4	3.5	4.81	N/A
1970-1979	6.24	2.6	3.6	6.47	N/A
1980-1986	9.00	4.1	6.1	11.9	N/A
Census Region					
Northeast	6.46	2.1	3.2	4.45	N/A
Midwest	5.71	3.2	3.7	6.52	N/A
South	6.00	3.7	4.0	8.17	N/A
West	9.19	2.7	4.4	6.42	N/A

N/A: This statistic was created using a composite of data from Table D1 and the relative standard errors are unavailable.

Sources: Percent of floorspace and usage factor from Energy Information Administration, Office of Energy Markets and End Use, Form EIA-871A, "Building Questionnaire" of the 1986 Nonresidential Buildings Energy Consumption Survey; Illuminance and efficacy derived from sources described in Appendices B and C. Lighting power density is derived from illuminance and efficacy.

Table F12. Relative Standard Errors for Table D3

Lamp Type and Conservation Feature Present	Floorspace (million square feet)		Annual Lighting End-Use Intensity (kWh/square foot)	Annual Lighting Energy (billion kWh)
	Total Lighted	Percent of Total Lighted		
Standard Fluorescent	4.1	4.1	3.1	5.5
No Conservation Features	5.4	5.4	5.2	7.0
Ballast	8.7	8.7	5.5	10.7
Controls	11.6	11.6	7.6	15.4
Delamping	18.0	18.0	10.1	23.4
Ballast and Controls	14.5	14.5	7.7	15.7
Ballast and Delamping	16.8	16.8	10.4	19.8
Controls and Delamping	33.2	33.2	29.2	38.2
Ballast, Controls, and Delamping	25.8	25.8	17.1	24.1
Energy-Efficient Fluorescent	5.4	5.4	5.8	7.8
No Conservation Features	9.1	9.1	8.3	12.4
Ballast	8.0	8.0	9.0	11.4
Controls	18.4	18.4	6.8	16.8
Delamping	12.2	12.2	11.9	15.0
Ballast and Controls	12.3	12.3	18.6	23.5
Ballast and Delamping	14.4	14.4	7.2	16.6
Controls and Delamping	26.0	26.0	10.8	23.1
Ballast, Controls, and Delamping	16.1	16.1	20.0	28.6
Standard Incandescent	4.7	4.7	4.4	6.5
No Conservation Features	5.9	5.9	6.0	8.3
Controls	13.1	13.1	7.4	12.3
Delamping	25.2	25.2	11.3	21.1
Controls and Delamping	17.2	17.2	17.9	23.4
Energy-Efficient Incandescent	7.7	7.7	6.6	8.8
No Conservation Features	9.6	9.6	8.2	9.3
Controls	14.1	14.1	14.5	21.9
Delamping	20.6	20.6	9.0	20.6
Controls and Delamping	20.7	20.7	12.8	14.2
High-Intensity Discharge	12.4	12.4	19.9	27.4
No Conservation Features	14.6	14.6	8.1	15.3
Controls	21.6	21.6	23.9	46.5
Delamping	28.6	28.6	17.2	21.1
Controls and Delamping	26.2	26.2	35.0	59.4

Sources: Floorspace from Energy Information Administration, Office of Energy Markets and End Use, Form EIA-871A, "Building Questionnaire" of the 1986 Nonresidential Buildings Energy Consumption Survey; Illuminance and efficacy derived from sources described in Appendices B and C. Lighting end-use intensity and energy measures are derived from illuminance and efficacy.

Table F13. Relative Standard Errors for Table D4

Building Characteristics	Floorspace, 1986 (million square feet)			Annual Lighting End-Use Intensity (kWh/square foot)		Annual Lighting Energy (billion kWh)
	Total	Total Lighted	Percent of Total Lighted	per Total Square Feet	per Total Lighted Square Feet	
All Buildings	3.0	3.2	3.2	3.3	3.2	4.8
Principal Activity						
Assembly	7.1	7.8	7.8	5.3	5.2	8.7
Education	7.0	7.2	7.2	4.2	4.2	8.5
Food Sales	14.4	15.0	15.0	7.5	7.1	14.7
Food Service	10.1	12.0	12.0	13.4	11.3	20.9
Health Care	17.4	18.2	18.2	4.5	4.7	16.8
Lodging	9.8	10.5	10.5	5.0	4.2	11.5
Mercantile/Service	7.0	7.1	7.1	3.4	2.6	7.7
Office	6.2	6.3	6.3	2.8	2.4	6.3
Public Order and Safety	18.5	19.6	19.6	21.3	21.3	34.3
Warehouse	8.6	10.1	10.1	6.4	5.1	10.4
Vacant	9.6	11.9	11.9	20.4	17.2	19.9
Other	16.7	17.8	17.8	8.2	7.6	17.8
Building Size (square feet)						
1,001 to 5,000	5.2	5.5	5.5	3.9	3.3	6.7
5,001 to 10,000	4.5	4.6	4.6	4.2	3.9	5.5
10,001 to 25,000	4.8	5.1	5.1	5.8	5.8	6.5
25,001 to 50,000	5.8	6.0	6.0	5.7	5.6	7.6
50,001 to 100,000	6.9	7.3	7.3	6.9	6.4	9.2
100,001 to 200,000	8.5	8.2	8.2	8.0	8.1	10.9
200,001 to 500,000	10.0	10.0	10.0	7.9	7.7	11.0
Over 500,000	15.1	16.0	16.0	15.3	13.9	22.6
Year Constructed						
Before 1920	9.0	9.7	9.7	10.9	8.9	12.6
1920-1945	6.3	7.3	7.3	9.8	9.4	13.1
1946-1959	7.7	7.7	7.7	7.6	6.9	8.8
1960-1969	6.2	6.4	6.4	5.2	5.2	8.3
1970-1979	5.7	6.2	6.2	6.8	6.7	8.3
1980-1986	8.3	9.0	9.0	9.6	9.3	14.6
Census Region						
Northeast	7.0	6.5	6.5	5.6	5.4	5.5
Midwest	5.1	5.7	5.7	6.8	6.2	9.2
South	5.5	6.0	6.0	6.9	6.1	10.0
West	9.6	9.2	9.2	7.3	7.6	9.6

Sources: Floorspace from Energy Information Administration, Office of Energy Markets and End Use, Form EIA-871A, "Building Questionnaire" of the 1986 Nonresidential Buildings Energy Consumption Survey; Illuminance and efficacy derived from sources described in Appendices B and C. Lighting end-use intensity and energy measures are derived from illuminance and efficacy.